Introduction and Objectives:

A college is a place where you gain most of your knowledge, skills and experience, but deciding which college to attend and what major to study makes it even more difficult. If one wants to earn good money after graduation and wants a satisfactory salary growth after spending years in a particular field, choice of college is a very significant decision. A decision which will influence your future earning potential. The point here is not to make a student choose only that college or major, by which he or she can make lots of money; but to help him or her choosing that college, by which he or she can sound financially good. In this paper, we will examine three prominent elements which will help us determine a good college having a high ROI or equivalent of saying a college that pays you back.

Firstly, salary increase by type of college one attends. It is a fact that your starting salary is affected, depending on which college you attend. For example, a State college, Party college, Liberal Arts college or an Ivy league school. We will explore the starting and mid-career salaries of graduates from an extensive diversity of schools.

Secondly, salaries in particular region. According to the PayScale Inc. survey, graduates from the school in Northeast and California got high salaries in comparison to graduates from Midwest. We will analyze how different region affect the starting and mid-career growth in salaries of graduates.

Thirdly, salary increase by major. One's earning potential is very influenced by major. Most of the degrees can't pay you back sufficiently, in today's job market a major has a significant influence on well-paying jobs.

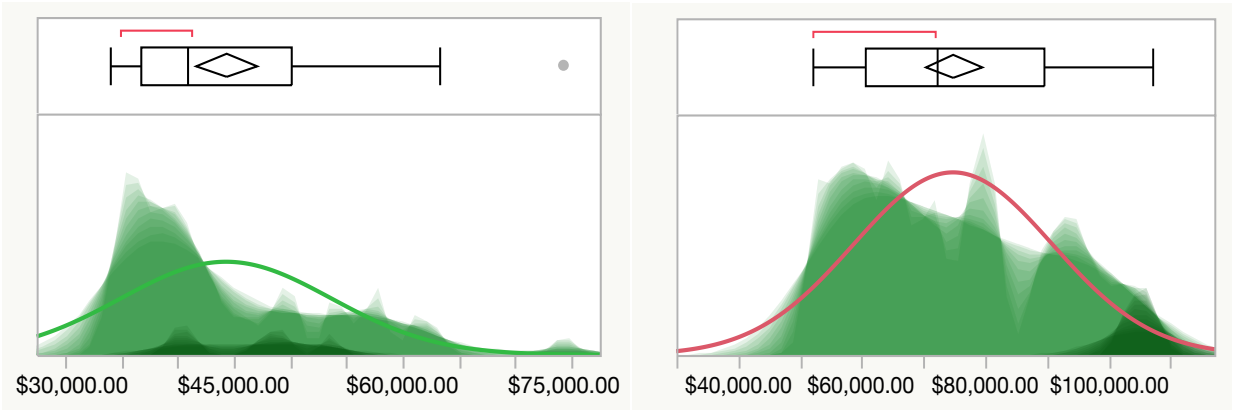
Data:

All the data is publicly available on Kaggle and Payscale website. In total there are three files, having few common variables like median salary, 10th, 25th, 50th, 75th and 90th percentile. Each row represents the starting and mid-career salaries in the different percentiles. Each column with percentiles represents the growth of salaries over time. Apart from the percentile column, there is the percentage change column which describes the % change in starting to mid-career salary. Salaries by degree dataset have total 50 rows and 8 variables. Every observation in college dataset depicts college name and type of college with its graduates starting and mid-career salaries. Few values are missing in some rows; this would be interesting to analyze how they will affect the findings. The third dataset gives the information of graduates from particular college who belongs to a certain region. There are 320 observations and 8 variables having the name of the college and region in which college exists. Some of the observations have multiple college type, for example a college could be a state college as well as a party college. Few of the colleges have only two percentile values like 75th and 90th, by this data we can only come to a range of higher salaries. But, it might not affect the overall analysis because of the large dataset.

Analysis and Methodology

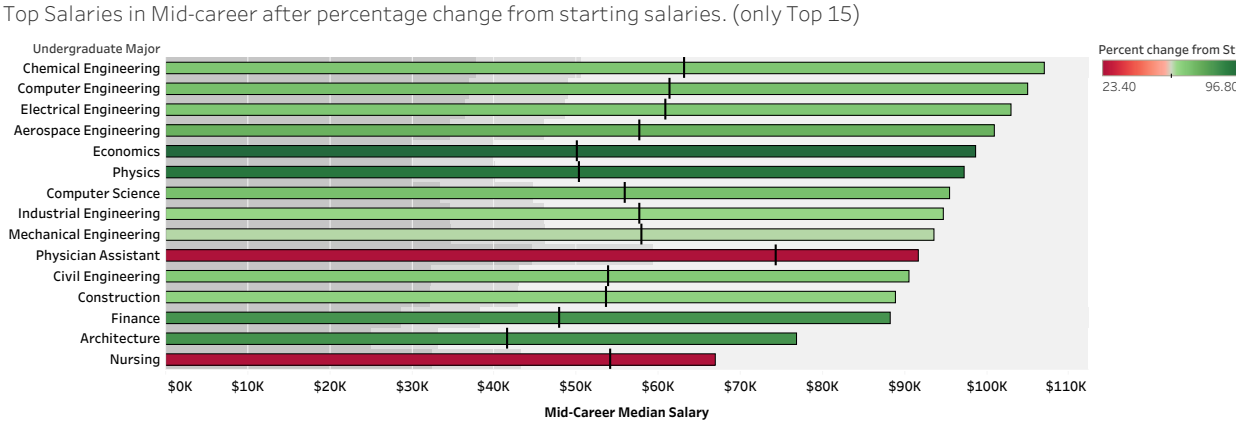
The analysis will be divided into three part majorly. Firstly, we'll analyse how salaries of different major vary from their starting median salary to mid-career salaries. Secondly, how salaries vary depending on the type of college. Thirdly, how salary differs depending on the region you graduated from and where your college exists.

Let's see the distribution of starting median salary and mid-career salaries of majors.



