



Module 1: Hospital Pricing and Selection on Observables

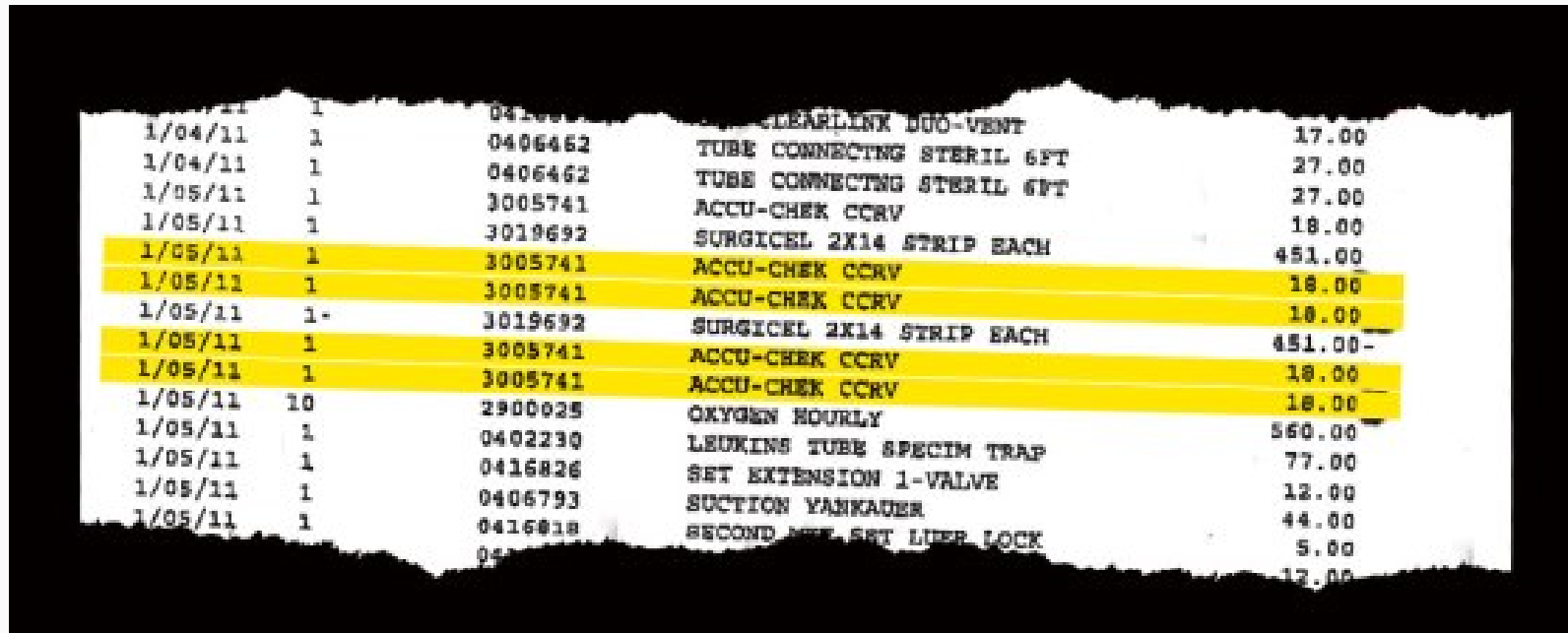
Part 1: HCRIS Data

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Econ 470 & HLTH 470

What is a hospital price?

Defining characteristic of hospital services: *it's complicated!*



| | | | | |
|---------|----|---------|----------------------------|--------|
| 1/04/11 | 1 | 0416826 | CLEARLINK DUO-VENT | 17.00 |
| 1/04/11 | 1 | 0406462 | TUBE CONNECTING STERIL 6FT | 27.00 |
| 1/04/11 | 1 | 0406462 | TUBE CONNECTING STERIL 6FT | 27.00 |
| 1/05/11 | 1 | 3005741 | ACCU-CHEK CCRV | 18.00 |
| 1/05/11 | 1 | 3019692 | SURGICAL 2X14 STRIP EACH | 451.00 |
| 1/05/11 | 1 | 3005741 | ACCU-CHEK CCRV | 18.00 |
| 1/05/11 | 1 | 3005741 | ACCU-CHEK CCRV | 18.00 |
| 1/05/11 | 1- | 3019692 | SURGICAL 2X14 STRIP EACH | 451.00 |
| 1/05/11 | 1 | 3005741 | ACCU-CHEK CCRV | 18.00 |
| 1/05/11 | 1 | 3005741 | ACCU-CHEK CCRV | 18.00 |
| 1/05/11 | 10 | 2900025 | OXYGEN HOURLY | 560.00 |
| 1/05/11 | 1 | 0402230 | LEUKINS TUBE SPECIM TRAP | 77.00 |
| 1/05/11 | 1 | 0416826 | SET EXTENSION 1-VALVE | 12.00 |
| 1/05/11 | 1 | 0406793 | SUCTION YANKAER | 44.00 |
| 1/05/11 | 1 | 0416818 | SECOND SET LUER LOCK | 5.00 |
| | | 0416818 | | 12.00 |

