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Health Care & Costs: How Treasury Loan Programs Impact California Hospitals

Introduction

The State of California has a vast network of healthcare organizations that operate hospitals. According to the United States Bureau of Labor Statistics (BLS, n.d.), over 1,500 healthcare-related facilities serve California's population of just over 39 million. BLS data also confirms that it has the largest number of healthcare facilities in the US. For clarity, this paper will define a "healthcare facility" as an organization that provides diagnosis, care, and inpatient services, in accordance with California Health and Safety Code Section 1250 (2024). In the US, high maintenance expenses and little profit margins burden healthcare facilities, especially in the non-profit sector (Ly & Cutler, 2018). These costs are associated with rising prices and healthcare consolidation, which reduces competition among providers.

Like challenges facing healthcare facilities nationwide, issues specific to California hospitals have persisted for the past two decades. A longitudinal study commissioned by the California Healthcare Foundation found that extreme financial variation existed between high and low-margin hospitals, with low-margin facilities, like non-profits, struggling to operate and meet the state's seismic upgrade requirements (2007). Among these non-profits were a collection of rural and city hospitals that struggled to borrow at rates vital for capital improvements. To

ease distressed facilities, the state launched the Distressed Hospital Loan Program, or DHLP, in 2023 (California Health Facilities Financing Authority, 2024), which diverted borrower-friendly loans from the state's general fund to needy applicants. Yet, these responses raise the question: Did the CA State Treasury's Loan Program improve outcomes for healthcare facilities during 2022 and 2024? To answer this question, this study launched a small-n Difference-in-Difference (DiD) assessment across 18 non-profit hospitals across the state. Ultimately, the results indicate that although loan recipients remained open and net income improved after receiving a loan, extensive periodic analysis is needed to assess future outcomes, as no direct correlation was confirmed between loans and positive net income compared to untreated hospitals.

Context & Significance

California has a history of enacting healthcare facility-oriented legislation. For instance, the state's passage of SB 1953 in 1994 for seismic or earthquake-ready upgrades is expected to cost hospitals a collective \$100 billion to reach the deadline by 2030 (California Healthcare Foundation, 2007). Political pressure is also compounded with external economic factors, like post-COVID revenue loss and rising fiscal burdens, like maintenance and upkeep.

Administrative costs like issuing bills, customer service, physician activities, and managerial hierarchies, despite making up only 25% of total hospital expenditure, reached \$600 billion to \$1 trillion of US medical expenditure (Chernew & Mintz, 2021). Essentially, hospitals in the US have an incredibly high expense margin, even for just a portion of total operations. Furthermore, in a report by the California Hospital Association, it was reported that total hospital expenditure across the state had ballooned to \$28.9 billion compared to \$6.2 billion on the eve of the COVID-19 outbreaks (2024). Economic tensions and routine recovery initiatives culminated in

2023, when a sizable subset of California hospitals began hemorrhaging money due to diminished patient retention, increasing administrative expenses, and rising labor costs.

To assist non-profit hospitals with retrofits and fiscal burdens, California legislators passed AB 112, which established the Distressed Hospital Loan Program. This legislation allowed the California State Treasury Office's California Health Facilities Financing Authority, or CHFFA, program to receive applications and offer loan terms to selected hospitals as late as 2032 (Distressed Hospital Loan Program, 2023). Further amendments increased the amount of awardable funds to \$300 million in total. After its passage, 16 hospitals with demonstrated needs, as determined through consultations involving revenue and patient utilization rates, were selected to receive millions of dollars in interest-free loan funding (Ibarra, 2024). Of these 16 facilities, 9 hospitals involved in this paper's study had their loans closed in 2023, while the other 7 were set to originate in 2024 and 2025.

Applicants have argued that access to credit is central to offering healthcare. For example, Madera Community Hospital in the San Joaquin Valley was the only general hospital in a county of 160,000, with the nearest other emergency rooms being 40 minutes away (Ibarra, 2024). Closures, especially in rural areas, are likely to affect services and place strain on other established facilities (Chatterjee, 2022). The sheer volume of potentially affected residents demonstrates the urgency of hospitals' demand for funds to operate. Ultimately, measuring the effectiveness of these loan programs is vital to ensuring the success of hospital programs throughout the state, as organizations have voiced that without access to credit, closure is imminent, and constituents will lose service provision as a result. Further evidence for these risks will be analyzed within the literature overview.

