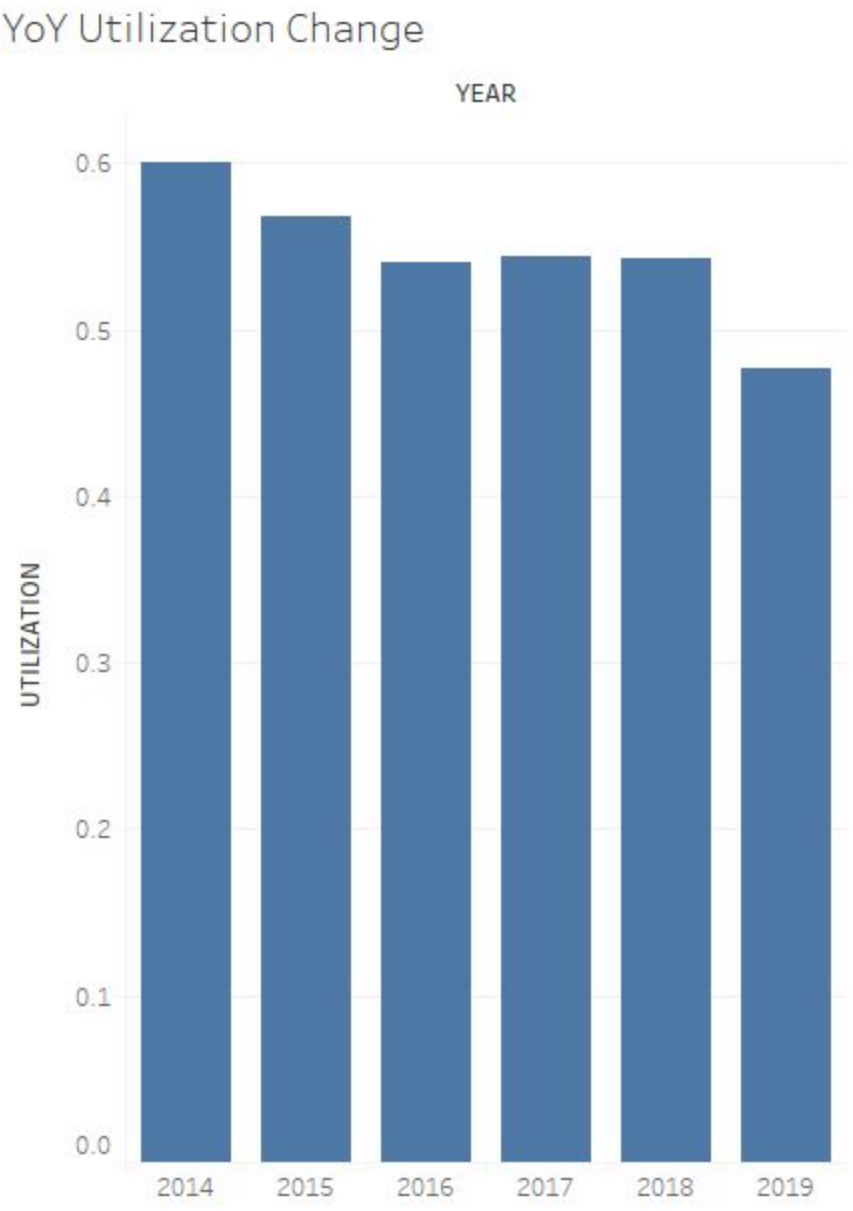
