REPORT

2024-06-01

Summary Statistics

	year	sd_hospital_beds	sd_paid_employees	sd_non_paid_employees	sd_total_cost	sd_total_revenue	sd_medicare_days	sd_medicaid_days	sd_total_discharge	sd_medicare_discharge	sd_medicaid_discharge
Sd	2011	560.8998	1615.797	72.58805	304570722	223339811	19214.29	9207.699	10898.600	10898.600	1757.158
Sd1	2012	579.8366	1961.637	81.29861	294143536	321273114	19765.74	9340.373	10994.170	10994.170	1740.423
n1	2011	566796.000	1853439.150	1199.19000	326394348921	344203010215	25092003.78	7866979.000	14238489.000	14238489.000	1674607.000
n2	2012	574620.000	2259049.058	1343.09280	327490734507	350717045576	25938976.38	8054865.540	14478325.000	14478325.000	1677082.000
mean1	2011	376.6086	1237.276	39.97300	216873322	228706319	16739.16	5301.199	9492.326	9492.326	1130.727
mean2	2012	376.8000	1491.121	44.76976	214748022	229978391	17110.14	5366.333	9544.051	9544.051	1119.547

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2011	560.8998	1615.797	72.58805	304570722	223339811	19214.29	9207.699	10898.600	10898.600	1757.158
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2011	566796.000	1853439.150	1199.19000	326394348921	344203010215	25092003.78	7866979.000	14238489.000	14238489.000	1674607.000
2012	574620.000	2259049.058	1343.09280	327490734507	350717045576	25938976.38	8054865.540	14478325.000	14478325.000	1677082.000
2011	376.6086	1237.276	39.97300	216873322	228706319	16739.16	5301.199	9492.326	9492.326	1130.727
2012	376.8000	1491.121	44.76976	214748022	229978391	17110.14	5366.333	9544.051	9544.051	1119.547

Characteristics	X2011_N	X2011_Mean	X2011_Std_Dev	X2012_N	X2012_Mean	X2012_Std_Dev
Hospital beds	5.667960e+05	3.766086e+02	560.89980	5.746200e+05	3.768000e+02	579.83660
Number of paid Employee	1.853439e+06	1.237276e+03	1615.79700	2.259049e+06	1.491121e+03	1961.63700
Number of non-paid Employee	1.199190e+03	3.997300e+01	72.58805	1.343093e+03	4.476976e+01	81.29861
Total hospital cost	3.263943e+11	2.168733e+08	NA	3.274907e+11	2.147480e+08	NA
Total hospital revenues	3.442030e+11	2.287063e+08	NA	3.507170e+11	2.299784e+08	NA
Available Medicare days	2.509200e+07	1.673916e+04	19214.29000	2.593898e+07	1.711014e+04	19765.74000
Available Medicaid days	7.866979e+06	5.301199e+03	9207.69900	8.054866e+06	5.366333e+03	9340.37300
Total Hospital Discharge	1.423849e+07	9.492326e+03	10898.60000	1.447832e+07	9.544051e+03	10994.17000
Medicare discharge	1.423849e+07	9.492326e+03	10898.60000	1.447832e+07	9.544051e+03	10994.17000
Medicaid discharge	1.674607e+06	1.130727e+03	1757.15800	1.677082e+06	1.119547e+03	1740.42300

Exercise 2

Performing t.test of exercise 1

Statistic	P_Value
hospital_beds	0.0000
total_hospital_employees_on_payr	0.0000
total_hospital_non_paid_workers	0.1409
total_hosp_cost	0.0000
total_hosp_revenue	0.0000
total_hospital_medicare_days	0.0000
total_hospital_medicaid_days	0.0000
total_hospital_discharges	0.0000
total_hospital_medicare_discharg	0.0000
total_hospital_medicaid_discharg	0.0000