Literature Review

There is ample research describing the relationships between assets, net income, and loan-based credit programs in hospitals. To start, this paper must corroborate the studied correlation between financial health and credit availability. In a comprehensive peer-reviewed paper by Aghamolla, Karaca-Mandic, Li, and Thakor (2021), it was found that after credit shocks, where the supply of money is restricted, hospitals tend to conserve resources to increase profits and reduce service capacity, which decreases favorable patient outcomes. This lays the groundwork for the state's policy response: California hospitals applied for loans specifically to continue carrying out service provision due to demand, and also because they lacked the reserve funds to continue cutting valuable resources. However, the study by Agamolla et. al focused on private lines of credit, whereas this paper seeks to determine if hospitals are impacted by borrower-friendly or state-issued credit through loans.

Without additional capital through loans, hospitals may close, leading counties and constituents to lose important healthcare services. A study by Chatterjee, Lin, and Venkataramani (2022) at the national level asserted that hospital closures resulted in a statistically significant loss of medical personnel in rural communities. According to their analysis, economic decline in counties can negatively impact hospitals in rural areas, as a lack of financial support would in turn lead to eventual closure. Regarding urban closures, a study performed by Buchmueller, Jacobson, and Wold discovered a strong association between distance to a hospital and mortality rate (2006). With this inference in mind, it can be surmised that the risks of hospital closures have a lasting impact on the general populace, which can be remedied by keeping hospitals available to patients. Should state loans improve outcomes for distressed hospitals, it will inform

policy decisions that help reduce mortality rates and bolster healthcare provision across California.

In addition to credit availability, asset structure is also crucial to understanding how hospitals overcome financial hurdles. This paper will also utilize the study designed by Lee (2013) to frame its examination of California hospitals' financials. For instance, Lee's research infers that non-profits tend to emphasize asset preservation and stop investing during times of financial crises or extremely high operating costs. Research also suggested that for-profits were more readily able to reinvest by maximizing external funds from shareholders (Lee 2013). This implication corroborates previous literature, such as Aghamolla et. al's paper, because their findings also found that hospitals hold onto liquid assets when credit is unavailable. Since non-profits retain different asset structures, this paper will not control for profit-based hospitals. The full study will only utilize non-profits to assess the effectiveness of the loan programs, as those hospitals are demonstrated to have lower access to credit and thus were the only ones to receive state loans (California Health Facilities Financing Authority, 2025). With for-profits excluded from our control group entirely, this study will be able to narrow down a relationship between demand and financial assistance more coherently.

Finally, it will be vital to establish how hospitals with favorable financials impact outcomes for their primary beneficiaries: patients. A study by Akinleye, McNutt, Lazariu, and McLaughlin (2020) determined that improved patient outcomes and healthcare provision were strongly associated with a hospital's financial health. Since hospital performance was found to be correlated with better patient outcomes, the most marginal benefit to the general populace would be if a hospital were well-provisioned and had stable finances. The previous paper did not

include a variable for credit/loans or public financing, so this study can fill that research gap. The relationship between patients, demand, and finances then segues into this paper's theoretical explanations and central hypothesis.

Theory & Hypothesis

Building on the existing literature, a theoretical framework that articulates the primary drivers of capital demand in the hospital industry can be developed. As established research shows, the hospital industry is capital-intensive - especially for non-profits. Healthcare facilities invest in new technologies and capital to keep pace with the demand for services and the evolving needs of patient care (Lee, 2013). With demand in mind, a theory that explains this association is the notion that financial assistance encourages healthcare institutions to expand facilities and accumulate capital. This general theory is also corroborated by long-standing research by the US Institute of Medicine, which stated that available capital is paramount to purchasing new technologies, repairing deteriorated facilities, and acquiring new capital (*For-Profit Enterprise in Health Care*, 1986). Since there is an association between demand and acquisition, it can be reasonably determined that the causal mechanism driving hospitals to seek financial assistance is high expenditure from rising costs, which encourages hospitals to request more loans to expand facilities and balance finances.