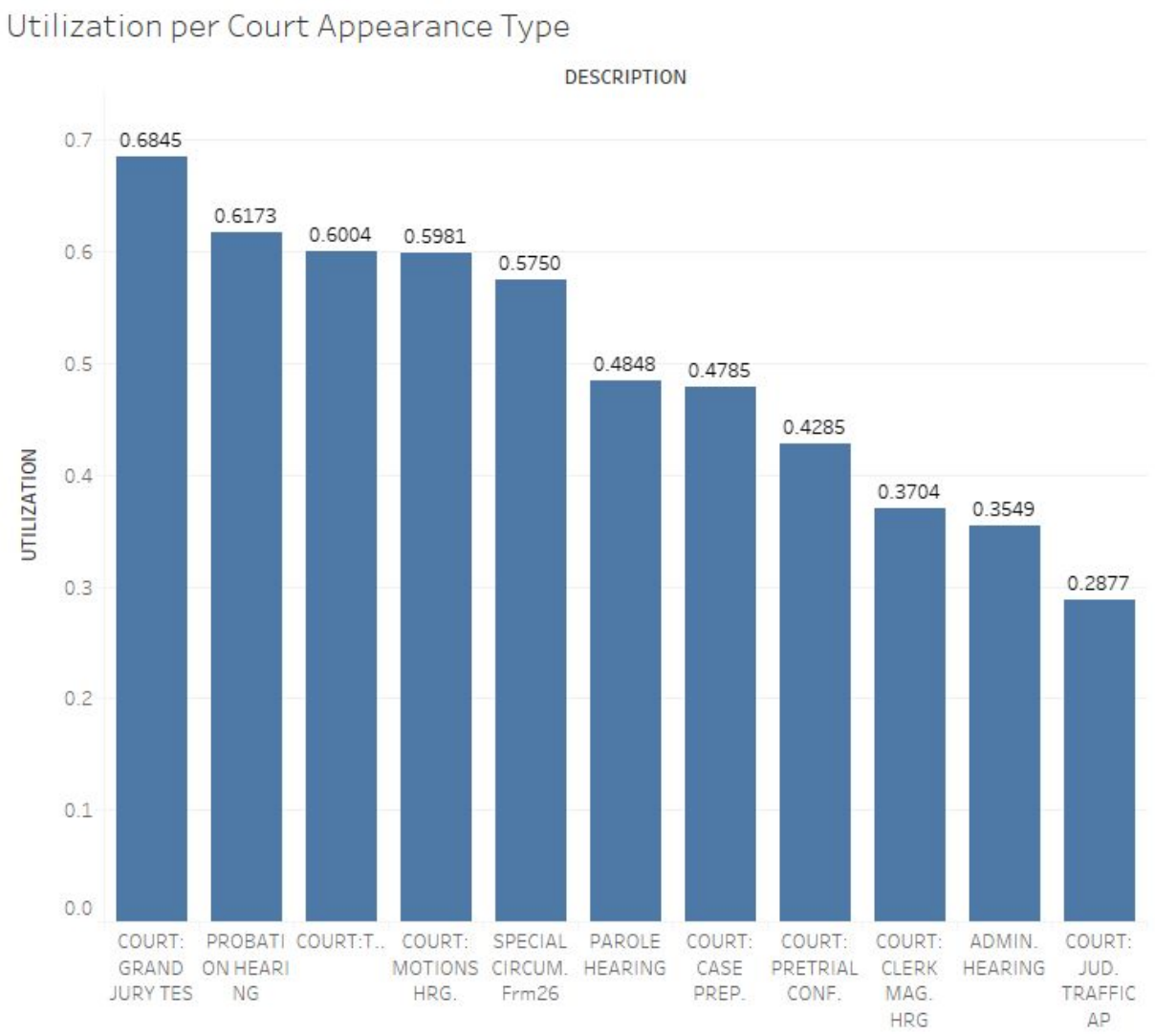
Deliverable 1

