



The Rising Economics of the University System

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The Questions

Question 1

Does the price of tuition affect the overall enrollment of public and private Universities?

Question 2

What is the relationship between employment and education attained?

What does the unemployment rate look like based on education attained?

Question 3

Who was affected the most in the pandemic, persons with undergrad degrees, advanced degrees, or no degrees?

The Data

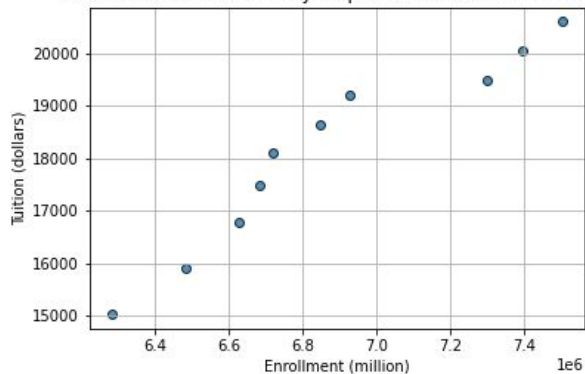
- National Center for Education Statistics (nces.ed.gov)
 - Tuition and enrollment at public and private universities
- U.S. Bureau of Labor Statistics (bls.gov)
 - Employment status and educational attainment
- U.S. Census (census.gov)
 - Educational attainment and demographic information

Deep-Dive into the Data

Question 1 - 4 Year

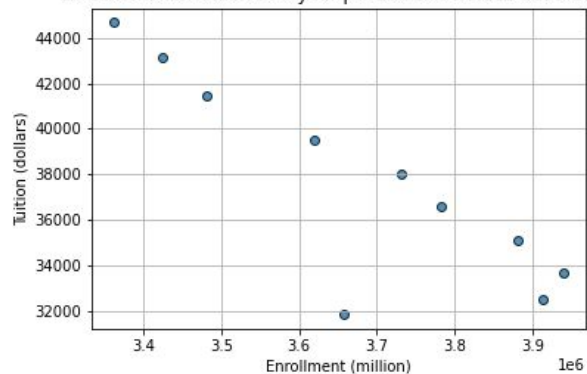
Does the price of tuition affect the overall enrollment of public and private Universities?

Enrollment vs. Tuition at 4-year public universities 2009-2019



$$r = .96$$

Enrollment vs. Tuition at 4-year private universities 2009-2019

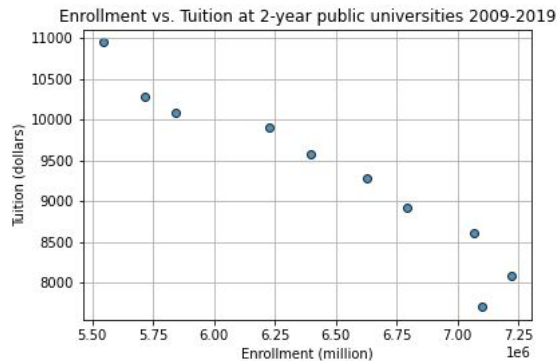


$$r = -.86$$

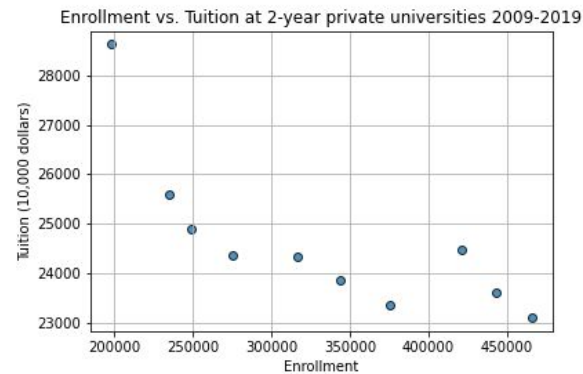
Deep-Dive into the Data

Question 1 - 2 Year

Does the price of tuition affect the overall enrollment of public and private Universities?