Based on the theory that hospitals seek capital to expand and renovate older equipment, a hypothesis can be generated. To measure the extent to which the CA State Treasury's DHLP loan initiative was successful, this paper hypothesizes that, on average, healthcare facilities' net income increases after a state treasury loan is distributed compared to hospitals that did not receive one because the added funds help hospitals cover their balances and permit financial

recovery. Before significance testing, the null hypothesis states that there is no significant effect of loans on net income for hospitals compared to hospitals that did not receive a loan.

Alternatively, if there is an observable effect, a causal interpretation is possible. To assess the program's effectiveness, data were collected across recipients and applicants of DHLP, which will relate to this paper's research design.

Research Design

This paper's research will examine the relationship between the State Treasury's loan programs and the financial success of their recipients. Predictably, financial health was selected as the dependent variable because this study measures improved or diminished economic success. As a proxy for financial health, this paper utilized net income because it intuitively controls revenue and expenses. Additionally, if a hospital attracts more patients and reserves more capital for refinancing, it stands to reason that revenue will exceed expenditures. Values for net income are located on the California Department of Health Care Access and Information webpage (California Department of Health Care Access and Information, 2024), or HCAI. As a continuous variable, it was measured in precise dollar amounts and regressed against the DiD interaction term created from the treatment and control groups.

Next, a variable was created that consisted of the DiD interaction term for the control and treatment groups. The treatment group consisted of hospitals that received a loan in 2023, and the control group, vice versa. In essence, this meant that loan assignment or simply "loans" was the independent variable. This was measured by assigning recipients a categorical nominal dummy variable of "1" and control hospitals as "0." However, since hospitals received different loan amounts, a further control variable was added, which was the precise loan size, to account

for potential funding differences in the tens of millions that were based on each hospital's financial need. Loan data was pulled from the DHLF's 2023 allocations released after decisions were finalized (California Health Facilities Financing Authority, 2024).

Additional control variables consisted of net assets and county population to avoid possible omitted variable bias. Within the number of county residents is the population of likely patients, which could impact the magnitude of potential service and income. Population data for the years 2022, 2023, and 2024 were obtained from each county's census. For net assets, data were extracted from the HCAI database and entered as another numerical continuous variable to pair with net income. Net assets were important to account for, as excluding previously accumulated funds could lead to a biased estimate. For example, if higher assets and loan amounts are found to be negatively correlated, and loan amounts are generally associated with larger net income, then the exclusion of net assets would make the impact of the loan and DiD coefficient an underestimation. In addition to addressing potential omitted-variable bias, net assets implicitly control for hospitals' current liabilities and total assets because net assets equal total assets less total liabilities.

All 9 recipients were non-profits, so as not to affect the correlation between treatment and control, the control group also consists of non-profits. The control group of 9 hospitals was selected using two methods: by taking the hospitals that applied for a loan in 2024 - whose loans had not originated yet - and selecting three other "distressed" hospitals whose net incomes were decreasing in tandem with the additional control hospitals to help resolve self-selection bias. This produces the downward tendency in common DiD analysis, with a firm parallel trend. The reason only non-profits were selected for analysis is that for-profit hospitals have been

demonstrated to possess different asset structures and less financial leeway due to a lack of shareholders or profit-maximizing returns (Lee, 2013). So, by eliminating that subset, there is a decreased risk to the study that would have otherwise been present by including excessively high profits or assets. Furthermore, only non-profit and public hospitals were eligible for the DHLP, so the addition of for-profit hospitals would introduce unnecessary skewness or confound the variables.

Research Methods

To determine an existing relationship between treasury loans and fiscal outcomes, a Difference-in-Difference study was utilized to view the loan program's overall treatment effect. Using STATA statistical software, a parallel trends graph was mapped first to determine any visible associations between the treatment and control groups.