For our first deliverable, we tried to answer our second strategic question, looking at the wasteful BPD overtime practices.

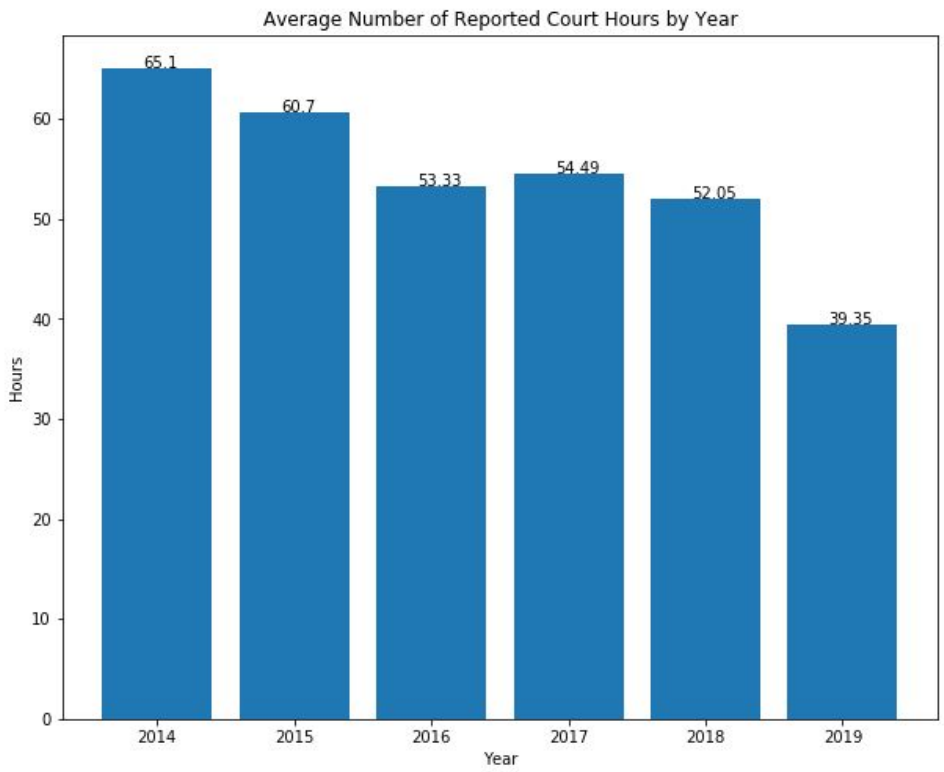


In this image, you can see how the ratio of worked hours in comparison to the hours reported has decreased year over year, meaning that the police overtime budget wasted on overtime hours that aren't actually worked has gone up.

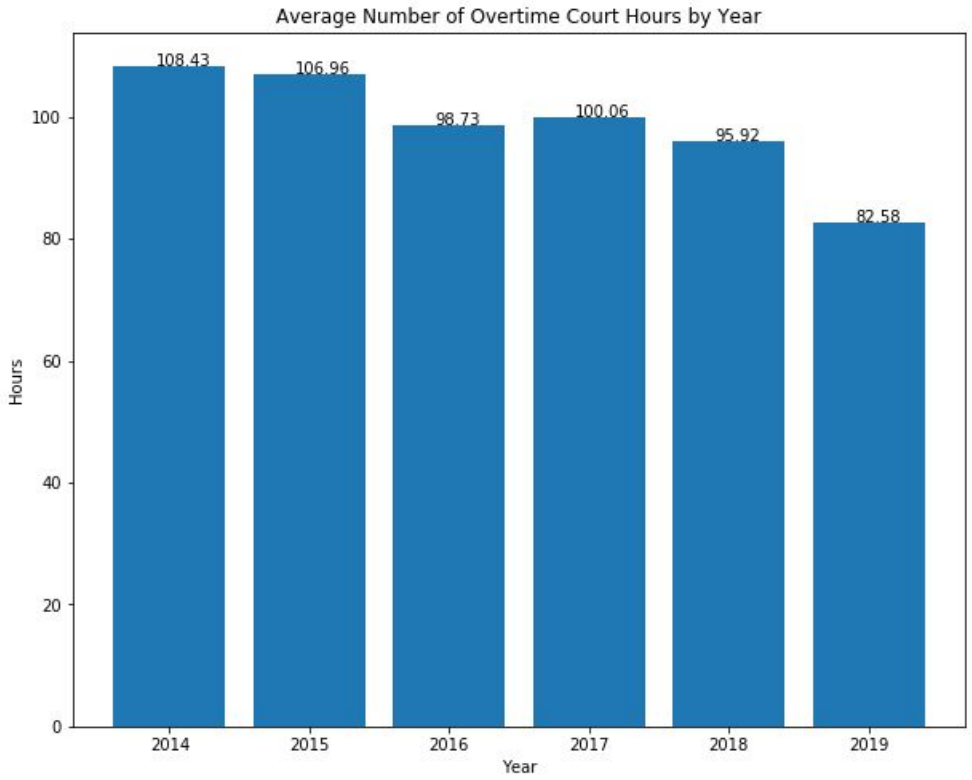


This image shows the ratio of worked hours in comparison to the hours reported based on the court appearance type, showing that the most wasteful is judicial traffic appearances, while the least wasteful is grand jury testimonies.

