Playoff Free Throws

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Overview

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3. Data
4. Analysis on how the playoffs affect free throw percentage
5. Analysis on how the playoffs affect free throw percentage per season
6. Analysis on how the playoffs affect free throw percentage per quarter
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What is a free throw?

- Free shot after a foul
- High Pressure
- Taken 15 feet from the basket

Research Question

What is the impact of the playoffs on free throws?

- Per season
- Per quarter

Why should we care?

- Free Throws bring a lot of pressure
  - Shooter
  - Players
  - Fans
- Playoffs add more pressure
  - Will players fold under the pressure?
  - Will players rise to the occasion?

Data

- 618,019 rows by 13 columns

	period	player	playoffs	shot_made	home_team	visit_team	home_score	visit_score	home_final_score	visit_final_score	minutes	season_start
0	1	Andrew Bynum	0	1	LAL	PHX	1	0	114	106	47.000000	2006
1	1	Andrew Bynum	0	1	LAL	PHX	2	0	114	106	47.000000	2006
2	1	Andrew Bynum	0	1	LAL	PHX	12	18	114	106	29.733333	2006
3	1	Andrew Bynum	0	0	LAL	PHX	12	18	114	106	29.733333	2006
4	1	Shawn Marion	0	1	LAL	PHX	12	21	114	106	29.200000	2006

Data

- There are no missing values
- All of the data types are correct
- Drop the unwanted Columns

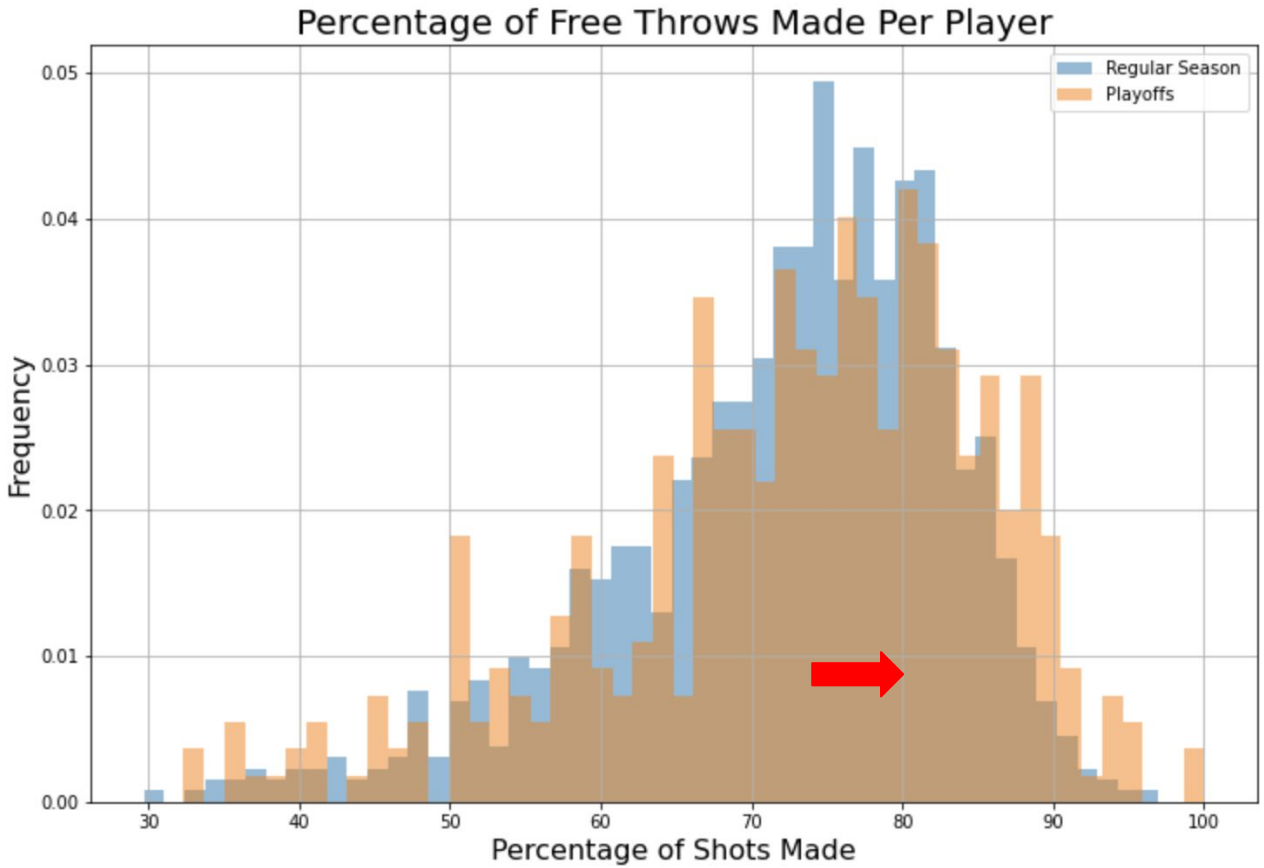
Cleaned Data

- 618,019 rows by 5 columns

	quarters	player	playoffs	shot_made	season_start
0	1	Andrew Bynum	0	1	2006
1	1	Andrew Bynum	0	1	2006
2	1	Andrew Bynum	0	1	2006
3	1	Andrew Bynum	0	0	2006
4	1	Shawn Marion	0	1	2006

Analysis

- How do the playoffs affect free throw percentage?
- There is a lot of outside factors especially player to player


Percentage of Free Throws Made Per Player
Regular Season
Playoffs
Frequency
0.05
0.04
0.03
0.02
0.01
0.00
30
40
50
60
70
80
90
100
Percentage of Shots Made

The mean is relatively the same as well as the lower 25% and the median.