$$r = -.96$$

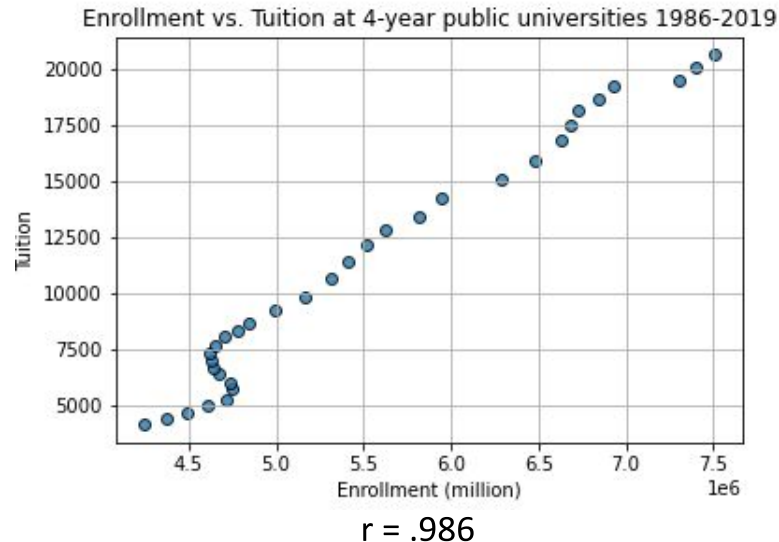


$$r = -.77$$

Deep-Dive into the Data

Question 1 - Future Look

Will people continue to pay for rising university costs?

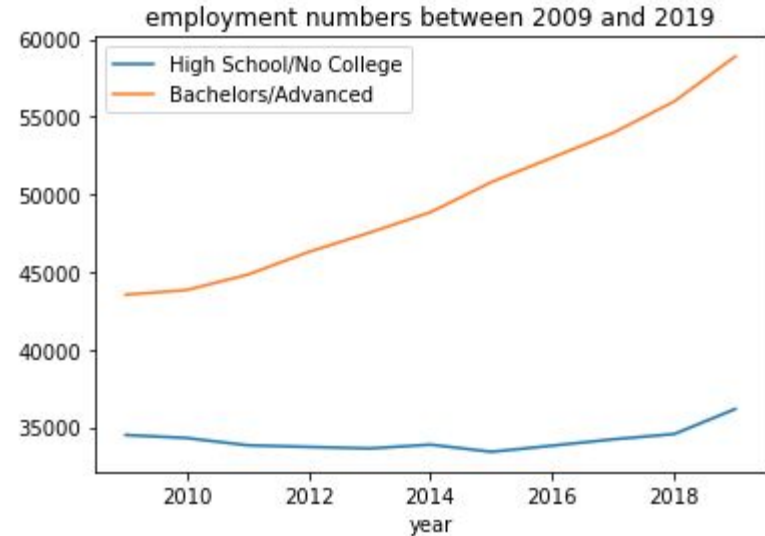


Deep-Dive into Data

Question 2

The correlation between employment and degree attainment.

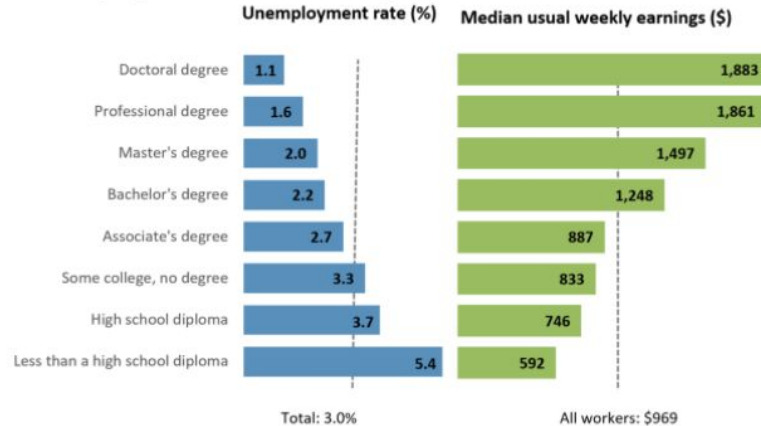
- In the data from 2009 to 2019 we see more positive growth from people who are employed with college degrees than those who do not have a college degree.
- As the job market remains strong in The following year we see unemployment at an all time low (3.5%)



Data at a Glance

- As the level of degree rises, Median Weekly Earnings rise with it.
- In the same respect unemployment rates fall as the level of degree rises
- Doctoral degree and a Professional degree are separated by about .5% unemployment rate, however their weekly earnings only differ by \$22.00