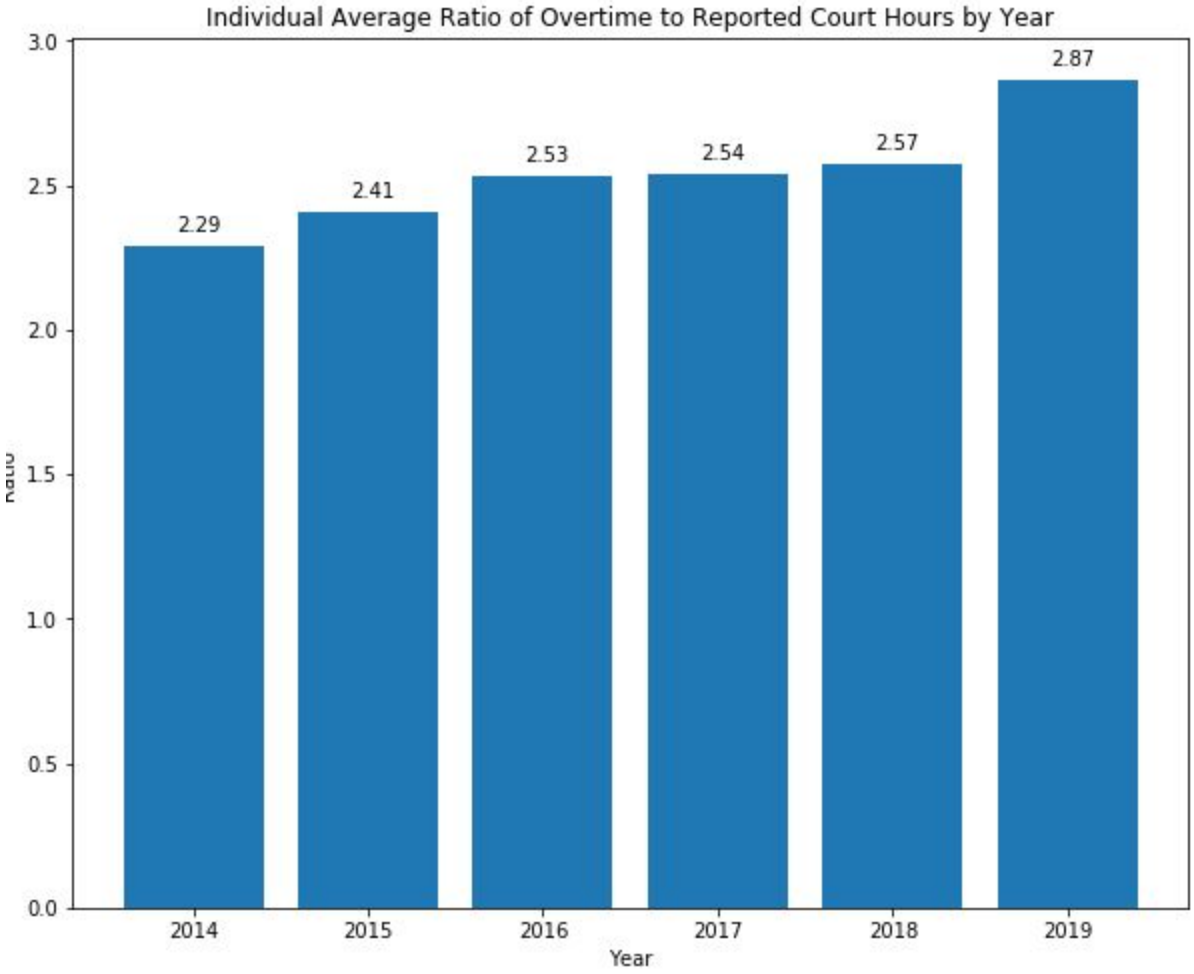
We also analyzed the relation of overtime hours to the reported hours for each individual officer. We can calculate the number of court hours an officer requested on average, in years 2014-2019:



As well as the average number of overtime court hours it those years:



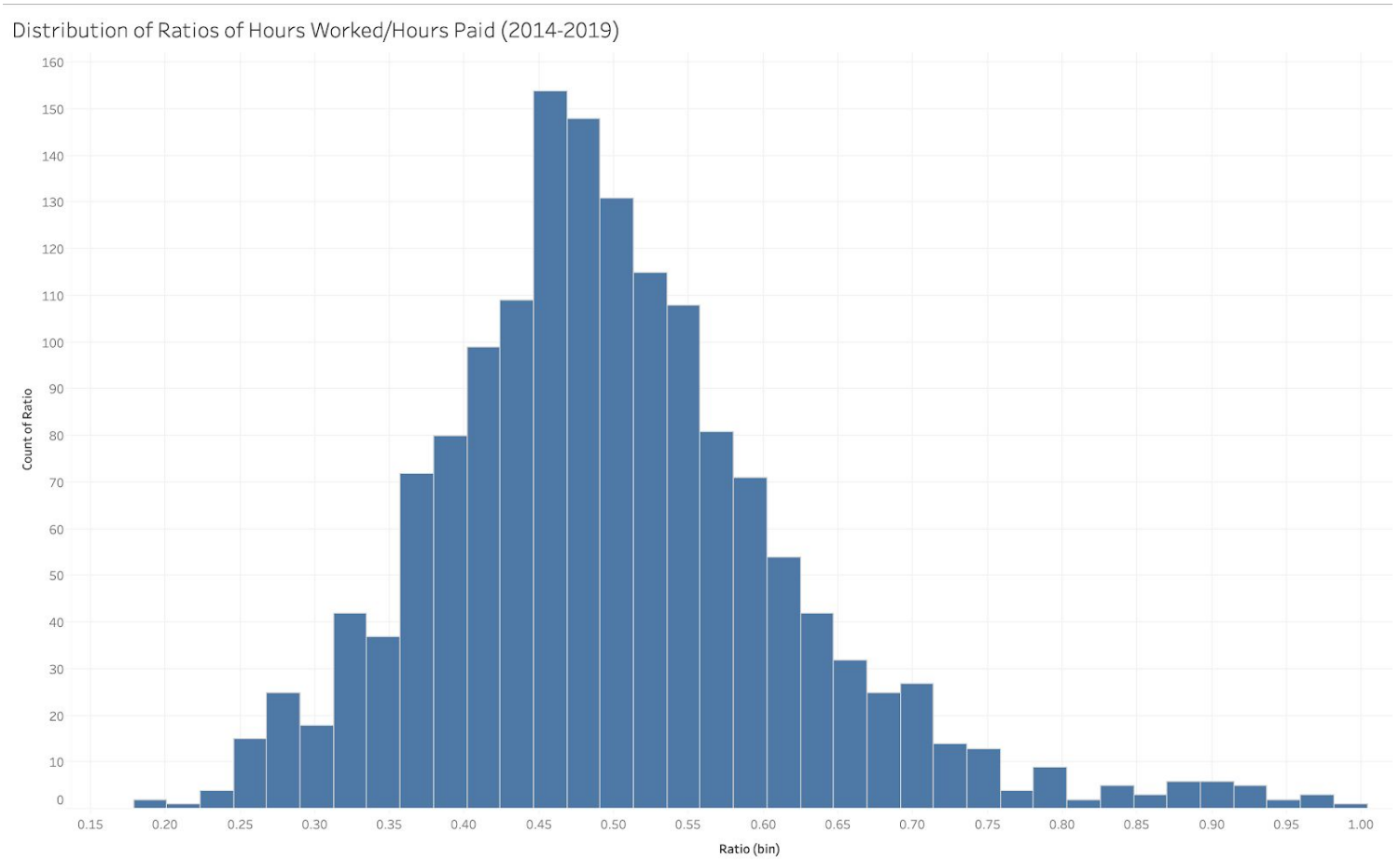
For each officer, we can calculate the overtime/reported ratio by taking a total number of overtime hours to the total of reported hours. We then average the overtime/reported ratios over all officers in a given year to get the individual average overtime/reported court hours. In the chart below we can see this indicator for each year between 2014-2019.