Brill, Steven. 2013. "Bitter Pill: Why Medical Bills are Killing Us." *Time Magazine*.

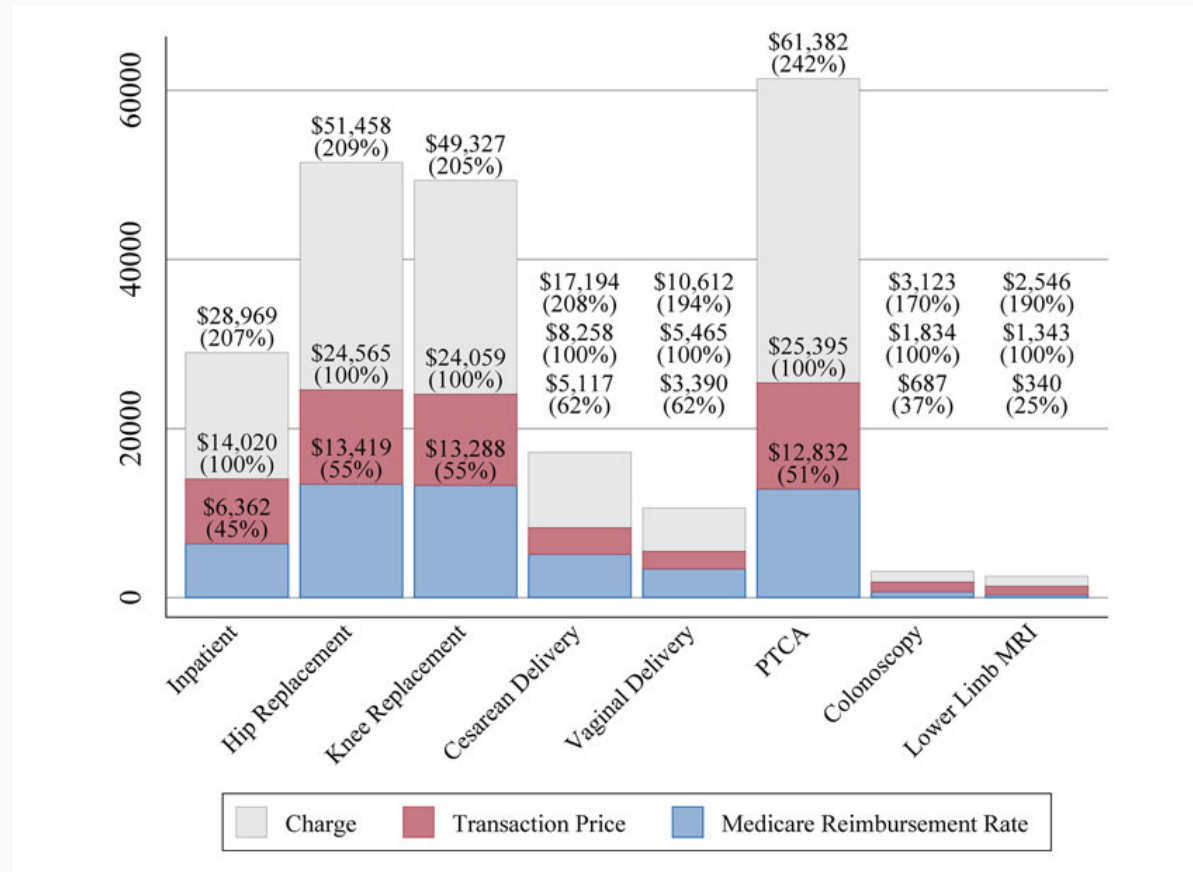
What is a hospital price?