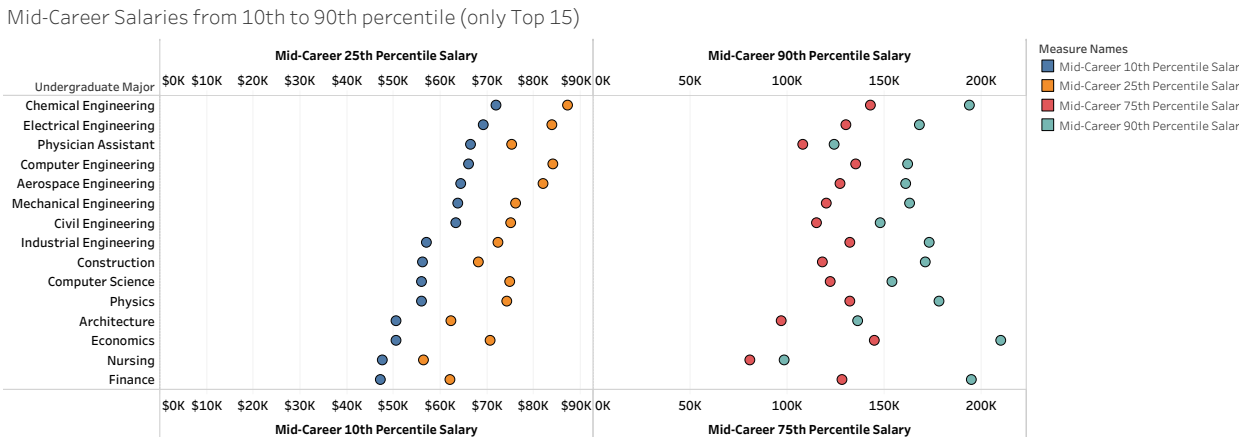
It is visible that the starting median salary distribution is concentrated within the salary range of $34,000 to $74,300 with a mean of $44,310, and somewhat rightly skewed. Salaries are normally distributed, see Appendix A for the goodness of fit test. Although the salaries of graduates in mid-career are widely spread having the salary range of $52,000 to $107,000 with a mean of $74786. Salaries are normally distributed but are marginally significant, see the goodness of fit test in Appendix A. It seems obvious that the graduates who recently graduated, having no prior experience have less salary than graduates, who are in their mid-career. But, there is a starting salary which is way up in comparison to other graduates, this salary can be seen in the distribution as a dot on the top right corner as an outlier.

Let's check the top salaried major and the percentage change from starting salary to mid-career salaries through the below diagram.



The left side of the black dash line represents the starting salary and another side shows the mid-career salary of a particular major and it also signifies the percentage change from starting

to mid-career salary. So, Chemical engineering has the highest median salary of $107,000 with a 69.3% change from a median starting salary of $63,200. 8 out of 10 degrees on top are from Engineering field including the Computer Science. Math, Economics and Physics have high mid-career salary with large percentage change, which signifies a high growth in mid-career whereas physician assistant and nursing have relatively very low mid-career salary growth. See references for detail. Though Philosophy and International relations have a high percentage change from starting to mid-career salaries but due to the fact that they have relatively low starting salary they are not in the top.



Once again 8 out of 15 high salaries belong to Engineering field and some STEM courses including Economics. And, there are very least majors except for them, who are touching six-digit salary figure. So, this majors represents high salary growth potential in mid-career.
It is very interesting that mid-career salaries are so correlated from 10th to 90th percentile. They follow a linear pattern of progression for most majors. It would be interesting to see how mid-career salaries are related to starting salaries.

Salaries of graduates are highly correlated with mid-career salaries with Pearson's r value around 0.85. See Appendix A for the joint plot and prediction plot. Starting mid-career salary has significant p-value as well as the prediction plot has a high R-squared value of 0.72 which means starting salaries can explain about 72% of the variability in the linear model. So, if we want to predict mid-career salary of any major, we can predict it through this model.

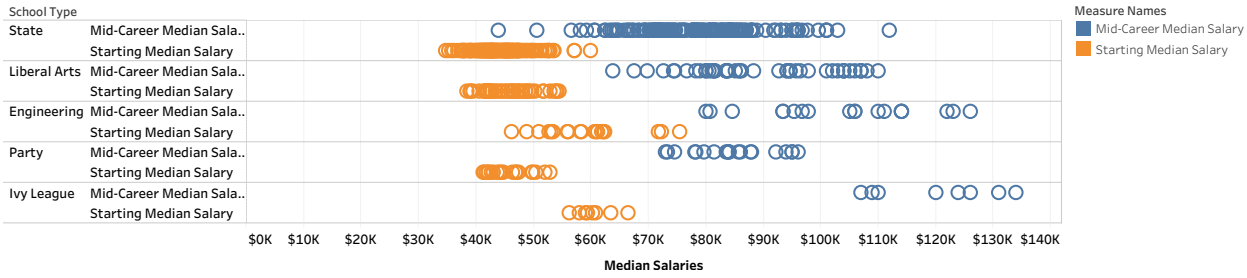
The high correlation between the starting salary and mid-career salary indicates that salaries of one or more major have a comparable percent growth. Then this majors can be clustered together to know, which of them end up as high, medium or low mid-career salary brackets.

Please see Appendix A for dendrogram, biplot and cluster means. After running PCA over the 10th to 90th percentile mid-career salary. It is clear that majors can be clustered in 4 groups broadly as interpret by eigenvalues in scree plot. Each of the cluster has significant Chi-sq value in Bartlett's test. The dendrogram and biplot also reflect the 4 cluster which has the different mean salary in each mid-career percentile, can be seen in the cluster means. Clusters in descending order of their salaries are as follows:
1. The Engineering and STEM courses.

2. Finance, Math and Economics
3. A hybrid group including Film, Geography, Techno-business and many more.
4. Education, language and Art

Analyzing salaries depending on the college type.

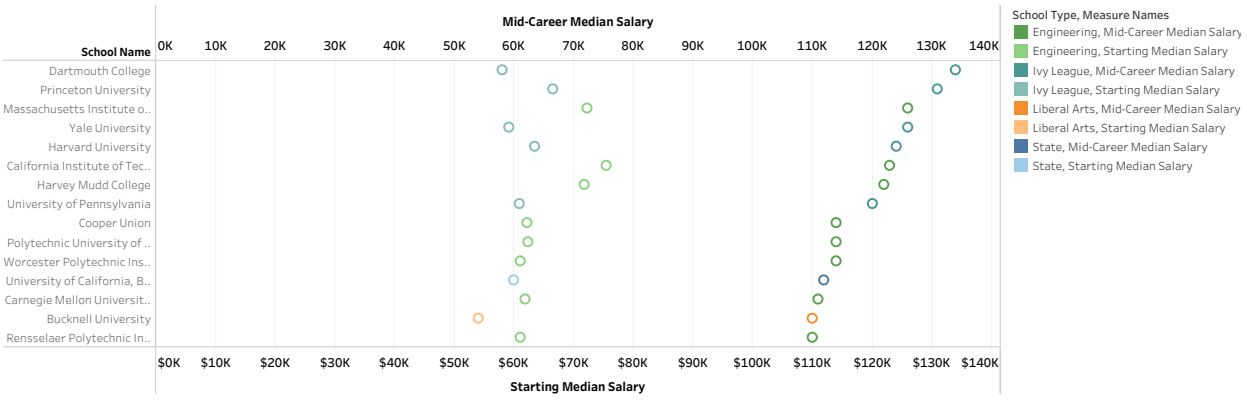
Salaries by college type.