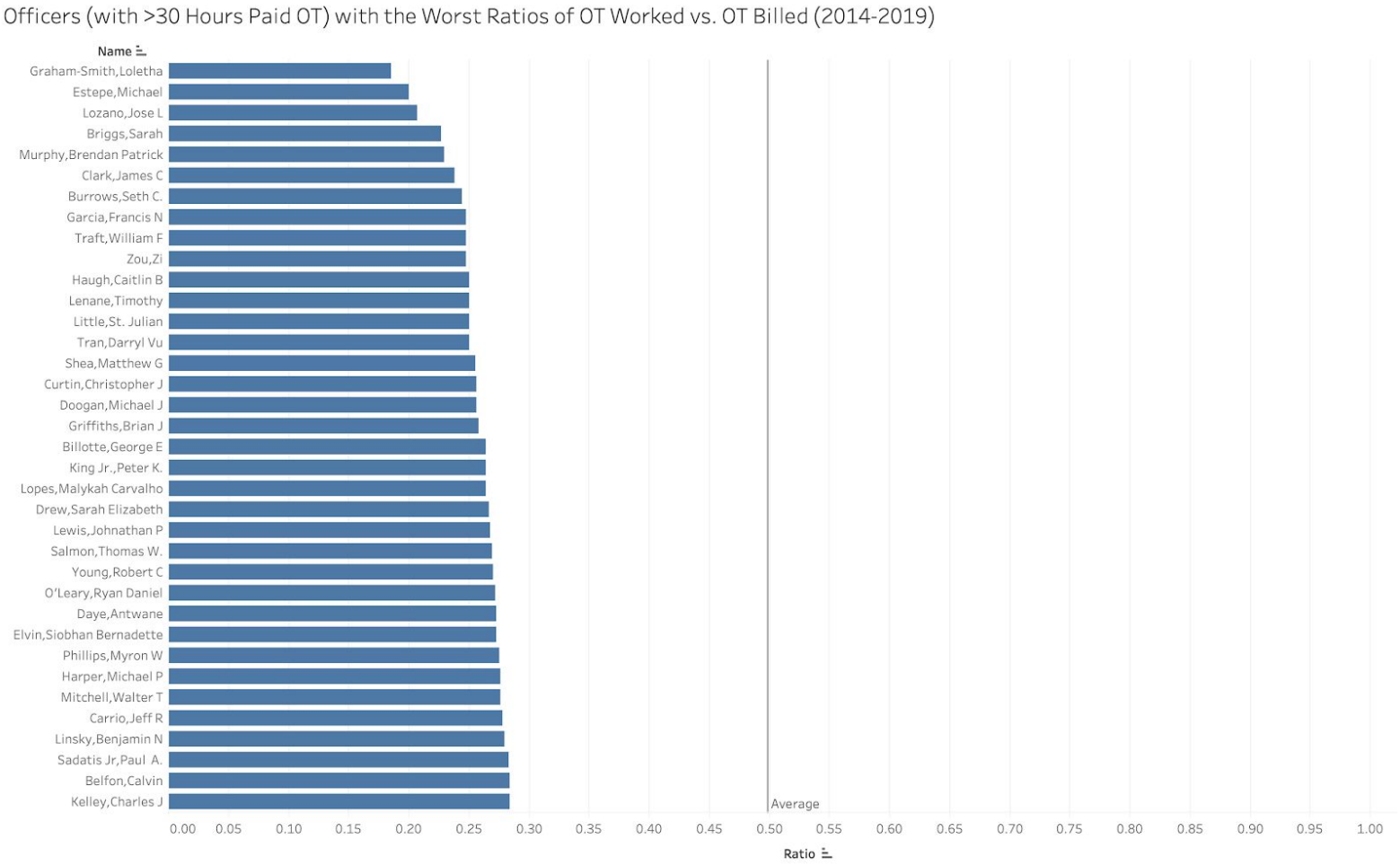
As we can see, it appears that officers on average spent less time in court over the years 2014-2019; however, there is also a noticeable 25% increase from 2014 to 2019 in the amount of overtime hours an officer spent in court on average as opposed to how many hours they had initially reported. The code used to generate these charts in this section is in ‘analysis.ipynb’.