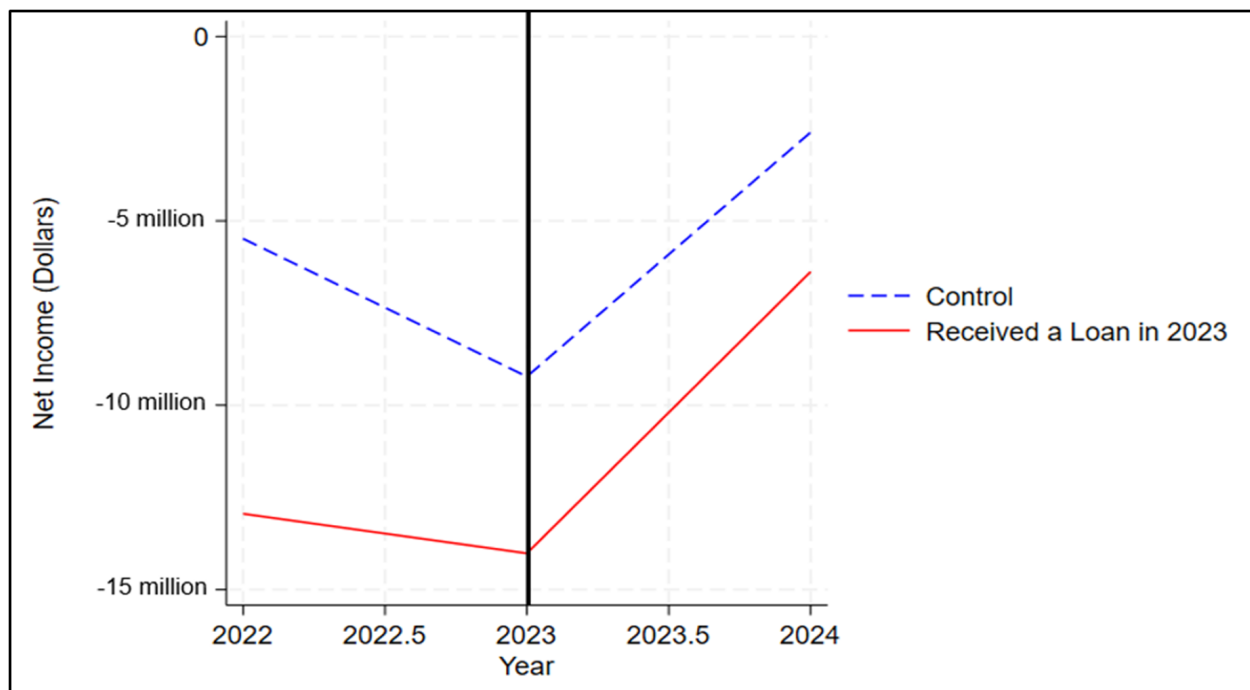


Figure 1: Parallel Trends Association Between Control and Treatment Groups

As displayed in Figure 1, there was a clear downward trend before 2023, and both groups experienced a considerable surge in net income, although it remained negative on average after the loans were disbursed, despite rising in the post-treatment period. After mapping the trend, a simple and robust ordinary least squares, or OLS, regression was performed to isolate the average treatment effect on the control and treatment groups.

Within the treatment group, every hospital was monitored by CHFFA and HCAI to ensure usage of loan proceeds (California Department of Health Care Access and Information, 2023), so there was no issue with potential non-compliance. Therefore, the average treatment effect was the same as the average effect of the treatment on the treated groups. With that discrepancy covered, a simple regression code was input into STATA with the robust feature to isolate the causal effect of the loan program.