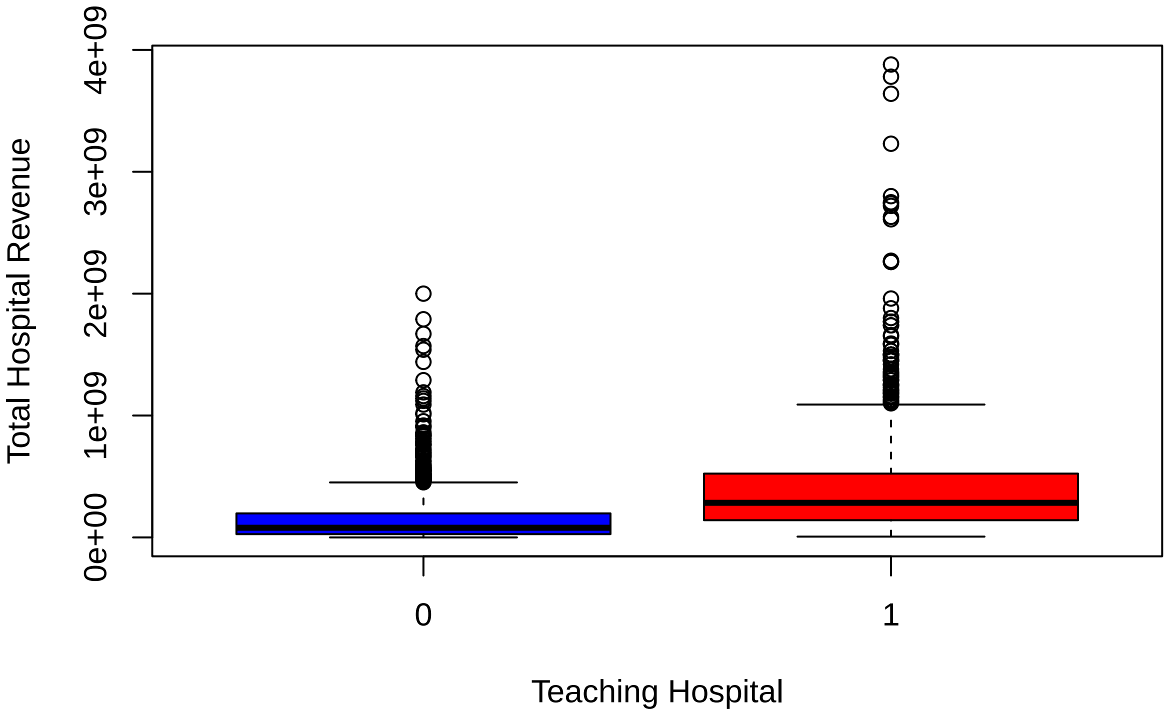
Comparing hospital net-benefit which hospitals has better performance? To answer this question first compute the hospital net benefits with subtracting hospital costs and revenues and then use ttest to compare the significant differences between teaching and non-teaching hospitals.

var.test to know if the varianccce is equal.

```
##
##  F test to compare two variances
##
## data:  net_benefits by teaching_hospital
## F = 0.34347, num df = 2093, denom df = 935, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.3076147 0.3826102
## sample estimates:
## ratio of variances
##          0.3434651
```

```
##
##  Welch Two Sample t-test
##
## data:  net_benefits by teaching_hospital
## t = 8.6723, df = 1231.2, p-value < 2.2e-16
## alternative hypothesis: true difference in means between group 0 and group 1 is not equal to 0
## 95 percent confidence interval:
##  12292896 19480912
## sample estimates:
## mean in group 0 mean in group 1
##        -8635257       -24522161
```