The next subquestion we attempted to answer was: What is the distribution of ratios of overtime worked vs. overtime paid? Are there any outliers?

To do so, first we combined the court overtime data from 2014-2019. Next, we calculated the ratios of $\frac{OT Hours\ Worked}{OT Hours\ Paid}$. The distributions of those looked like this:

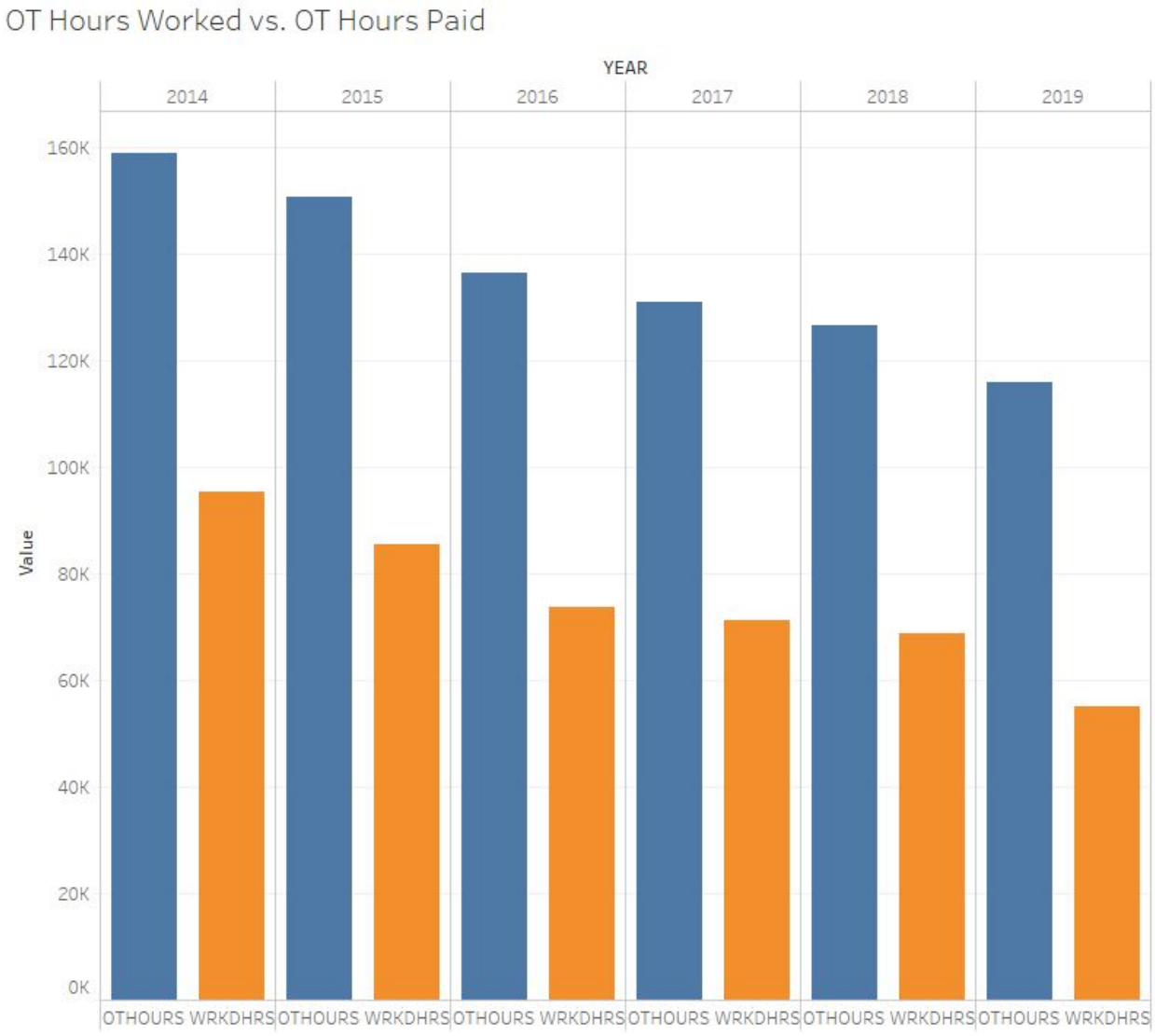


To find some outliers from this data, we plotted the individual officers ratios (looking only at those with over 30 hours of paid overtime - an arbitrary threshold to