Unemployment rates and earnings by educational attainment, 2019

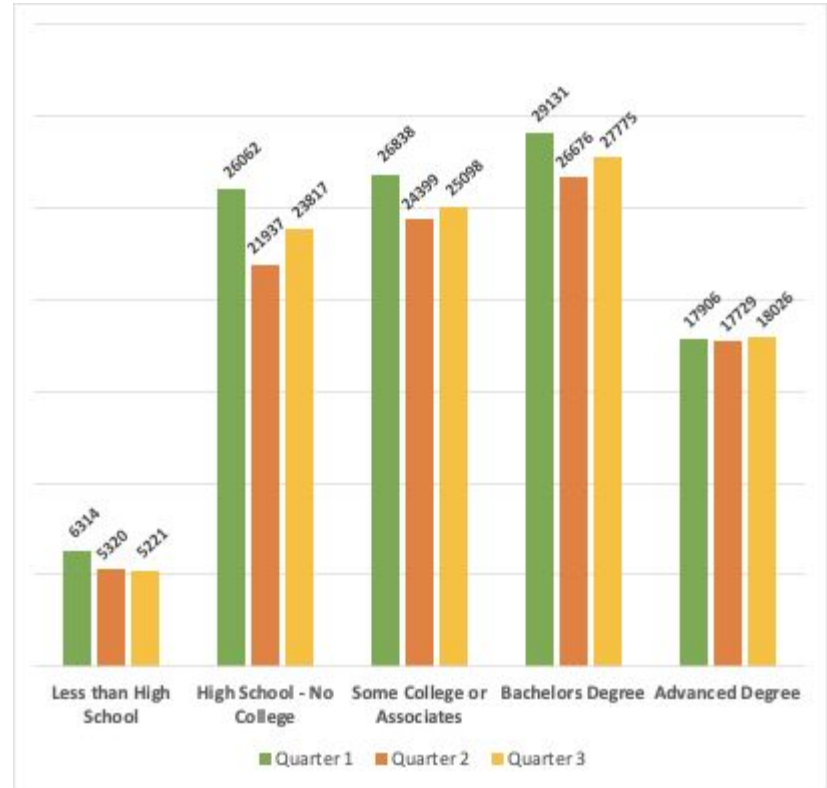


Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Deep-Dive into Data

Question 3

The relationship between individuals with varying levels of education and how they were impacted by COVID-19 during the first 3 quarters of 2020.





ETL Process



Extraction: To extract our data sources from the US Census Bureau, Bureau of Labor Statistics, and the NCES, we used csv files to get the data from its source.



Transformation: The clean up process began on the csv files taking out only what we needed, joining them in SQL, building charts in pythons and creating new smaller csv files from the parent file to gain a clearer picture of the questions we planned to answer.



Load: After the transformation was complete we chose to load the data into SQL where we were able to query a table and find the answers we set out to find. We also loaded the new csv files into Jupyter notebook to merge particular files, run correlations, and create plots.