It is clear that both Engineering and Ivy-league colleges have high starting and mid-career salaries. But, Ivy league pulls up in the mid-career salary range. Liberal Arts, Party and State schools graduates have a pretty same mean starting salary range. But, Liberal Arts graduates improve their salaries in mid-career. After performing the ANOVA on both starting and mid-career salaries, O'Brien test gives a significant value for both test i.e. we'll reject the null hypothesis and can say there is variance in the salaries of one or more type of college. After running Tukey's test on starting salaries, Engineering and Ivy-league(A) fall in the same bracket with a p-value of 0.94 and Liberal Arts, Party and State schools(B) in one. See Connecting Letter report and Ordered difference report in Appendix B.

After running Tukey's test on mid-career salaries it is seen that Engineering and Ivy-league graduate's salary no more fall in the same bracket, salaries of Ivy-league graduates get increased in their mid-career. Liberal Arts and State school graduates mid-career salaries fall in different brackets with party school in both brackets. Though it is clear that comparatively Liberal Arts and Party college graduates have high similarities in their mid-career salaries with a p-value of 0.47. See Connecting Letter report and Ordered difference report in Appendix B.

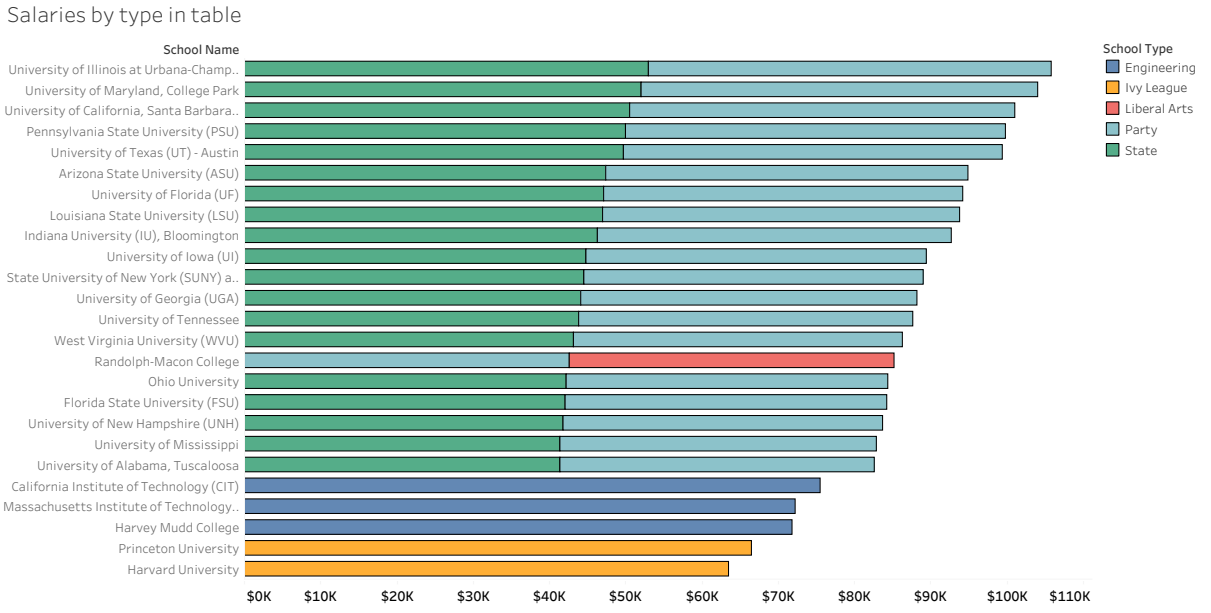
Top 15 Schools by highest salary



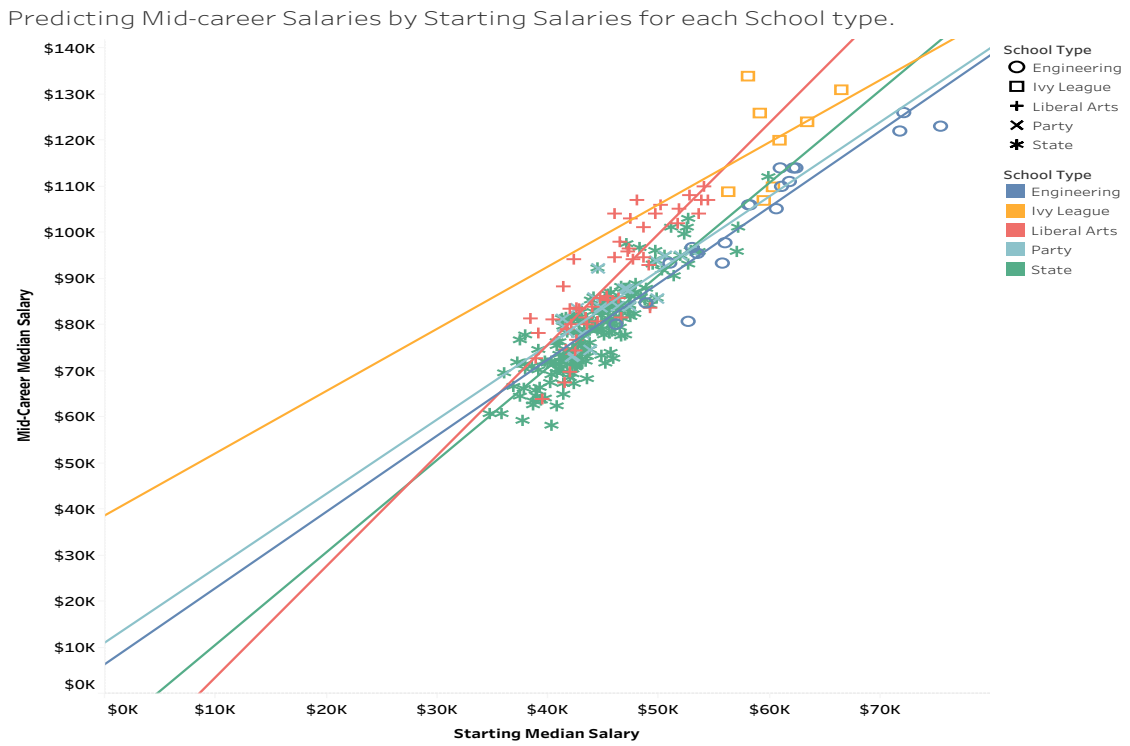
5 out of 8 Ivy-League colleges are in top 15 with top Engineering colleges like MIT, CalTech and Harvey Mudd. It seems that college does matter in high salaries. Apart from this, there is also a

Liberal Arts college in top 15, Bucknell University with graduates having a six-figure salary in Mid-career. While the University of California, Berkeley which is a state university remains in bottom 5 of top 15. Dartmouth tops in Ivy-league, MIT in Engineering, UC Berkeley in State, Bucknell University in Liberal Arts and UIUC in Party colleges.

Some of the schools in the dataset have a dual college type. For example, UIUC is both state and party school, while Randolph-Macon College is both Liberal Arts and Party. From the following visualization, we can interpret that schools which are a state, as well as a party, have higher graduate salary than the schools which are state and non-party. Clearly, having a state-party school acquires graduates a higher starting and mid-career salary.