only look at officers with meaningful data), and sorted by those with the worst (lowest) ratios. Here is what that chart, included is a bar showing the average ratio (.4985).

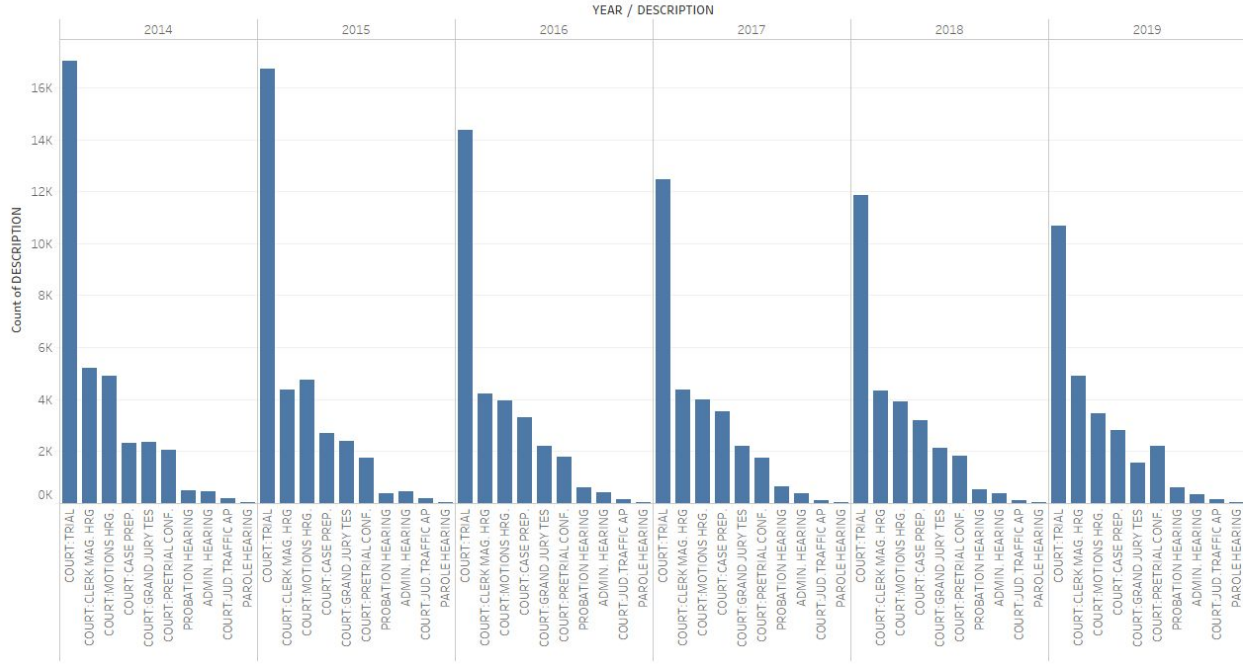


This chart is a useful indicator of officers who are potentially demonstrating excess overtime usage over time.

Below are some extra Tableau charts we generated from the court overtime data that could be of use in answering the broad question being asked.



Count of Descriptions



YoY Utilization Change for Court Appearance Types