

## ECON 470: Preliminary Analysis

What is the effect of hospital profit status on hospital prices?

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## I. Motivation

Individuals and families have a tremendous burden from healthcare costs, and hospital prices are a significant contributor to these costs. Understanding the factors that determine hospital prices can assist policymakers in plans to reduce costs and improve access to care. Whether a hospital’s profit status affects its prices has been researched prior, with mixed results, and further investigation into this relationship is an important topic to consider in today’s healthcare landscape (Devereaux, 2004). Non-profit hospitals are healthcare establishments that do not collect their profits and are tax-exempt. These hospitals are often philanthropic organizations that provide affordable and accessible healthcare to their community, and their profits are reinvested in the hospital or its community benefit activities. Conversely, for-profit hospitals are managed as a business to produce profit for their owners or shareholders. These hospitals practice profit maximization, are owned by private firms or investor groups, and use technological investments to draw patients.

Hospital pricing is a challenging issue, and many hospitals lack transparency in their pricing methods. Examining the link between hospital profit status and prices, we can gain a better understanding of how hospitals set prices and whether there are disparities in pricing between for-profit and non-profit hospitals. In the past ten years, a rising number of hospitals have made the switch from non-profit to for-profit status, and it is imperative to comprehend the effects of these changes on healthcare costs and accessibility. Researchers discovered that after assuming the for-profit status, converted hospitals increased their financial income-revenue margins (Joynt, et al., 2014). This follows concerns that for-profit hospitals charge more for services to increase profits while providing unchanged patient care (Bai, 2015). High hospital costs can have serious consequences, including increased healthcare spending and decreased access to healthcare services.

Policymakers could promote increased price accountability and transparency as an effective strategy to address the issue of hospital price discrepancies, and simultaneously ensure that non-profit hospitals use appropriate financial practices. Non-profit hospitals should be obligated to disclose additional information about their operational expenditures, including salaries, service costs, and the volume of charitable donations given. This would make it easier for the general public to assess whether nonprofit hospitals are meeting their duties to provide community benefits. Non-profit hospitals should risk losing their tax-exempt status if they are determined to not fulfill their community benefit duties, as determined by government audits. Establishing accountability and transparency may aid in reducing the price discrepancies between for-profit and nonprofit hospitals.

Making hospital prices more open and widely accessible to the general public could promote competition by increasing pressure on hospitals to lower their prices to remain competitive. By implementing these policy solutions, policymakers and healthcare professionals can develop effective strategies to address hospital price discrepancies between hospitals of different profit statuses, and ensure equitable access to healthcare services.

## II. Data

To address this question, I used data from the Healthcare Cost Report Information System (HCRIS) combined with data from the Centers for Medicare & Medicaid Services (CMS) Provider of Services (POS) files. The HCRIS is a database maintained by the CMS in the United States, and contains financial and operational information on healthcare providers who participate in Medicare, Medicaid, and other CMS programs. The information in HCRIS comes from annual cost reports submitted by healthcare providers to the CMS. In the HCRIS data, I used its information on hospital providers' total beds, total charges, total operating expenses, in-patient charges, ICU charges, and ancillary charges. The POS files contain information on healthcare providers who participate in Medicare and Medicaid programs, including hospitals, skilled nursing facilities, home health agencies, and hospices. The files also provide information on their type of ownership, including the following: Non-profit Church, Non-profit Private, Non-profit Other, Profit, and Physician Owned. In these initial data sources, I selected data from all years available.

From these raw sources, I cleaned each individual dataset of duplicate reports, blank values, and negative values, only selecting for providers classified as hospitals, and only selecting for providers with non-profit and for-profit ownership types (mentioned above). I merged the HCRIS and POS datasets by the providers' National Provider Identifier number and year to create the final dataset. I added a "price" column to this dataset, using the following equation:

$$\text{price} = ((\text{ip\_charges} + \text{icu\_charges} + \text{ancillary\_charges}) * (1 - \text{tot\_discounts}/\text{tot\_charges}) - \text{tot\_mcare\_payment}) / (\text{tot\_discharges} - \text{mcare\_discharges})$$

The equation was found in the class website, M1.1: HCRIS Data under presentation slide "Estimating Hospital Prices". These steps provided me with a dataset of U.S hospitals from 1997-2018 I could group by Non-Profit (non-profit church, non-profit private, non-profit other) and For-Profit (profit, physician owned) status, and compare their average price.