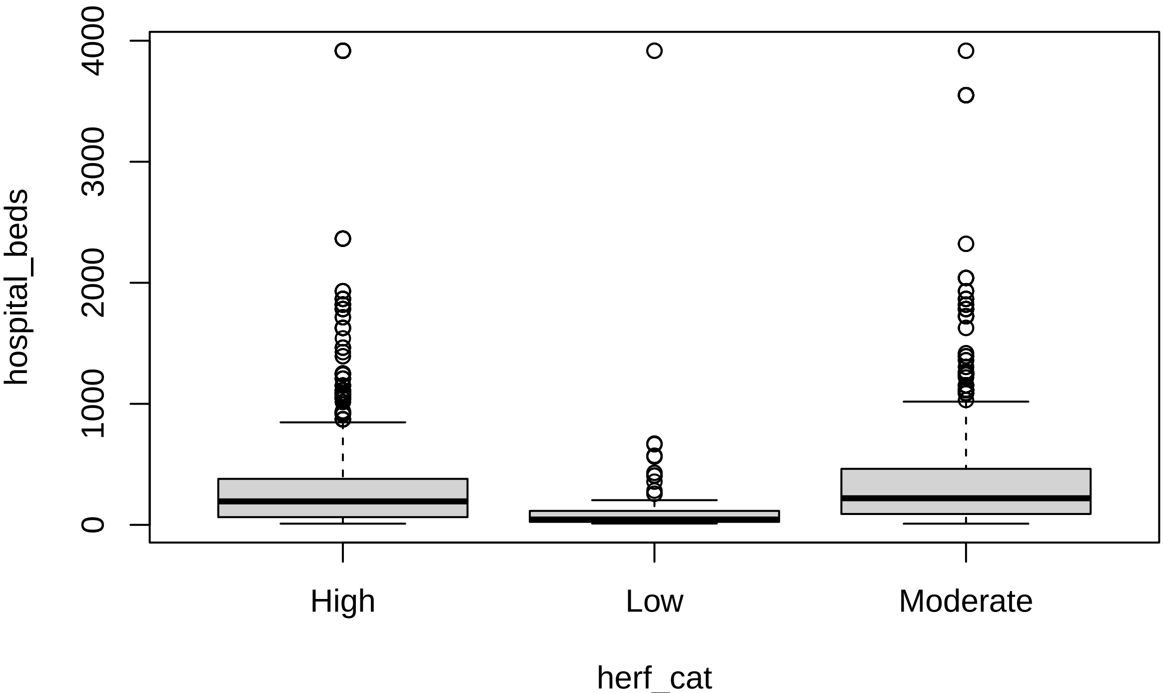
Use a box-plot and compare hospitals-cost and hospital-revenues between teaching and non-teaching hospitals.



Exercise 3

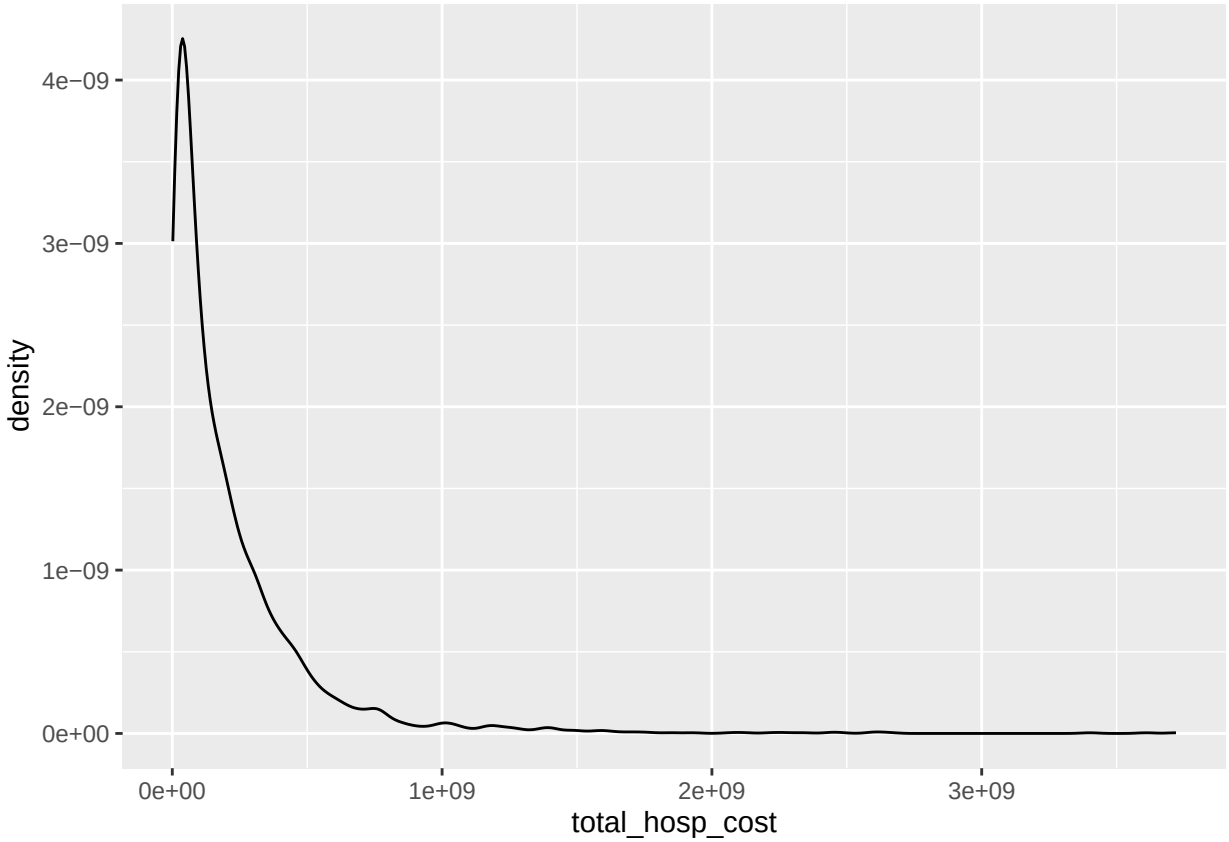
herf_cat	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
High	373.6403	1308.968	47.00928	86.55375	0.6315078	201077821	214430928	- 214430928	16792.69	4712.455	5120.806	3435.407	1066.646	1.697769
Low	130.9174	899.8935	NaN	38.32182	0.4246575	73687087	77700145	- 77700145	5377.214	1416.412	2607.836	1067.938	309.8802	1.963470
Moderate	420.5188	1570.113	35.87832	112.2055	0.6073574	255520635	270841127	- 270841127	18983.76	6553.995	11100.95	3781.610	1324.156	0.668919