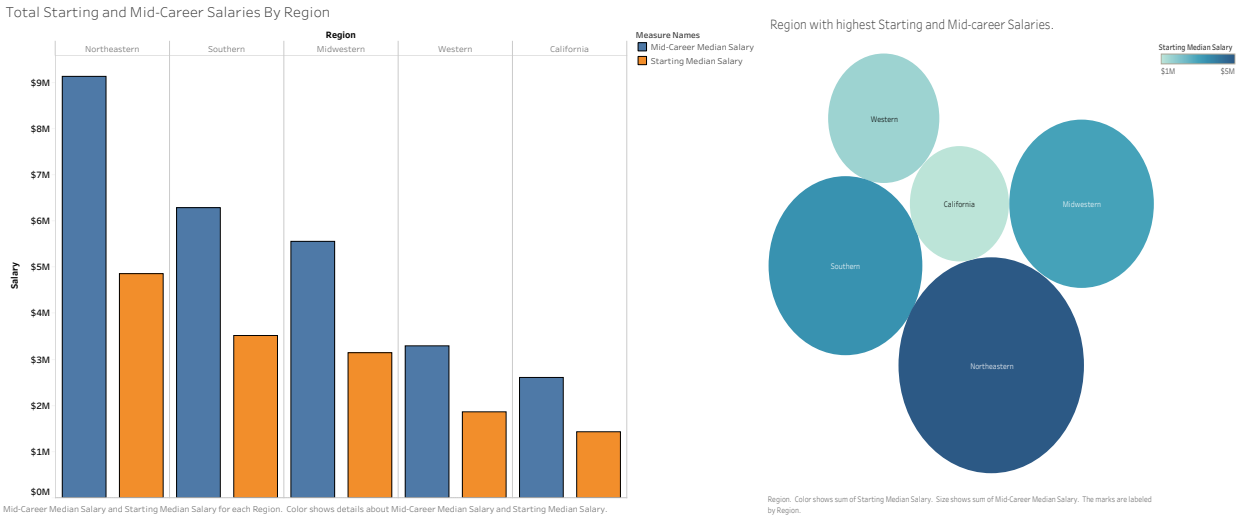


After running a regression model for predicting the Mid-career salary by starting salary. It is clear that except Ivy-league all other school type has significant p-value, which means starting salaries of graduates from this schools are correlated with their Mid-career salaries. Engineering graduates have the highest R-square value of 0.87. While, State, Liberal Arts and Party schools have R-square value 0.76, 0.72 and 0.67 respectively. Possibly due to the fact that, there are only 8 Ivy-league colleges, and starting salaries of graduates varies from there Mid-career salaries, and it's also possible that graduates from Ivy-League are much lesser than the other schools likely gave us a high p-value. See Appendix B for detailed analysis.



Starting Median Salary vs. Mid-Career Median Salary. Color shows details about School Type. Shape shows details about School Type. The data is filtered on Percentage Change, which ranges from 30 to 56.716417910.

Analyzing Salaries by region.

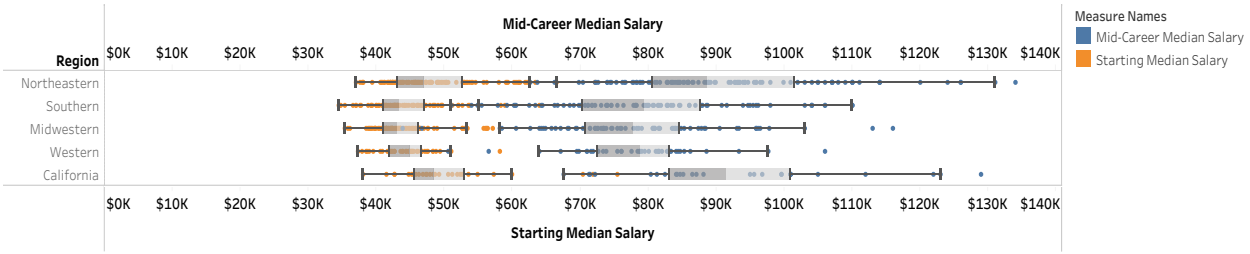


Northeastern Region has the highest starting and mid-career salaries, followed by Southern, Midwestern, Western and California respectively. Another reason for Northeastern being the highest salary region is, it has NY, MA and PA states in it, and all the Ivy-League colleges are in Northwestern Region. Apart from the Ivy-League colleges top Engineering Colleges like MIT, PUNY and CMU are in this region. It is interesting that California itself is a region, no doubt the state has many distinguished Universities and Companies. Institutes like Stanford, CalTech, UC

Berkeley and Tech giants like Google, Apple and many more are in the region, this contributes to higher salary range and packages.

Let's see how starting and mid-career salaries of the graduates in different regions vary.

Salary Variance in Starting and Mid-career by Region



Starting Median Salary and Mid-Career Median Salary for each Region. Color shows details about Starting Median Salary and Mid-Career Median Salary.

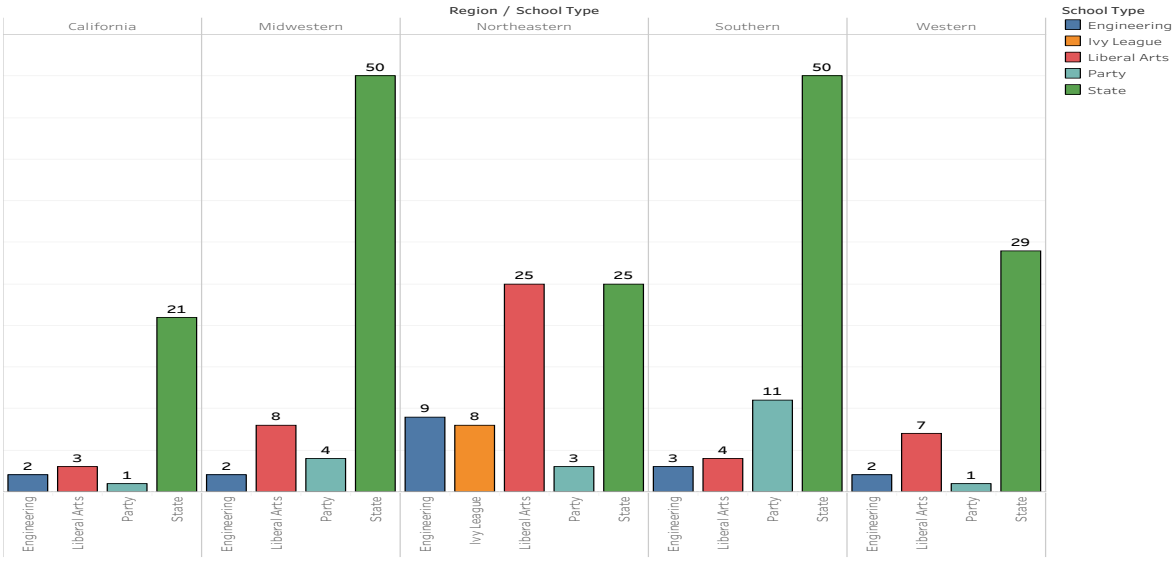
Starting salaries of the Northwestern region and California are comparatively high then the other region. The Southern and Western region is somewhat same, led by the Midwestern region.
The median salaries of Northeastern and California are widely spread. It could be possible because of graduates from Ivy-League and Engineering college have a high salary in comparison to other graduates, it causes a wide distribution of salary ranges.