Transformation Example

Year and cost	Table																							
	Constant 2018-19 dollars(\$)												Current dollars											
	Total tuition, fees, room, and board			Tuition and required fees(\$)			Dormitory rooms			Board(\$)			Total tuition, fees, room, and board			Tuition and required fees(\$)			Dormitory rooms			Board(\$)		
	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year	All institutions	All institutions	2 year
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1963-64	\$10,248.00	\$10,561.00	\$6,368.00	\$4,174.00	\$4,538.00	\$1,406.00	\$2,319.00	\$2,288.00	\$1,717.00	\$1,756.00	\$3,736.00	\$3,736.00	\$1,248.00	\$1,286.00	\$775.00	\$508.00	\$171.00	\$282.00	\$279.00	\$209.00	\$457.00	\$455.00	\$395.00	
1968-69	10,357	10,973	7,477	4,234	4,832	1,778	2,558	2,557	2,321	2,343	3,564	3,578	1,459	1,545	1,053	596	683	250	360	380	327	502	502	476
1969-70	10,460	11,227	7,504	4,325	5,062	1,893	2,635	2,637	2,336	2,324	3,517	3,516	1,560	1,674	1,089	645	755	247	389	392	347	526	526	495
1970-71	10,537	11,376	7,543	4,387	5,188	1,930	2,690	2,690	2,355	2,380	3,498	3,497	1,653	1,784	1,120	688	814	249	419	422	369	546	549	501
1971-72	10,651	11,506	7,712	4,455	5,326	1,944	2,760	2,760	2,406	2,438	3,458	3,458	1,730	1,878	1,172	724	865	251	445	448	391	562	564	530
1972-73	10,853	12,055	7,949	4,603	5,623	1,987	2,886	2,913	2,454	2,474	3,479	3,396	1,834	2,031	1,276	759	950	287	488	492	455	587	608	574
1973-74	10,337	11,392	7,979	4,322	5,348	1,784	2,691	2,715	2,334	2,324	3,529	3,560	1,903	2,097	1,358	796	985	328	495	500	440	612	613	600
1974-75	9,698	10,693	7,000	3,958	4,930	1,602	2,582	2,605	2,250	2,158	3,158	3,146	1,583	1,787	1,432	809	1,008	328	528	533	460	646	646	644
1975-76	9,605	10,754	6,729	3,861	4,901	1,517	2,598	2,611	2,165	2,121	3,222	3,207	1,503	1,703	1,473	829	1,079	297	569	576	474	705	706	702
1976-77	9,818	11,120	6,895	3,987	5,228	1,491	2,604	2,636	2,169	2,227	3,226	3,235	1,575	1,757	1,508	924	1,218	346	603	611	503	748	748	750
1977-78	9,798	11,039	6,888	3,981	5,222	1,529	2,609	2,644	2,172	2,158	3,133	3,137	1,575	1,753	1,508	984	1,293	378	645	654	525	781	780	801
1978-79	9,564	10,786	6,759	3,966	5,164	1,519	2,544	2,572	2,126	2,054	3,114	3,087	1,573	1,757	1,507	1,027	1,397	411	688	696	575	826	825	842
1979-80	9,164	10,320	6,458	3,794	4,936	1,471	2,450	2,477	2,049	2,020	2,919	2,938	1,507	1,679	1,163	1,513	451	751	759	638	895	895	900	900
1980-81	9,067	10,231	6,520	3,768	4,908	1,538	2,445	2,473	2,060	2,035	2,850	2,923	1,501	1,699	1,289	1,679	526	836	846	705	976	975	1,000	1,000
1981-82	9,391	10,633	6,663	3,920	5,133	1,587	2,556	2,587	2,133	2,014	2,912	2,943	1,489	1,687	1,297	1,687	590	961	961	793	1,083	1,082	1,094	1,094
1982-83	10,023	11,360	7,002	4,155	5,520	1,761	2,745	2,781	2,254	2,064	3,067	3,077	1,677	1,866	1,215	1,626	1,159	675	1,064	1,078	873	1,187	1,189	1,195
1983-84	10,369	11,812	7,303	4,436	5,832	1,817	2,849	2,892	2,280	2,084	3,089	3,096	1,667	1,864	1,244	1,783	1,244	730	1,145	1,162	916	1,239	1,242	1,208
1984-85	10,536	12,357	7,613	4,754	6,148	1,968	3,034	3,076	2,339	2,138	3,119	3,114	1,663	1,860	1,179	1,985	1,267	821	1,267	1,282	1,058	1,310	1,311	1,301
1985-86(A)	11,359	12,811	7,836	5,076	6,481	2,098	3,155	3,153	2,576	2,178	3,177	3,170	1,695	1,895	1,367	2,181	1,294	888	1,338	1,355	1,107	1,365	1,365	1,372
1986-87	11,853	13,580	7,903	5,264	6,827	2,043	3,198	3,248	2,555	2,190	3,405	3,406	1,706	1,904	1,395	2,312	1,402	897	1,405	1,427	1,034	1,489	1,489	1,564
1987-88	12,023	13,713	7,914	5,374	6,998	2,169	3,252	3,315	2,224	2,186	3,460	3,460	1,744	1,944	1,422	2,458	1,401	899	1,488	1,516	1,037	1,549	1,550	1,637