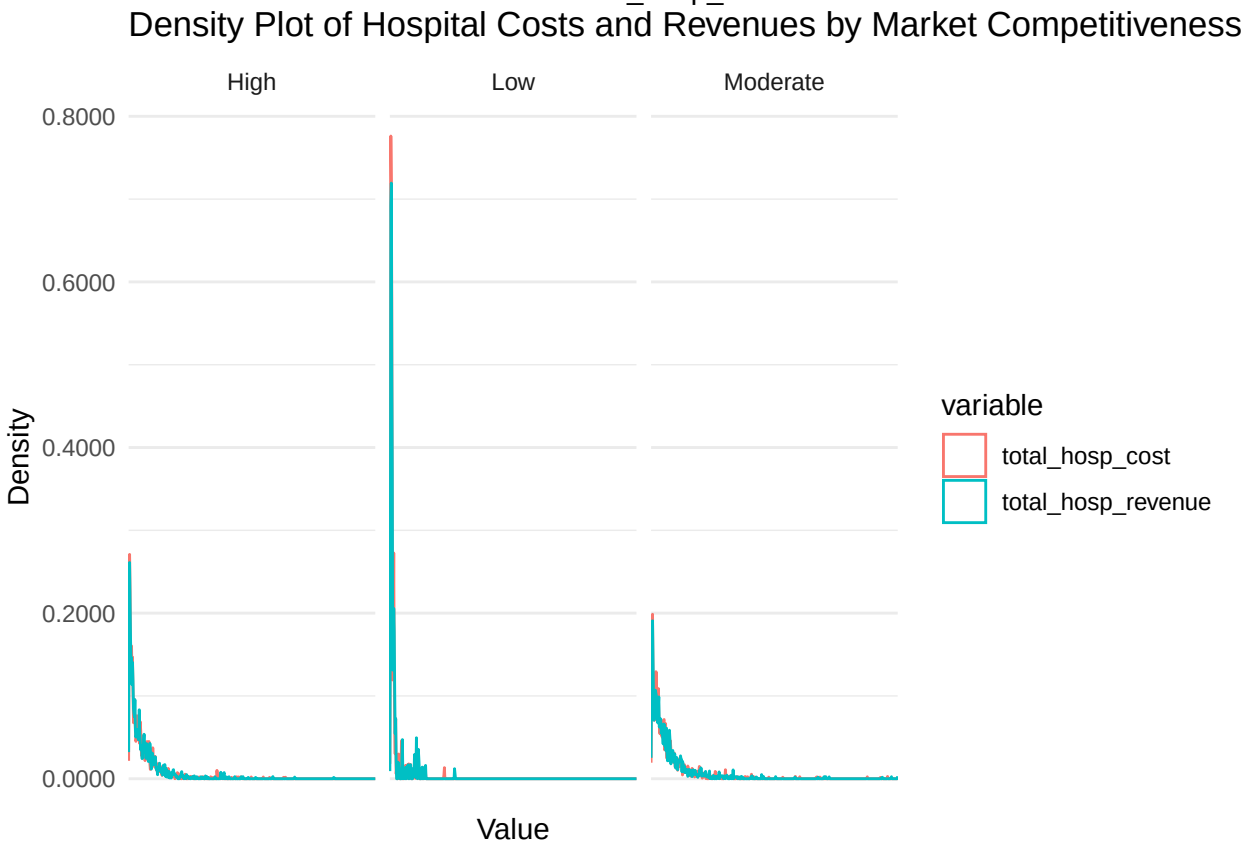
One way Anova test



p_value	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]discharge
0	0	0.5284202	9e-07	0	0	0	0	0	0	0	0	0

Density Curves





Linear Regression

```
##
## Call:
## lm(formula = net_benefits ~ total_hospital_beds + own, data = hospital)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -654363322   -3961986    1635010    9567832  572394334
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          -906253    1146471  -0.790    0.429
## total_hospital_beds   -73150       3220 -22.720   <2e-16 ***
## own1                 2409879    1837706   1.311    0.190
## own2                 3420199    2189969   1.562    0.118
## own3                 2224995    1661067   1.339    0.181
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 36300000 on 3010 degrees of freedom
##   (15 observations deleted due to missingness)
## Multiple R-squared:  0.1474, Adjusted R-squared:  0.1463
## F-statistic: 130.1 on 4 and 3010 DF,  p-value: < 2.2e-16
```

```
##
## Call:
## lm(formula = net_benefits ~ total_hospital_beds + own + system_member,
##     data = hospital)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -654571181   -4329015    1786854    9697784  573220978
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          1939586    1371589   1.414 0.157431
## total_hospital_beds   -71276       3251 -21.924  < 2e-16 ***
## own1                 2172134    1834796   1.184 0.236564
## own2                 3521355    2185368   1.611 0.107212
## own3                 2000968    1658522   1.206 0.227728
## system_member1      -5145510    1368152  -3.761 0.000173 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 36220000 on 3009 degrees of freedom
##   (15 observations deleted due to missingness)
## Multiple R-squared:  0.1514, Adjusted R-squared:   0.15
## F-statistic: 107.4 on 5 and 3009 DF,  p-value: < 2.2e-16
```

```
##
## Call:
## lm(formula = lm(net_benefits ~ total_hospital_beds + own + system_member +
##     medicare_dratio + medicaid_dratio, data = hospital))
##
```

```
## Residuals:
##        Min         1Q     Median         3Q        Max
## -654404007   -4428627    1789724    9810925  573249954
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)          1949233    3414651   0.571 0.568149
## total_hospital_beds   -71355       3661 -19.491  < 2e-16 ***
## own1                 2156294    1859286   1.160 0.246247
## own2                 3545406    2209990   1.604 0.108762
## own3                 1998577    1719083   1.163 0.245092
## system_member1      -5247414    1392923  -3.767 0.000168 ***
## medicare_dratio       305422    5298689   0.058 0.954038
## medicaid_dratio      -300477    7626550  -0.039 0.968575
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 36450000 on 2967 degrees of freedom
##   (55 observations deleted due to missingness)
## Multiple R-squared:  0.1511, Adjusted R-squared:  0.1491
## F-statistic: 75.46 on 7 and 2967 DF,  p-value: < 2.2e-16
```