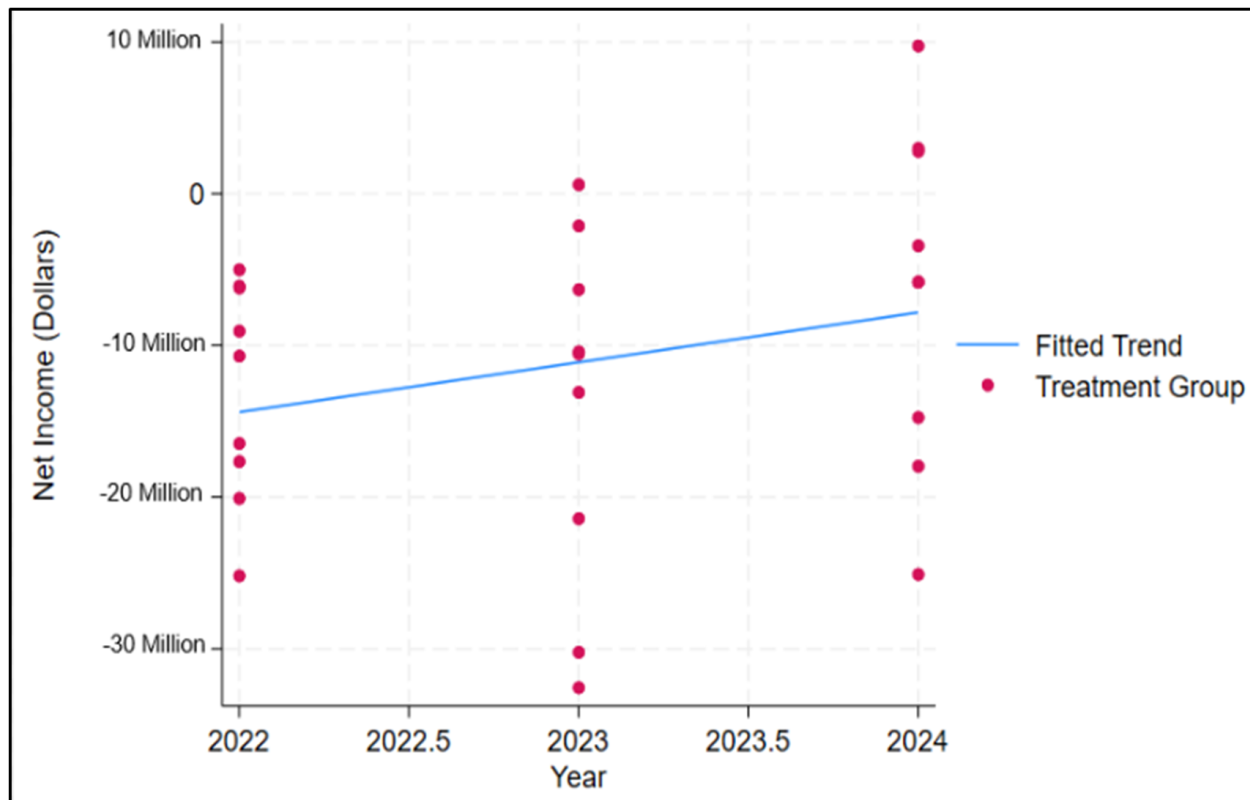


Figure 2: Positive Fitted Trend Line of Treatment Group

Immediately following the regression, it appeared that the output indicates a clear causal effect of loans, compared to the control group. According to the tabulated figure, or Table 1, loan treatment causes an increase of \$1,695,908.1 on average after the loans were disbursed. While this would appear as a resounding success for the loan program, further significance testing confounded the findings - especially with the presence of outliers.

Results

To make certain that the results were statistically significant, this study also utilized a T-test with STATA software. Showcased in bold is the p-value within the coded output figure.

VARIABLES	(1) NetIncome
NetIncome	. (.)
Treat	-4972579.500 (0.374)
Post	5538194.500 4745760.000 (0.505)
did	7061400.000 1695908.125 (0.857)
NetAssets	9357380.000 0.036 (0.582)
LoanAmt	0.065 -0.204 (0.463)
CountyPopulation	0.275 -0.553 (0.221)
Constant	0.446 -6794694.000 (0.142)
Observations	4551258.500 54
R-squared	0.114
Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1	

Table 1: OLS Regression Parameters and P-Values

According to the tabulated results, the effect of the treatment compared to the control was not statistically significant, with a p-value of 0.857, which is far above the generally accepted 0.05 or 5% significance level. So, with this initial significance test, this study was unable to reject the null hypothesis that the loan treatment had no direct impact on net income for hospitals that received a loan compared to those that did not receive one.

However, when assessing the magnitude of the DiD estimates, there are further implications for the exact extent to which loans assisted hospitals. Using a manual calculation, the difference in the treatment was approximately \$2,300,000, which still confirms an overall positive difference but would still be considered statistically insignificant based on the generated p-value. So, the extent of this positive rise will be assessed next at the individual level.