Lots of different payers paying lots of different prices:

- Medicare fee-for-service prices
- Medicaid payments
- Private insurance negotiations (including Medicare Advantage)
- But what about the price to patients?

Price \neq charge \neq cost \neq patient out-of-pocket spending

What is a hospital price?



Source: Health Care Pricing Project

What is a hospital price?

Not clear what exactly is negotiated...

Fee-for-service

- price per procedure
- percentage of charges
- markup over Medicare rates

Capitation

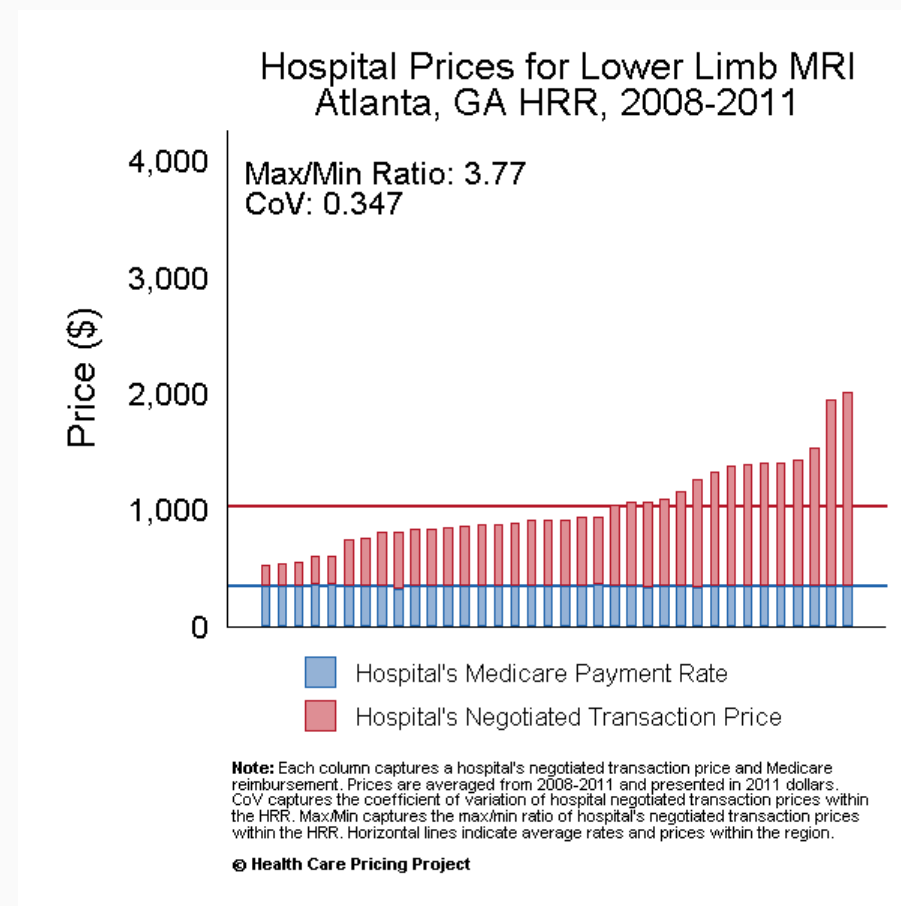
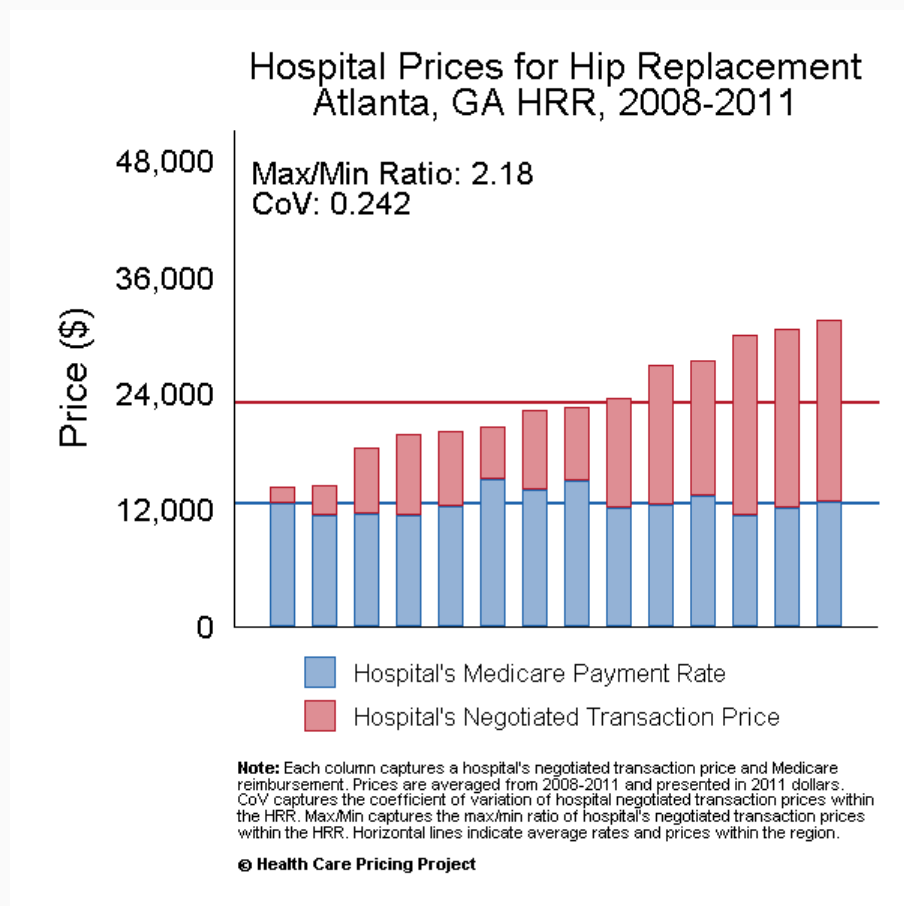
- payment per patient
- pay-for-performance
- shared savings