After running ANOVA on each regions starting salaries, O'Brien Test gives a significant value, which means one or more regions have not similar salaries. We already know that Northwestern and California have higher starting salaries, after seeing above visualizations. Though we'll run Tukey's test to see, connecting letter report and Ordered Difference report. It is explicit that, California and Northwestern(A) are at the same level and other three regions are at the same level in starting salaries of graduates. It is worth noting that, Southern and Midwestern have a high p-value of 0.99, so as the Western and Midwestern region. And, the Southern and Western region has a p-value of 1, this shows that salaries of graduates in this regions are slightly similar. See Appendix C for detailed Analysis.

Applying ANOVA on the mid-career salary of graduates by region gave O'Brien test a reasonably high p-value then 0.05. This means we fail to reject the null hypothesis and assumption of ANOVA here remains intact. Mid-career salaries in regions have less variance in it and are kind of similar to each other. Other robust tests like Brown-Forsythe and Levene also gives marginal significant values, signifying that there are fewer variances in the salaries of graduates in all region during their mid-career. Connecting Letter shows the same result as the starting salaries. But, the similarities in mid-career salaries differ a little now, Western and Midwestern have a high p-value of 1, which means salaries of graduates in this both region are pretty much same. See Appendix C for detailed analysis.

Analyzing Region and type of schools.

Region and type of School.

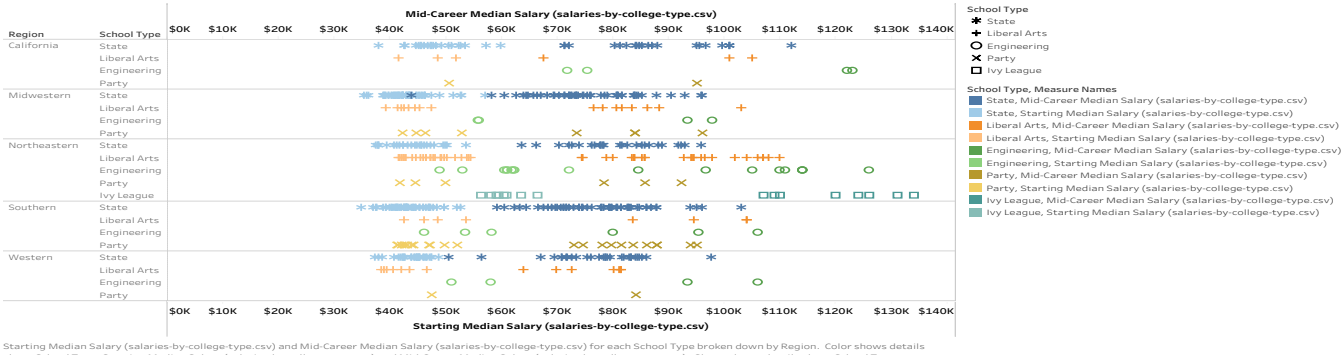


Sum of Number of Records for each School Type broken down by Region. Color shows details about School Type.

The Midwestern and Southern region has 50 state colleges including UIUC, U Minnesota and Texas A&M, U Texas, Clemson respectively. Party colleges are less throughout the US and Northeastern region has most Liberal Arts college. While California being top in schools and salaries have mostly state schools including UC Berkeley. California has fewer another type of schools. It might be possible because of their policies to give low-cost education to residents. California state colleges have relatively very low intuition fees than the out-tuition fees, which is almost double. Northwestern has most engineering college including MIT. It would be really interesting if we would have the data of Salaries of majors in all region. By that, data we can figure out which region has a high salary for a particular major. For example, Computer Science and Engineering salaries are high in California due to Silicon Valley, but this is just an assumption. A concrete data might help us in finding such things.

Salaries of all type of schools in each region.

Starting and Mid-career Salaries by type of college and region.



Starting Median Salary (salaries-by-college-type.csv) and Mid-Career Median Salary (salaries-by-college-type.csv) for each School Type broken down by Region. Color shows details about School Type, Starting Median Salary (salaries-by-college-type.csv) and Mid-Career Median Salary (salaries-by-college-type.csv). Shape shows details about School Type.

State school graduates in California have a higher salary than the state school graduates of another region. Engineering Colleges in California and Northwestern have a neck to neck

salaries in mid-career and somewhat similar in the start. Party college have the almost similar salary range in starting and mid-career throughout the US. While Ivy-League being in only one region has higher starting and mid-career salary than all school types in every region.

Conclusion and key interpretation from all three objectives.

Key interpretation of the salaries by majors are:

Choose STEM courses, if you want to have a good headstart and smooth mid-career. STEM also have high ROI in less time, see the reference for more detail.

1. New graduates earn around $44k a year, with some having the salary around $74k.
2. Potential high salary and growth are in STEM majors specifically in Engineering. And, in Economics too one can make up to $165k to $200k a year in high mid-career.
3. Starting salaries of few major are low but they have high mid-career growth, like Math, Physics and Economics with average percentage growth of about 96% approx.
4. Most of the time starting salaries determine, how much you can earn in mid-career. A high starting salary might give a high mid-career salary. But it is not true in some cases like in Philosophy and International relations which have percentage growth of about 103% but end up with relatively low-income comparatively.

Key interpretation of the salaries by college type are:

The name does matter, a graduate from Ivy-League mostly have higher starting salaries than graduate from Party or State Schools.

1. Ivy-league and Engineering colleges have high starting salary but Ivy-league graduates earn more than Engineering graduates in Mid-career.
2. Starting salaries of Liberal Arts, Party and State schools are moderately alike. But, Liberal Art graduates earn slightly more in mid-career in comparison to both.
3. Most of the colleges are State School but State-Party school graduates have a higher starting and mid-career salary in comparison to State non-party colleges.

Key interpretation of salaries in different regions are:
California and Northeastern have the highest earning graduates.

1. Engineering college graduates have higher earnings in the Northeastern region as well as in California. Opting Engineering in the Northeastern region might help you fetch high starting and continuous mid-career growth.
2. Choose Northeaster region, if you want to study in a Liberal Arts college.
3. The state schools in California are good and graduates have relatively higher salaries than any state graduates throughout the US.

References:

http://www.businessinsider.com/stem-majors-earn-a-lot-more-money-after-graduation-2014-7

http://www.ppic.org/publication/higher-education-in-california-student-costs/

https://www.payscale.com/college-salary-report
https://www.kaggle.com/wsj/college-salaries

https://www.forbes.com/sites/brucejapsen/2016/01/29/physician-assistant-pay-reaches-100k-annually/ - 56dc8e8151c6

APPENDICES

Appendix A – Output of Salaries by Majors analysis.