	Pre	Post	Mean	se	t	p-value
Net Income (\$)	-1.35e+07	-6378086.0	-7102527.0	4092989.81	-1.74	0.0475
Observations	27	0	0			

Table 2: T-Test for Treatment Group: Pre vs. Post

Despite the outcome, had the study been performed only on the treatment group, it would stand to reason that loans have had a relatively large effect on net income. The difference between the averages of Post and Pre-period treatments was \$7,121,914, further suggesting an overwhelming positive increase in net income for loan recipients. A significance test run on the treatment group compared the average net incomes before and after the treatment period, which generated a p-value of 0.0475. Using a one-tailed test with a significance level of 5%, this would reject the initial null hypothesis and corroborate the alternative hypothesis that loans do increase net income for loan recipients. The reason a one-tailed test works in this case is that the

alternative hypothesis states that loans would increase net income for hospitals that enrolled in the loan program, rather than have an overall effect. Even though this would give credence to the effectiveness of the loan program, there is still a possibility that the outcome is a false positive precisely because the DiD coefficient had an 85.7% chance of being a random occurrence.

In addition to performing a one-sided test on the treatment group, a t-test was also designated for the control group to compare significance levels.

	Pre	Post	Mean	se	t	p-value
Net Income (\$)	-7353207.39	-2597515.78	-4755691.61	7115403.96	-0.67	0.2550
Observations	27					

Table 3: T-Test for Treatment Group: Pre vs. Post

As shown in Table 3, the significance test returned a p-value of 0.2550, which is statistically insignificant compared to the treatment's stronger one-tailed test. It can reasonably be inferred that the control group's effect was either due to internal noise in the model or other external factors, indicating that the criteria for control group selection were not as firm as first assumed.

Implications

Overall, the findings and supplemental significance tests suggest that the treatment group did experience a statistically significant positive increase in net income after the treatment. When compared to the control group, however, there was insufficient evidence to determine whether receiving a loan improved financial outcomes compared to hospitals that did not.

Yet, this study does not suggest that state treasury loans are wholly ineffective at assisting hospitals in overcoming financial burdens. California's legislators should continue monitoring and supporting hospitals. For instance, Watsonville Community Hospital, which received a loan

in the treatment group, emerged from bankruptcy after the established treatment period (Ojeda, 2024). None of the hospitals in the treatment group closed after the program, giving further possible credence to the program's success.

Limitations

This study encountered several limitations that likely contributed to the conflicting results. Firstly, as a pilot program, the State Treasury's DHLP initiative only had 9 applicants with a disbursed loan in the treatment period of 2023. This small sample size was a likely hindrance to the statistical analysis. Furthermore, since hospitals had little audited fiscal data available for 2025, the length of the study was hindered because there were only three consecutive fiscal years to analyze from 2022 to 2024. Self-selection bias cannot be understated either, as hospitals with less net income were more likely to apply for need-based state loans. Hospitals with similar financials or with severe underperformance would have been liable to close or would have automatically been considered for the DHLP.

However, this study's research question is open for contributions. Alternatively, future studies could quantify quarterly data rather than annual data. This change could lead to more variation in net income amounts and may yield more statistically significant results due to a larger timeframe and thus more data points. More valuable results could be achieved by utilizing a stricter criterion for the control group, as decreasing net income and future loan eligibility may not be the only indicator for a hospital's financial distress. Other comprehensive controls could be included in the regression analysis, such as inpatient bed utilization or other sources of financial support, like grants and insurance payments, that may have influenced the initial parallel trends relationship.

Conclusion

This paper's assessment of the DHLP discovered minor issues in the research design in tandem with notable correlations between hospitals' financial outcomes and loan issuance. Issues included a small sample size and the length of the testing period, but significant patterns were uncovered that warrant future study. This contains the large isolated improvement of the treatment group directly after 2023, despite an initially insignificant DiD parameter.

Even though the data itself is not particularly representative of a prevailing effect, that does not mean California's efforts to support hospitals are ineffective. There was still a statistically significant improvement for hospitals in the treatment group and an overall increase in net income on average for hospitals that received a loan, despite the exact traces being unconfirmed. In 2025, all distressed hospitals involved in the study that received a loan are still in operation, which may be an indicator of relative success. Other unexplored sources of hospital income, such as insurance payments and state grants, may explain net income growth across both control and treatment groups. As a policy provision, the state of California should continue presiding over these hospitals' income and monitor them closely to ensure the best financial outcomes for its administration and their clients, in addition to continuing to provide need-based financial assistance.