Hospital prices in real life

A few empirical facts:

1. Hospital services are expensive
2. Prices vary dramatically across different areas
3. Lack of competition is a major reason for high prices

Hospital prices in real life



Understanding HCRIS Data

What is HCRIS?

Healthcare Cost Report Information System ('cost reports')

- Nursing Homes (SNFs)
- Hospice
- Home Health Agencies
- Hospitals

Hospital Cost Reports

10-12

FORM CMS-2552-10

4090 (Cont.)

STATEMENT OF PATIENT REVENUES
AND OPERATING EXPENSES

PROVIDER CCN:

PERIOD:
FROM _____
TO _____

WORKSHEET G-2,
PARTS I & II

PART I - PATIENT REVENUES

| REVENUE CENTER | | INPATIENT | OUTPATIENT | TOTAL | |
|--|--|-----------|------------|-------|----|
| | | 1 | 2 | 3 | |
| GENERAL INPATIENT ROUTINE CARE SERVICES | | | | | |
| 1 | Hospital | | | | 1 |
| 2 | Subprovider IPF | | | | 2 |
| 3 | Subprovider IRF | | | | 3 |
| 4 | Subprovider (Other) | | | | 4 |
| 5 | Swing bed - SNF | | | | 5 |
| 6 | Swing bed - NF | | | | 6 |
| 7 | Skilled nursing facility | | | | 7 |
| 8 | Nursing facility | | | | 8 |
| 9 | Other long term care | | | | 9 |
| 10 | Total general inpatient care services (sum of lines 1-9) | | | | 10 |
| INTENSIVE CARE TYPE INPATIENT HOSPITAL SERVICES | | | | | |
| 11 | Intensive care unit | | | | 11 |
| 12 | Coronary care unit | | | | 12 |
| 13 | Burn intensive care unit | | | | 13 |
| 14 | Surgical intensive care unit | | | | 14 |
| 15 | Other special care (specify) | | | | 15 |
| 16 | Total intensive care type inpatient hospital services (sum of lines 11-15) | | | | 16 |
| 17 | Total inpatient routine care services (sum of lines 10 and 16) | | | | 17 |
| 18 | Ancillary services | | | | 18 |
| 19 | Outpatient services | | | | 19 |
| 20 | Rural Health Clinic (RHC) | | | | 20 |
| 21 | Federally Qualified Health Center (FQHC) | | | | 21 |
| 22 | Home health agency | | | | 22 |