1988-89	12,264	14,055	7,967	5,564	7,256	2,047	3,291	3,362	2,267	2,420	3,477	3,553	1,869	2,075	1,553	2,658	1,472	979	1,575	1,609	1,085	1,636	1,644	1,509
1989-90	12,381	14,384	7,990	5,663	7,380	1,950	3,267	3,340	2,204	2,204	3,451	3,454	1,936	2,107	1,512	2,839	1,509	978	1,638	1,675	1,105	1,730	1,737	1,622
1990-91	12,410	14,376	7,833	5,704	7,582	2,057	3,297	3,370	2,236	2,408	3,455	3,460	1,940	2,116	1,516	3,006	1,507	1,040	1,687	1,743	1,162	1,802	1,811	1,660
1991-92	12,569	15,096	7,999	5,621	8,036	2,179	3,434	3,520	2,318	2,218	3,514	3,539	2,021	2,227	1,638	3,286	1,485	1,188	1,874	1,921	1,230	1,918	1,931	1,692
1992-93	13,243	15,562	7,977	6,295	8,444	2,267	3,645	3,748	2,380	2,204	3,548	3,580	2,006	2,212	1,638	3,406	1,489	1,207	1,999	2,057	1,240	1,996	2,015	1,692
1993-94	13,718	16,031	7,976	6,629	8,867	2,423	3,656	3,760	2,485	2,308	3,580	3,609	2,076	2,283	1,649	3,617	1,539	1,207	2,111	2,182	1,267	2,087	2,121	1,718
1994-95	13,985	16,381	7,802	6,810	9,078	2,505	3,612	3,704	2,511	2,351	3,563	3,599	2,046	2,266	1,656	3,634	1,531	1,248	2,145	2,220	1,286	2,116	2,138	1,750
1995-96	14,436	16,936	7,945	7,011	9,485	2,605	3,711	3,805	2,605	2,405	3,645	3,680	2,095	2,311	1,685	3,738	1,538	1,275	2,248	2,323	1,306	2,196	2,218	1,786
1996-97	14,672	17,278	7,802	7,274	9,752	2,499	3,770	3,860	2,477	2,428	3,667	3,692	2,016	2,206	1,681	3,854	1,534	1,242	2,322	2,397	1,301	2,276	2,301	1,830
1997-98	15,013	17,659	8,130	7,465	9,944	2,653	3,827	3,926	2,502	2,402	3,789	3,815	2,177	2,372	1,705	4,051	1,595	1,244	2,507	2,598	1,309	2,389	2,419	1,906
1998-99	15,509	18,299	8,144	7,716	10,348	2,656	3,906	4,011	2,487	2,487	3,817	3,810	2,201	2,396	1,725	4,201	1,603	1,251	2,657	2,726	1,316	2,506	2,540	1,950
1999-00	16,044	18,475	8,108	7,812	10,533	2,585	4,018	4,113	2,650	2,590	3,774	3,877	2,273	2,470	1,740	4,320	1,606	1,278	2,686	2,751	1,321	2,523	2,558	1,920
2000-01	15,651	18,692	7,907	7,778	10,653	2,456	4,081	4,184	2,578	2,578	3,791	3,845	2,275	2,470	1,740	4,320	1,606	1,278	2,686	2,751	1,321	2,523	2,558	1,920
2001-02	16,175	19,386	8,127	8,025	11,066	2,558	4,237	4,349	2,627	2,627	3,912	3,970	2,242	2,466	1,740	4,320	1,606	1,278	2,686	2,751	1,321	2,523	2,558	1,920
2002-03	16,708	20,081	8,095	8,348	11,555	2,647	4,421	4,538	2,689	2,689	3,939	3,998	2,242	2,466	1,740	4,320	1,606	1,278	2,686	2,751	1,321	2,523	2,558	1,920
2003-04	17,409	21,103	8,125	8,693	12,288	2,769	4,627	4,693	2,742	2,742	4,112	4,161	2,242	2,466	1,740	4,320	1,606	1,278	2,686	2,751	1,321	2,523	2,558	1,920

year_4_tuition

tuition_4_id	start_year	end_year	public_tuition	private_tuition
1	2009	2010	15036	31847
2	2010	2011	15919	32517
3	2011	2012	16787	33677
4	2012	2013	17475	35071
5	2013	2014	18100	36599
6	2014	2015	18632	37988
7	2015	2016	19204	39534
8	2016	2017	19488	41465
9	2017	2018	20049	43131
10	2018	2019	20598	44662

year_2_tuition

tuition_2_id	start_year	end_year	public_tuition	private_tuition
1	2009	2010	7708	24463
2	2010	2011	8079	23101
3	2011	2012	8617	23605
4	2012	2013	8927	23355
5	2013	2014	9283	23870
6	2014	2015	9585	24327
7	2015	2016	9914	24375
8	2016	2017	10090	24888
9	2017	2018	10280	25596
10	2018	2019	10950	28627

Further exploration into the data

An even DEEPER dive!

Some areas of this study we would like to dig a little deeper in:

- The role of vocational training and alternative to college pathways in employment and earnings (influencers...)
- Post-pandemic employment numbers
- Post-pandemic tuition rates and enrollment numbers
- Role of potential political mandates on future tuition rates and enrollment numbers (ie. free college, student loan forgiveness)



Questions?