Fit test of starting median salaries and mid-career salaries respectively.

Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.872028	<.0001*

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.943590	0.0187*

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Summary Statistics of median salaries and mid-career salaries respectively.

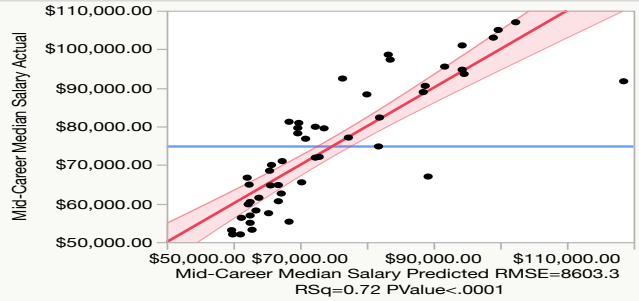
Summary Statistics

Mean	44310
Std Dev	9360.8662
Std Err Mean	1323.8264
Upper 95% Mean	46970.329
Lower 95% Mean	41649.671
N	50
Minimum	34000
Maximum	74300

Summary Statistics

Mean	74786
Std Dev	16088.404
Std Err Mean	2275.2439
Upper 95% Mean	79358.274
Lower 95% Mean	70213.726
N	50
Minimum	52000
Maximum	107000

Regression model of starting salaries and mid-career salaries of graduates.



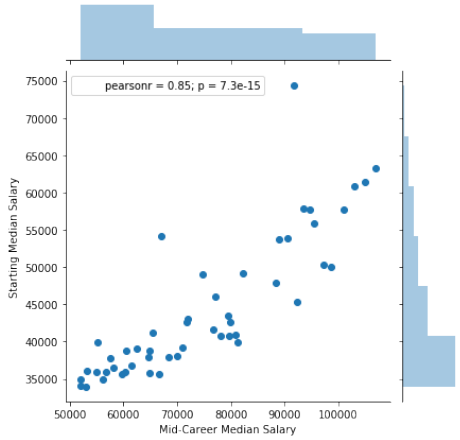
Summary of Fit

RSquare	0.719874
RSquare Adj	0.714038
Root Mean Square Error	8603.346
Mean of Response	74786
Observations (or Sum Wgts)	50

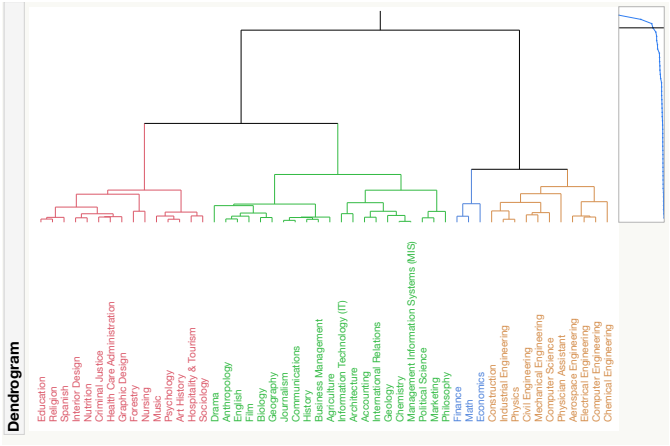
Parameter Estimates

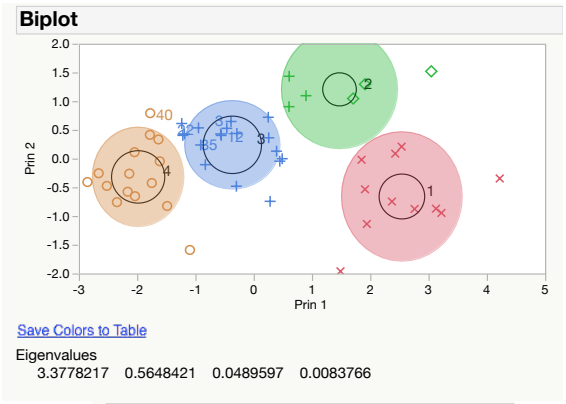
Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	10171.974	5943.616	1.71	0.0935
Starting Median Salary	1.4582267	0.131297	11.11	<.0001*

Join Plot between the starting salaries and mid-career salaries.



Cluster Analysis:





Cluster Means

Cluster	Mid-Career 10th Percentile Salary	Mid-Career 25th Percentile Salary	Mid-Career 75th Percentile Salary	Mid-Career 90th Percentile Salary
1	62772.7273	77572.7273	125636.364	163272.727
2	43633.3333	60100	126833.333	183166.667
3	39655.5556	52061.1111	98577.7778	143611.111
4	33620	43226.6667	79300	110553.333

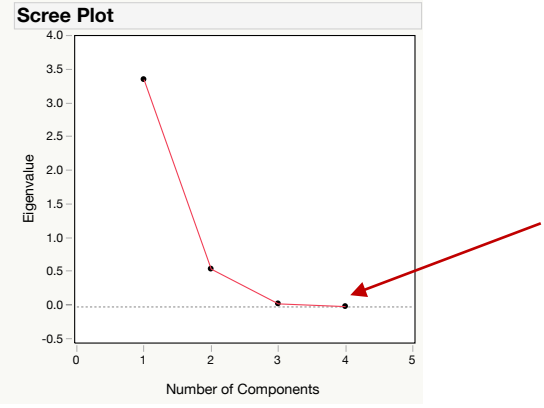
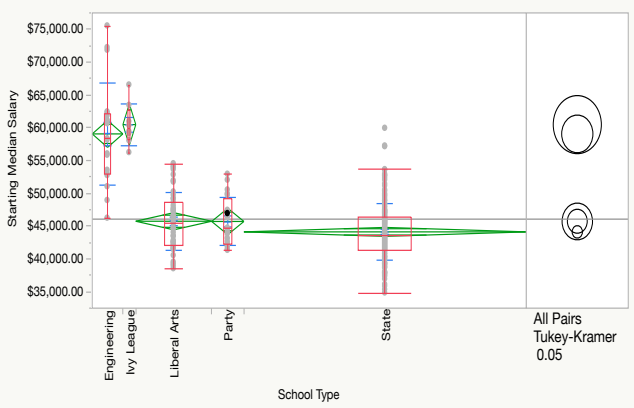


Tableau link of the dashboard – https://public.tableau.com/views/Salaryanalysisofdifferentundergraduatemajors/Dashboard1?:embed=y&:display_count=yes

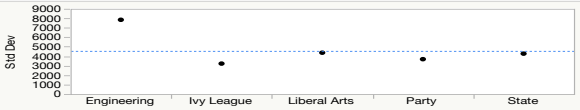
APPENDICES

Appendix B – Output of Salaries by College type analysis.