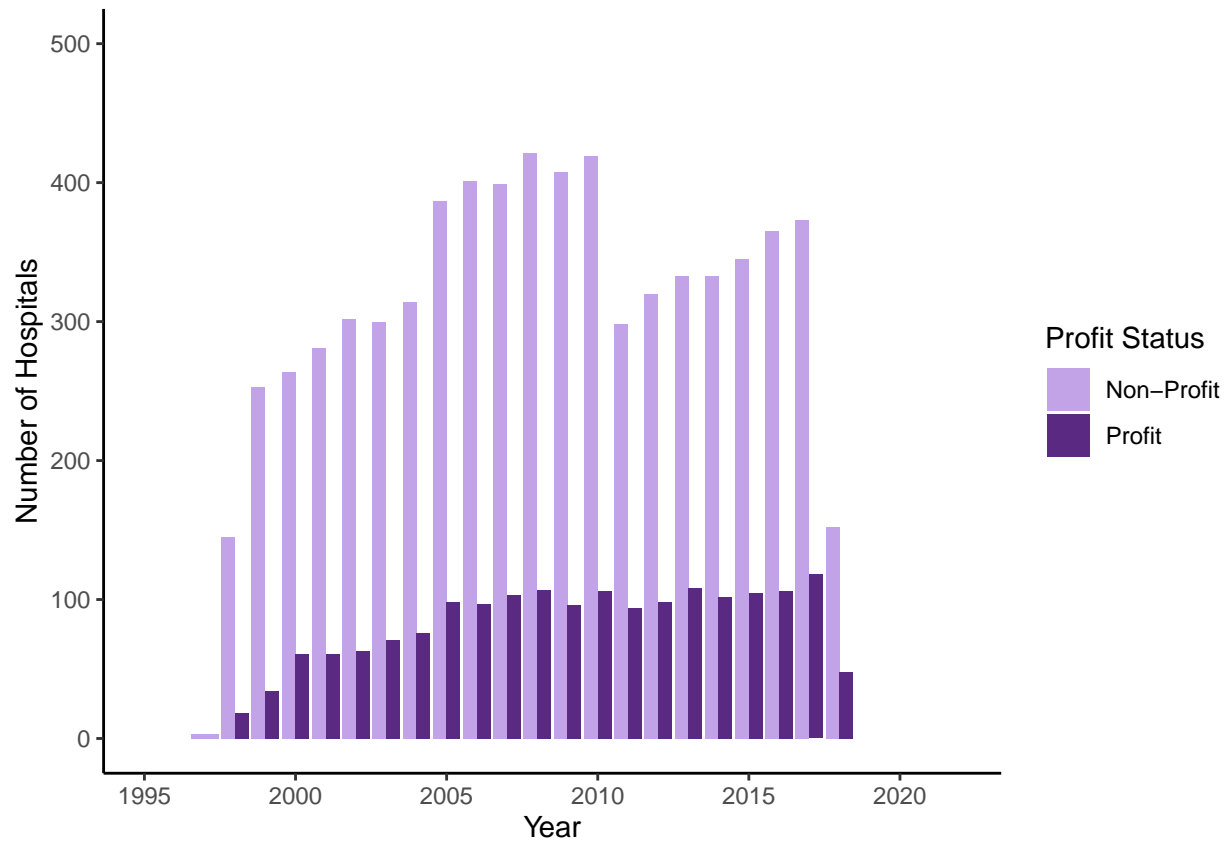


Figure 1: Distribution of Hospitals, by Profit Status, Over Time

Figure 1 demonstrates the increasing trend of hospitals being classified as for-profit entities. This trend has been observed over the past few decades, with more and more hospitals converting from non-profit to for-profit status. This is relevant as literature explains for-profit titles are increasingly popular as these hospitals tend to charge higher prices for their services.