References

- 2024 California Code :: Health and Safety Code - HSC :: DIVISION 2 - LICENSING*
- PROVISIONS :: CHAPTER 2 - Health Facilities :: ARTICLE 1 - General :: Section 1250.* (2024). Justia Law.
- <https://law.justia.com/codes/california/code-hsc/division-2/chapter-2/article-1/section-1250/>
- Aghamolla, C., Karaca-Mandic, P., Li, X., & Thakor, R. T. (2024). Merchants of Death: The Effect of Credit Supply Shocks on Hospital Outcomes. *American Economic Review*, *114*(11), 3623–3668. <https://doi.org/10.1257/aer.20221705>
- Akinleye, D. D., McNutt, L.-A., Lazariu, V., & McLaughlin, C. C. (2020). Correlation between hospital finances and quality and safety of patient care. *PLoS One*, *14*(8).
- <https://doi.org/10.1371/journal.pone.0219124>
- Buchmueller, T. C., Jacobson, M., & Wold, C. (2006). How far to the hospital?: The effect of hospital closures on access to care. *Journal of Health Economics*, *25*(4), 740–761.
- <https://doi.org/10.1016/j.jhealeco.2005.10.006>
- California Department of Health Care Access and Information. (2023, December 18). *Distressed Hospital Loan Program - HCAI*. HCAI.
- <https://hcai.ca.gov/facilities/health-facility-financing/distressed-hospital-loan-program/>
- California Department of Health Care Access and Information. (2024). *SIERA - HCAI*. Ca.gov.
- <https://reports.siera.hcai.ca.gov/>

California Health Facilities Financing Authority. (2025). *California Health Facilities Financing Authority Distressed Hospital Loan Program*.

<https://www.treasurer.ca.gov/chffa/meeting/2025/0626/staff/3-dhlp-update-june2025.pdf>

California Hospital Association. (n.d.). *Current State of California Hospital Finances* (Kaufman Hall & Associates LLC, Ed.). California Hospital Association.

<https://calhospital.org/file/kaufman-hall-report-2024/>

Distressed Hospital Loan Program, Assembly Bill No. 112, California State Assembly, LegiScan (2023). <https://legiscan.com/CA/text/AB112/id/2809108>

Chatterjee, P. (2022). Causes and consequences of rural hospital closures. *Journal of Hospital Medicine*, 17(11). <https://doi.org/10.1002/jhm.12973>

Chatterjee, P., Lin, Y., & Venkataramani, A. S. (2022). Changes in economic outcomes before and after rural hospital closures in the United States: A difference-in-differences study. *Health Services Research*, 57(5), 1020–1028. <https://doi.org/10.1111/1475-6773.13988>

Chernew, M., & Mintz, H. (2021). Administrative expenses in the US health care system: Why so high? *JAMA*, 326(17), 1679–1680. <https://doi.org/10.1001/jama.2021.17318>

Lee, J. (2013). Trends in asset structure of California hospitals during financial crisis. *Journal of Hospital Administration*, 2(3). <https://doi.org/10.5430/jha.v2n3p126>

Ly, D. P., & Cutler, D. M. (2018). Factors of U.S. Hospitals Associated with Improved Profit Margins: An Observational Study. *Journal of General Internal Medicine*, 33(7), 1020–1027. <https://doi.org/10.1007/s11606-018-4347-4>

Number of hospitals and hospital employment in each state in 2019: The Economics Daily: U.S. Bureau of Labor Statistics. (n.d.). [Www.bls.gov](http://www.bls.gov).

<https://www.bls.gov/opub/ted/2020/number-of-hospitals-and-hospital-employment-in-each-state-in-2019.htm>

Pricewaterhouse Coopers LLC. (2007). *The Financial Health of California Hospitals*. California Healthcare Foundation.

<https://www.chcf.org/wp-content/uploads/2017/12/PDF-HospitalFinancialHealthFullReport.pdf>