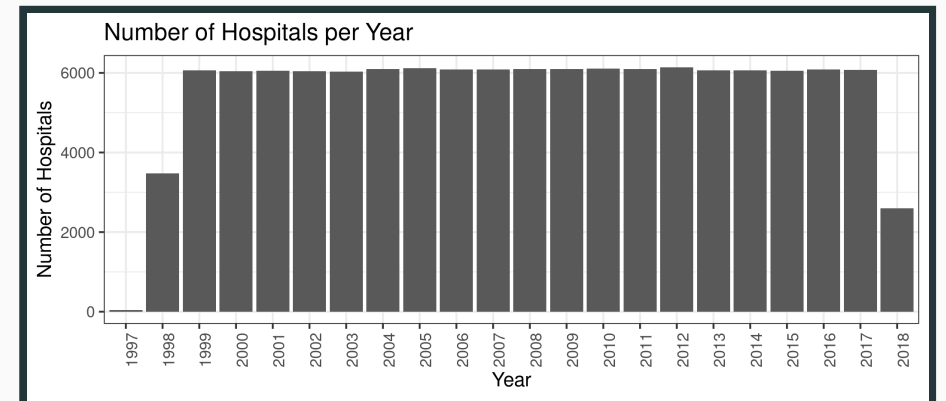
The Data

Let's work with the [HCRIS GitHub repository](#). But forming the dataset is up to you this time.

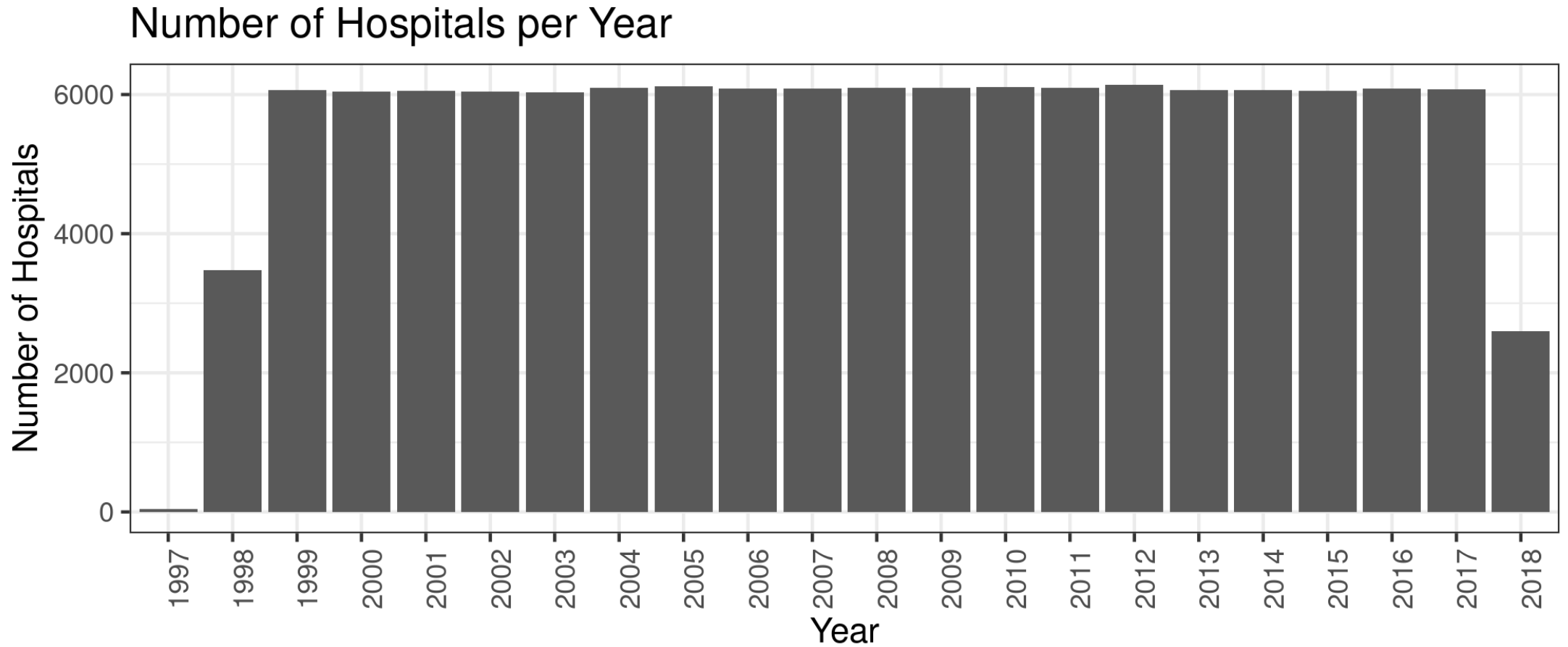


The Data

```
hcris.data %>%  
  ggplot(aes(x=as.factor(year))) +  
  geom_bar() +  
  labs(  
    x="Year",  
    y="Number of Hospitals",  
    title="Number of Hospitals per Year"  
  ) + theme_bw() +  
  theme(axis.text.x = element_text(angle = 90, hjust=1))
```