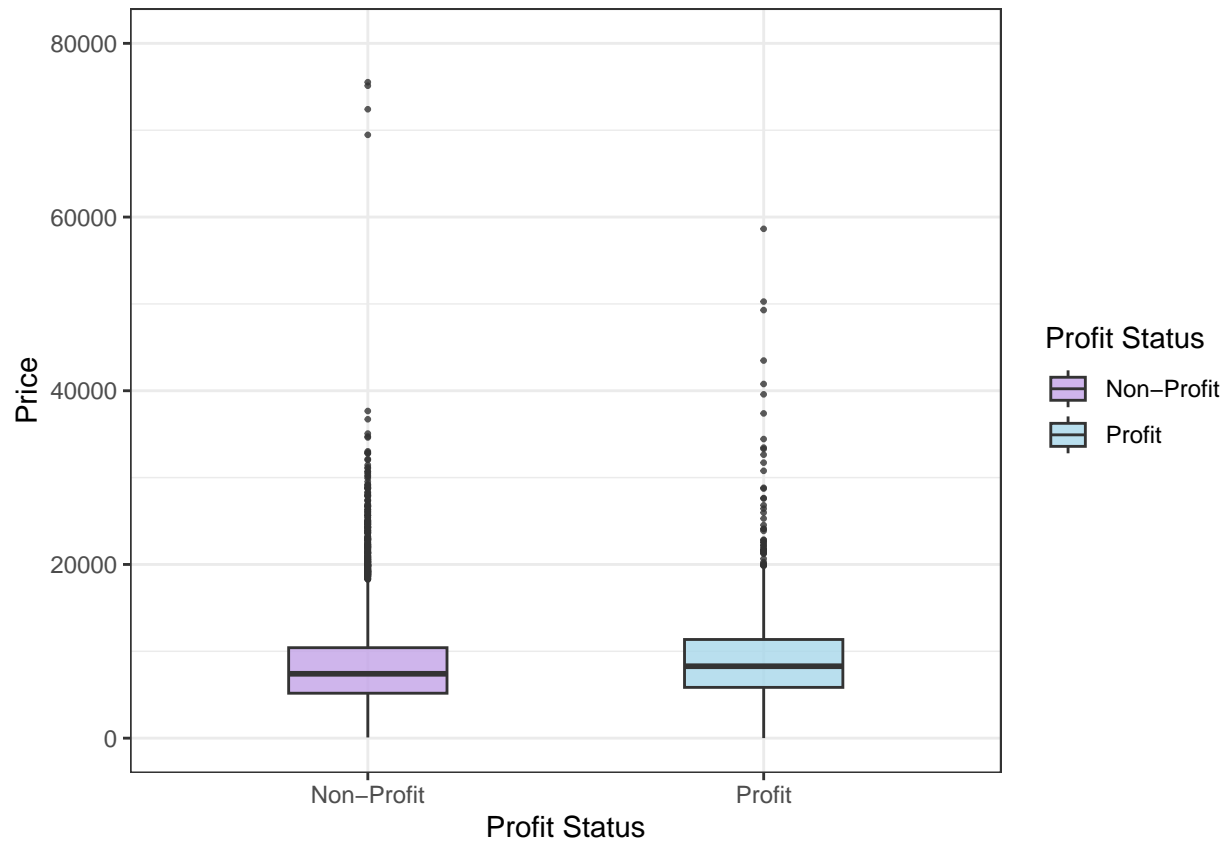


Figure 2: Hospital Prices by Profit Status

Figure 2 compares the distribution of hospital prices between for-profit and non-profit hospitals. This can provide a clearer picture of the differences in price distribution between the two groups, as the mean price seems similar yet the non-profit hospitals appear to have a greater price range, with outliers approaching 80,000 USD for an average hospital price.

Table 1. Average Price, Beds, and Operating Expenses by Hospital Profit Status

Profit Status	Price	Beds	Operating Expense
Non-Profit	8458	264	211007365
Profit	9812	218	124796095

Table 1 compares average hospital price, number of beds, and total operating expense between hospitals of different profit statuses. This comparison was intended to help identify other factors that may be driving the price differences between for-profit and non-profit hospitals. While it appears that non-profit hospitals have, on average, 1.69x higher total operating expenses, their average prices are lower than those of for-profit hospitals.

Table 2. Average Hospital Price by Ownership Type

	Hospital Type	Price
Non-Profit Church	01	8427.87
Non-Profit Private	02	8620.66
Non-Profit Other	03	8176.40
For-Profit	04	9813.19
For-Profit Physician-Owned	09	9463.48

Table 2 compares the average hospital price by the ungrouped Non-Profit and For-Profit hospitals investigated. It demonstrates if different types of hospital ownerships were more of the driving force of price differences among the grouped price averages. The highest price discrepancy found was between the Non-Profit Other and For-Profit Physician-Owned hospitals.