ANOVA results of Starting Salaries



Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Engineering	19	7842.924	6008.310	5968.421
Ivy League	8	3218.584	2343.750	2300.000
Liberal Arts	47	4368.855	3622.273	3617.021
Party	20	3685.716	3126.500	3025.000
State	175	4269.067	3274.253	3255.429

Test	F Ratio	DFNum	DFDen	Prob > F
O'Brien[.5]	6.8037	4	264	<.0001*
Brown-Forsythe	4.2666	4	264	0.0023*
Levene	4.5498	4	264	0.0014*
Bartlett	4.9378	4	.	0.0006*

Welch's Test

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
58.3687	4	33.38	<.0001*

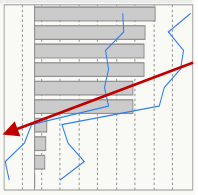
Connecting Letters Report

Level		Mean
Ivy League	A	60475.000
Engineering	A	59057.895
Liberal Arts	B	45746.809
Party	B	45715.000
State	B	44126.286

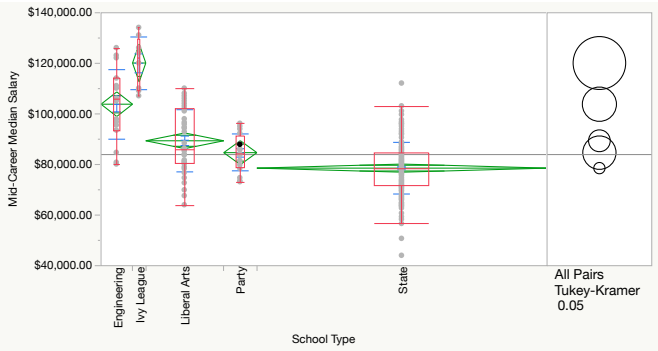
Levels not connected by same letter are significantly different.

Ordered Differences Report

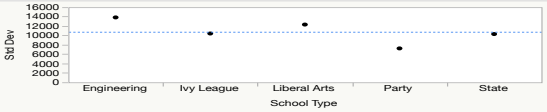
Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
Ivy League	State	16348.71	1648.259	11821.4	20876.04	<.0001*
Engineering	State	14931.61	1101.207	11906.9	17956.33	<.0001*
Ivy League	Party	14760.00	1907.142	9521.6	19998.41	<.0001*
Ivy League	Liberal Arts	14728.19	1743.619	9938.9	19517.45	<.0001*
Engineering	Party	13342.89	1460.510	9331.3	17354.53	<.0001*
Engineering	Liberal Arts	13311.09	1239.397	9906.8	16715.38	<.0001*
Liberal Arts	State	1620.52	748.984	-436.7	3677.78	0.1969
Party	State	1588.71	1076.087	-1367.0	4544.44	0.5788
Ivy League	Engineering	1417.11	1921.428	-3860.5	6694.76	0.9475
Liberal Arts	Party	31.81	1217.132	-3311.3	3374.94	1.0000



ANOVA results of Mid-Career Salaries



Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Engineering	19	13840.73	11445.98	11210.53
Ivy League	8	10412.05	8625.00	8625.00
Liberal Arts	47	12318.17	10704.12	10446.81
Party	20	7237.57	5743.50	5685.00
State	175	10296.07	7995.81	7995.43

Test	F Ratio	DFNum	DFDen	Prob > F
O'Brien[.5]	2.4072	4	264	0.0499*
Brown-Forsythe	3.0132	4	264	0.0187*
Levene	3.7685	4	264	0.0053*
Bartlett	2.4196	4	.	0.0462*

Welch's Test

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
45.0136	4	33.179	<.0001*

Connecting Letters Report

Level		Mean
Ivy League	A	120125.00
Engineering	B	103842.11
Liberal Arts	C	89378.72
Party	C D	84685.00
State	D	78567.43

Levels not connected by same letter are significantly different.

Ordered Differences Report

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
Ivy League	State	41557.57	3894.195	30861.3	52253.88	<.0001*
Ivy League	Party	35440.00	4505.834	23063.7	47816.32	<.0001*
Ivy League	Liberal Arts	30746.28	4119.491	19431.1	42061.42	<.0001*
Engineering	State	25274.68	2601.724	18128.4	32420.92	<.0001*
Engineering	Party	19157.11	3450.616	9679.2	28635.03	<.0001*
Ivy League	Engineering	16282.89	4539.586	3813.9	28751.92	0.0036*
Engineering	Liberal Arts	14463.38	2928.211	6420.4	22506.40	<.0001*
Liberal Arts	State	10811.29	1769.558	5950.8	15671.80	<.0001*
Party	State	6117.57	2542.374	-865.7	13100.79	0.1168
Liberal Arts	Party	4693.72	2875.608	-3204.8	12592.25	0.4781

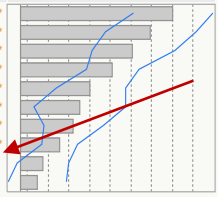


Tableau Link of the dashboard - https://public.tableau.com/views/AnalysisofSalariesbyCollegeType/AnalysisofSalarybyCollegeType?:embed=y&:display_count=yes&publish=yes

Regression model for predicting mid-career salary by type of college

Trend Lines Model
A linear trend model is computed for Mid-Career Median Salary given Starting Median Salary. The model may be significant at p <= 0.05. The factor School Type may be significant at p <= 0.05.

Model formula:	School Type*(Starting Median Salary + intercept)
Number of modeled observations:	266
Number of filtered observations:	0
Model degrees of freedom:	10
Residual degrees of freedom (DF):	256
SSE (sum squared error):	6.97563e+09
MSE (mean squared error):	2.72485e+07
R-Squared:	0.864752
Standard error:	5220.01
p-value (significance):	< 0.0001

Analysis of Variance:

Field	DF	SSE	MSE	F	p-value
School Type	8	3.4726152e+09	4.34077e+08	15.9303	< 0.0001

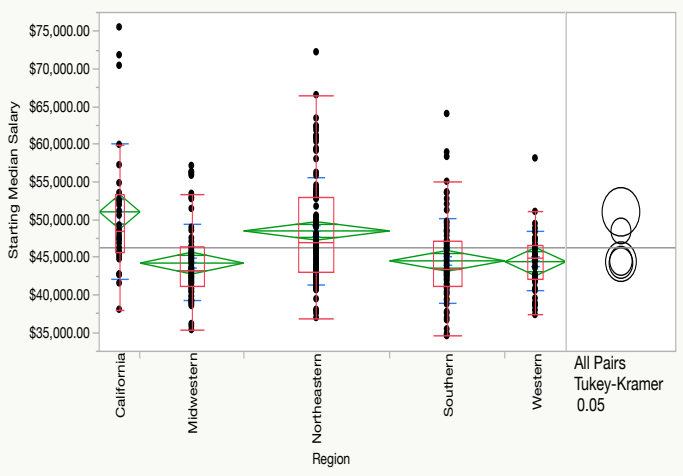
Individual trend lines:

Panes		Color	Line		Coefficients				
Row	Column	School Type	p-value	DF	Term	Value	StdErr	t-value	p-value
Mid-Career Median Salary	Starting Median Salary	State	< 0.0001	170	Starting Median Salary	2.00382	0.0844499	23.7279	< 0.0001
					intercept	-9562.67	3751.83	-2.5488	0.011694
Mid-Career Median Salary	Starting Median Salary	Party	< 0.0001	18	Starting Median Salary	1.61292	0.263999	6.10958	< 0.0001
					intercept	10950.2	12105.9	0.904532	0.377661
Mid-Career Median Salary	Starting Median Salary	Liberal Arts	< 0.0001	45	Starting Median Salary	2.40434	0.219542	10.9516	< 0.0001
					intercept	-20612.3	10088.1	-2.04323	0.046912
Mid-Career Median Salary	Starting Median Salary	Ivy League	0.304018	6	Starting Median Salary	1.34903	1.20036	1.12386	0.304018
					intercept	38542.3	72681.7	0.530289	0.614954
Mid-Career Median Salary	Starting Median Salary	Engineering	< 0.0001	17	Starting Median Salary	1.65229	0.150344	10.99	< 0.0001
					intercept	6261.46	8952.87	0.69938	0.493774

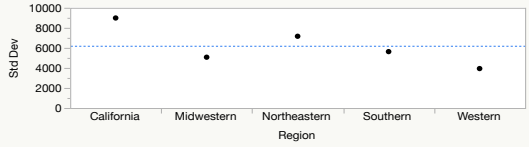
APPENDICES

Appendix C – Output of Salaries by Region.

ANOVA output of Starting Salaries:



Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
California	28	8982.042	6403.316	6060.714
Midwestern	71	5068.241	3844.793	3691.549
Northeastern	100	7159.001	5631.200	5466.000
Southern	79	5626.099	4289.793	4235.443
Western	42	3935.180	2908.163	2885.714

Test	F Ratio	DFNum	DFDen	Prob > F
O'Brien[.5]	4.8421	4	315	0.0008*
Brown-Forsythe	4.2289	4	315	0.0024*
Levene	5.7862	4	315	0.0002*
Bartlett	8.2681	4	.	<.0001*

Welch's Test

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
9.3590	4	115.29	<.0001*

Connecting Letters Report

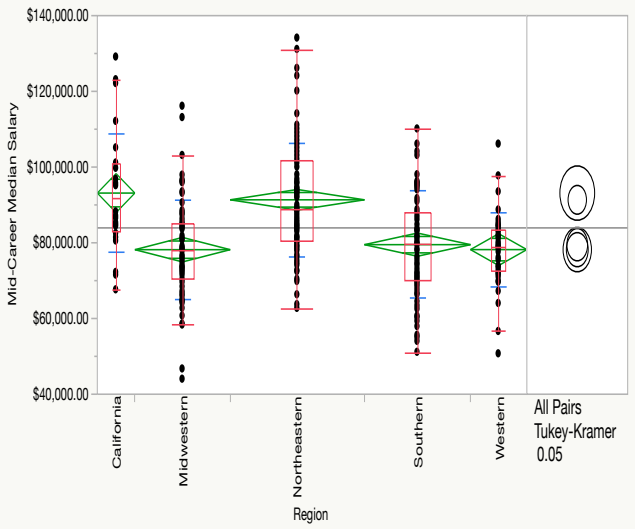
Level		Mean
California	A	51032.143
Northeastern	A	48496.000
Southern	B	44521.519
Western	B	44414.286
Midwestern	B	44225.352

Levels not connected by same letter are significantly different.

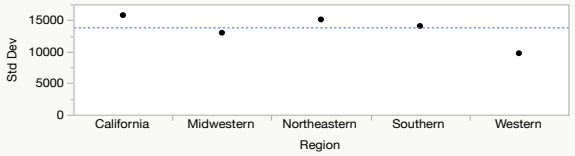
Ordered Differences Report

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
California	Midwestern	6806.791	1386.167	3003.63	10609.96	<.0001*
California	Western	6617.857	1515.484	2459.89	10775.82	0.0002*
California	Southern	6510.624	1366.172	2762.32	10258.93	<.0001*
Northeastern	Midwestern	4270.648	963.995	1625.78	6915.52	0.0001*
Northeastern	Western	4081.714	1142.157	948.03	7215.40	0.0037*
Northeastern	Southern	3974.481	935.016	1409.12	6539.84	0.0003*
California	Northeastern	2536.143	1328.104	-1107.72	6180.00	0.3143
Southern	Midwestern	296.167	1015.802	-2490.84	3083.18	0.9984
Western	Midwestern	188.934	1209.182	-3128.64	3506.51	0.9999
Southern	Western	107.233	1186.207	-3147.31	3361.78	1.0000

ANOVA output of Starting Salaries:



Tests that the Variances are Equal



Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
California	28	15787.71	12689.29	12689.29
Midwestern	71	12997.69	9889.86	9884.51
Northeastern	100	15103.02	12039.20	11834.00
Southern	79	14067.59	11129.18	11127.85
Western	42	9743.74	7028.57	6971.43

Test	F Ratio	DFNum	DFDen	Prob > F
O'Brien[.5]	1.9637	4	315	0.0999
Brown-Forsythe	2.9030	4	315	0.0220*
Levene	3.1869	4	315	0.0138*
Bartlett	2.8016	4	.	0.0243*

Welch's Test

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob > F
16.3790	4	116.69	<.0001*

Connecting Letters Report

Level		Mean
California	A	93132.143
Northeastern	A	91352.000
Southern	B	79505.063
Western	B	78200.000
Midwestern	B	78180.282

Levels not connected by same letter are significantly different.

Ordered Differences Report

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value
California	Midwestern	14951.86	3091.792	6469.05	23434.68	<.0001*
California	Western	14932.14	3380.230	5657.95	24206.33	0.0001*
California	Southern	13627.08	3047.195	5266.63	21987.53	0.0001*
Northeastern	Midwestern	13171.72	2150.155	7272.43	19071.00	<.0001*
Northeastern	Western	13152.00	2547.537	6162.44	20141.56	<.0001*
Northeastern	Southern	11846.94	2085.518	6124.99	17568.88	<.0001*
California	Northeastern	1780.14	2962.285	-6347.35	9907.63	0.9749
Southern	Midwestern	1324.78	2265.707	-4891.54	7541.10	0.9773
Southern	Western	1305.06	2645.790	-5954.07	8564.20	0.9880
Western	Midwestern	19.72	2697.033	-7380.01	7419.45	1.0000

Tableau public Links:

https://public.tableau.com/shared/8YMDNXBD7?:display_count=yes

https://public.tableau.com/views/AnalysisofSalariesbyRegionandtypeofschool/Dashboard2?:embed=y&:display_count=yes&publish=yes