Number of hospitals

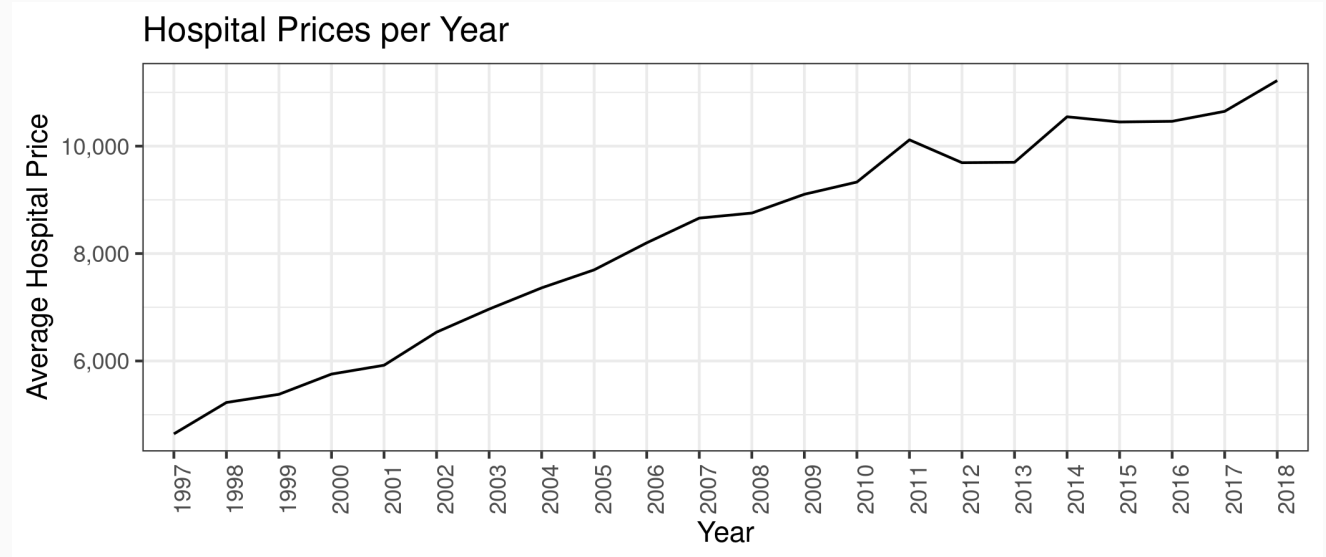


Estimating hospital prices

```
hcris.data ← hcris.data %>%  
  mutate( discount_factor = 1-tot_discounts/tot_charges,  
          price_num = (ip_charges + icu_charges + ancillary_charges)*discount_factor - tot_mcare_payment,  
          price_denom = tot_discharges - mcare_discharges,  
          price = price_num/price_denom)
```

Estimating hospital prices

```
hcris.data %>% group_by(year) %>%  
  filter(price_denom>10, !is.na(price_denom),  
         price_num>0, !is.na(price_num)) %>%  
  select(price, year) %>%  
  summarize(mean_price=mean(price, na.rm=TRUE))  
ggplot(aes(x=as.factor(year), y=mean_price))  
geom_line(aes(group=1)) +  
labs(  
  x="Year",  
  y="Average Hospital Price",  
  title="Hospital Prices per Year"  
) + scale_y_continuous(labels=comma) +  
theme_bw() + theme(axis.text.x = element_te
```



Estimating hospital prices

```
hcris.data %>% group_by(year) %>%  
  filter(price_denom>100, !is.na(price_denom)  
         price_num>0, !is.na(price_num),  
         price<100000) %>%  
  select(price, year) %>%  
  summarize(mean_price=mean(price, na.rm=TRUE)  
ggplot(aes(x=as.factor(year), y=mean_price)  
geom_line(aes(group=1)) +  
labs(  
  x="Year",  
  y="Average Hospital Price",  
  title="Hospital Prices per Year"  
) + scale_y_continuous(labels=comma) +  
theme_bw() + theme(axis.text.x = element_te
```