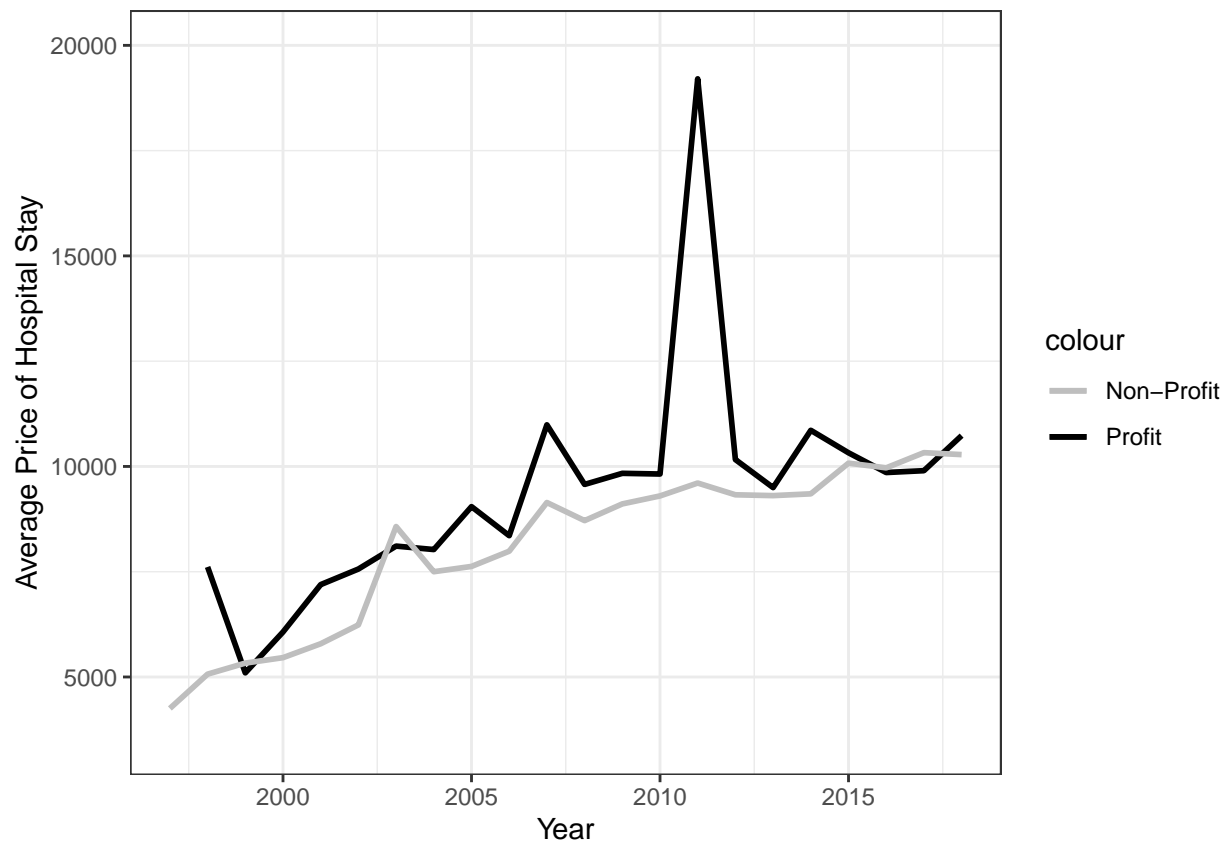


Figure 3: Hospital Prices by Profit Status, Over Time

Figure 3, as a time series line chart, shows the trends in hospital prices between 1997-2018, with separate lines for for-profit and non-profit hospitals. This can help identify if the price differences between the two groups are increasing, decreasing, or staying constant over time. While both Non-Profit and Profit prices increased over time, there was a spike in the profit hospital groups' average price in 2011.

Table 3. Proportion of Service Charges and Operating Expenses Relative to Total Charges

Profit Status	In Patient	ICU	Ancillary	Operating Expenses
Non-Profit	0.12	0.05	0.37	0.33
Profit	0.09	0.04	0.47	0.22

Table 3 shows the breakdown of hospital charges by type of service (inpatient, ICU, ancillary) and operating expenses, relative to total charges. These proportions can help provide some insight into the nature of a hospital's patient population and the complexity of the care provided. Non-Profit hospitals seem to have a greater emphasis on operating expenses, while for-profit hospitals have a higher percent of their total charges come from ancillary care.

## References

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