**Forbes Highest Paying Athletes Analysis**

The sports industry is valued in US$ 500BN worldwide and is grows at a 5.9% annual rate. Just it sports sponsorships, it is estimated that brands will spend US$ 50BN this year and the single most valuable sporting event (the NFL Superbowl) is valued at $ 379 M. With all of these facts, we are curious to understand what the top figures in sport make, if their earnings depend on what sport they play and how their earnings have evolved over the years.

Research Questions:

1. Are american athletes paid more than their foreign counterparts? Does this differ by sport?
2. Have top athlete earnings increased in real value over the past 30 years?
3. What sport pays it’s top athletes the most?

To analyze the data for these research question, we used a different Kaggle database with monthly CPI indices to calculate inflation with a 1990 as the base year and joined it to our main database. We used the inflation to adjust nominal earnings to 1990 US$ and performed the analysis using the adjusted earnings to eliminate inflation bias from the analysis (for example, in research question 1, more recent earnings would have skewed the data vs past earnings).

**Are american athletes paid more than their foreign counterparts? Does this differ by sport?**

Our hypothesis for this research question was that American athletes would earn more than their international counterparts in all sports based on the size of the sporting industry in the USA vs the rest of the world. However we found that this is not necessarily true.

A graph of multiple colored bars

Description automatically generated

As the graph above shows, there is a clear difference in top earnings between sports. Sports like basketball, boxing, Golf and American football have earnings going to predominantly American athletes while sports like Soccer, F1 Motorsports and Tennis have top earners being predominantly international. This matches the sport’s geographical popularity as F1, Soccer and Tennis are sports that have historically had an international audience, while the NBA, NFL, Boxing and PGA have a very large American audience and most of the tournaments/matches happen in the USA.

The American sporting sport industry is the largest in the world. This appears to correlate with athlete salaries as they are the stars and the events, TV rights, merchandise, etc depends on them performing well, however, we need more information to carry out a deeper analysis into salary drivers in the industry. It would be interesting to understand what drives salaries in the USA vs the rest of the world and how this varies by sport. It is interestring to note that sports with higher international earners are actively trying to break into the American market with F1 launching two new circuits in the past two years (Miami and Las Vegas) and the Inter Miami buying Messi. Both these events broke the news and elevated ticket process for the events considerably so it would be interesting to understand how this correlates with salaries in the future.

**Have top athlete earnings increased in real value over the past 30 years?**

Because the sporting industry has grown above inflation, we expect athelete earnings to have increase over the past 30 years, even when adjusted for inflation. For this analysis, we removed some anomalies that we found in 2015 and 2018 by using the 99th quantile.

A graph showing the difference between an average and an average

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As we can see, there is a positive correlation between years and adjusted earnings. R2 for this model however is 0.31, which means that only 31% of the variability in the data is explained by the model. When looking more closely at the data, we found that in the majority of years, the top earner had a considerably higher reported earning than the second ranked athlete. In this sense, we further cleaned the data considering the top earners for every year as anomalies, and re-plotted the linear regression model.

A graph showing the difference between an average and an average

Description automatically generated

As we can see from the second model, the positive correlation remains and it even became slightly more positive (0.88x) and in this case, R2 for the model is 0.52, which means that more than half of the variability in the data is explained by the linear regression model.

In conclusion, top earners are earning more in real terms over the years.

**What sport pays it’s top athletes the most?**

Based on the first research question and our individual experiences, we believe that NBA and NFL athletes will be the top earners. To analyze this question, we decided to look at per capita earnings instead of aggregated ones to distinguish individual earnings.

A graph of a chart

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If we look at the scatterplot of adjusted earnings vs time with all of the data (anomalies included), we can see that there are 2-3 points that catch our attention. When deep diving into the data, we found that these points corresponded to boxing legend Floyd Mayweather. Looking into pop culture, 2015’s fight between Floyd Mayweather and Manny Pacquiao was deemed the fight of the century, and Mayweather made a record US$ 275M on a single night according to Forbes.com. Interestingly enough, this fight also made Manny Pacquiao an incredible US$ 100M, making boxing the top sport in earnings that year. A similar situation occurred in 2018 when Mayweather fought Connor McGregor. That year, Mayweather toped the earnings rank with US$ 285M, nearly triple of what the second ranked athlete made that year.

A graph of a bar graph

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If we look at the aggregated data, Basketball has the total aggregated earnings, however, they also have a very high number of entries and therefore the per capita earnings are actually much lower and basketball ranks 5th on the per average adjusted earnings list by sport. The top earning sport in this case is MMA but this is because there is a single athlete in the list from that sport and he is Connor McGregor who fought Floyd Mayweather in his sport in 2018.

In general terms, individual sports appear to pay more than group sports. This makes sense as the events have to pay more athletes for a similar event time in a group sport.

**Limitations and Next Steps**

Because our database only included top earners for every year 10, we constantly ran into the issue of athletes falling off the top 10 and therefore their earnings not being recorded. This alters the data slightly, especially when looking at aggregate earnings. This is why we decided to look at yearly earnings instead of lifetime.

It is also important to recognize that analyzing only top earners means that we are by default analyzing skewed data. In order to get a better idea of the reality of the sporting industry, it would be interesting to obtain a larger sample of salaries from athletes in various earning levels.

Furthermore, we lacked industry data (ex. TV rights, number of spectators, team valuations) to carry out a correlation analysis to understand key drivers for earnings. It would be interesting to understand what the key drivers for yearly earnings are and how these vary by sport and nationality.

Finally, we found a limitation when looking at earnings by nationality. When looking for correlations and drivers for earnings, we looked into nationality, however this is not a variable for where the athlete is playing the sport and therefore some data might be altered, specially in the NBA, NFL and MLB, where the league happens entirely in the USA but some athletes are international.