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Project B

How does Position and Points Per Game Affect an NBA Player’s Salary?

1. **Motivation**  
    This study is of interest because it can help general managers of NBA franchises have better insight into paying players for their performance. For example, if a center is scoring 30 points per game and is a projected lottery pick, there could be a better idea for his projected rookie salary. Or if a SG is scoring in the 90th percentile, it would help in understanding the salary limits.
2. **Data Description**  
    The dataset contains players, their team(s), salary, game statistics including rebounds per game, steals per game, points per game, etc. The data was collected from *Kaggle*, here:  
   https://www.kaggle.com/datasets/jamiewelsh2/nba-player-salaries-2022-23-season
3. Data Exploration  
    First, I used a correlation plot to find what has the highest correlation to ‘Salary’.  
   *proc corr data=b\_data;  
    var Salary Age GP GS MP PTS ‘Total Minutes’n  
    with Salary Age GP GS MP PTS ‘Total Minutes’n  
   run;  
   A table of numbers and lines

   Description automatically generated*Since PTS have the highest correlation, I would use them in my model. However, I was curious about Total Minutes as well, and decided to use both in a scatter plot.  
     
     
     
     
     
     
     
     
     
     
   *proc sgscatter data=b\_data;  
    matrix Salary PTS ‘Total Minutes’n;  
   run;*A graph of a graph showing a number of numbers and a number of numbers

   Description automatically generated with medium confidence
4. **Model Fitting and Analysis**
   1. ANOVA Modeling
      1. After running a basic *proc glm* statement, PTS is found to be statistically significant in affecting Salary.  
         A screenshot of a table

         Description automatically generated  
         A graph showing a line graph

         Description automatically generated with medium confidence
      2. *Distribution of Salary* breaks down how points affect the salary. As shown in the correlation plots from (B), and how PTS is statistically significant in (i), the graph below proves how more points per game affect the salary. Typically, more points per game reflect on how much an NBA player is paid.  
         A table with numbers and a number of squares

         Description automatically generated  
         Since the F Value is 1.70 and Pr > F is 0.0019, we reject the null hypothesis. The variances are significantly different across the groups in ‘PTS’.  
         A graph of salary with blue and black squares

         Description automatically generated
      3. The residual analysis shows a right skew, however mostly normal graph. This could be from players expected to score higher and then score lower during the season, or players in different positions that make other significant plays in basketball other than having a higher points per game. This follows the assumptions, as some positions in basketball are more defensive and score less points per game whereas others are more offensive and score more points per game, leading to a right skew.  
         A chart of data analysis

         Description automatically generated with medium confidence
   2. ANCOVA Modeling
      1. A graph of colored dots

         Description automatically generated  
         A graph of a number of people

         Description automatically generated with medium confidence  
         The positions PG-SG, SF-SG, SF-PF, and SG-PG have two or less observations. However, these graphs suggest how positions and points affect salary. For example, PG’s have a much sider salary range, and are expected to make more than SF’s. That follows with the assumption that players who score more earn more. On average, PG’s score more than SF’s.  
         A table with numbers and letters

         Description automatically generated  
         This graphic shows how positions who score more, earn more. For instance, the highest earner (min. 3>N) are PG’s. Their mean PTS are roughly 11 points per game, which is the highest among the five.
      2. The residual analysis follows the assumptions. The data is statistically significant per Position, indicating that Position does affect Salary.
5. **Conclusions**  
    The above analysis shows how an NBA player’s position and points per game affect their salary. The findings are significant, meaning that there is a strong relationship between points per game and position towards a player’s salary. NBA general managers can expect to pay more for shooting guards, as they score more points per game than any other position in the NBA.