The largest difference between these graphs is the upper 75% which is only different by 2% and not significant.

Regular Season

```
count    977.000000
mean      72.155610
std       11.106802
min       29.729730
25%       66.233766
50%       74.193548
75%       80.212532
max       96.969697
Name: shot_made, dtype: float64
```

Playoffs

```
count    405.000000
mean      73.003350
std       12.890361
min       32.352941
25%       66.666667
50%       75.213675
75%       82.222222
max      100.000000
Name: shot_made, dtype: float64
```

Analysis

Conclusions

- An average player shoots from 70-80%
- No evidence that players shoot better in the playoffs
  - The playoff histogram is shifted to the right
  - But not significant enough to make any conclusions
- Similar range from both histograms
- More players on the high end of playoffs compared to the regular season

Analysis

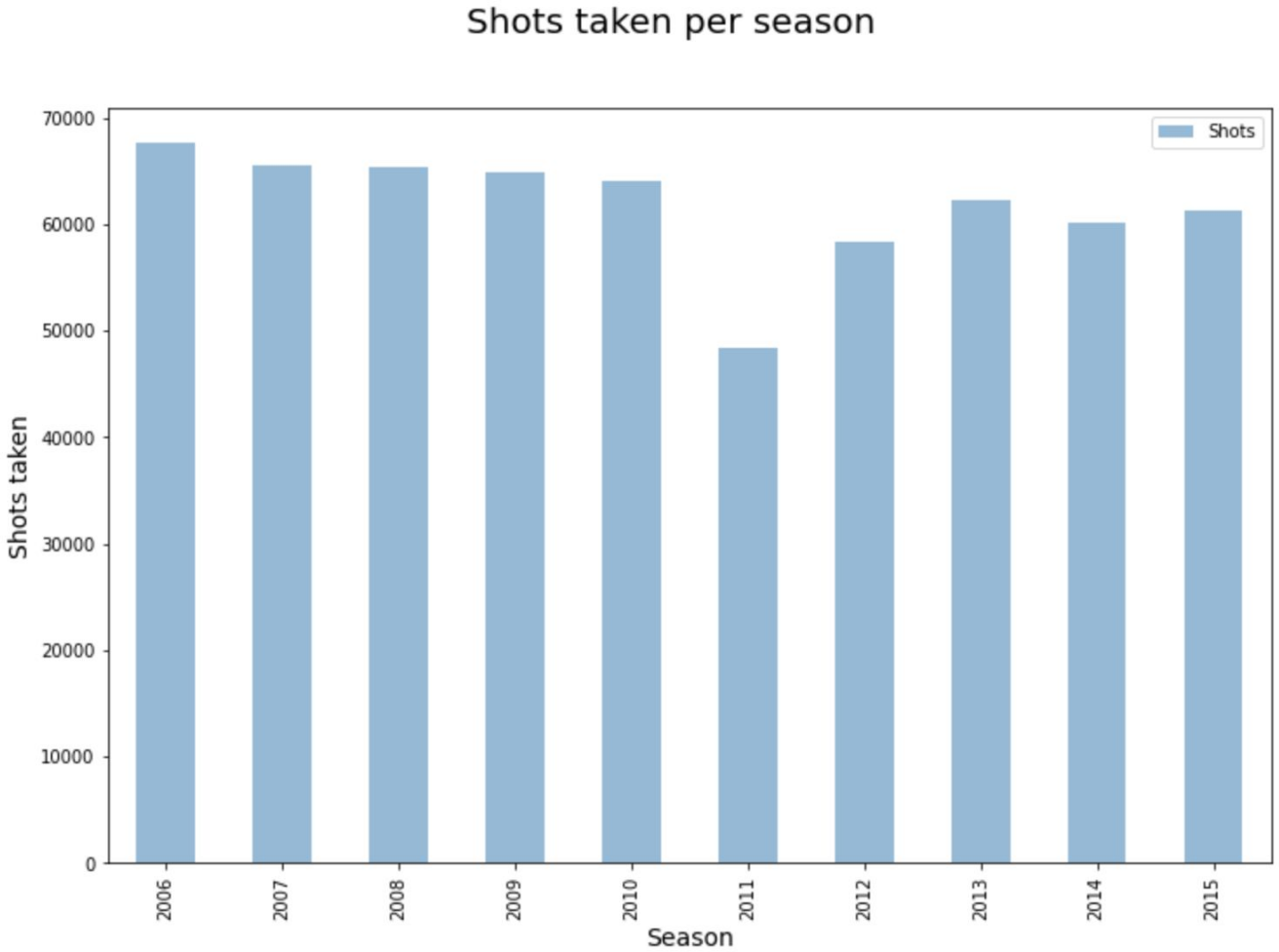
This now leads us to more questions

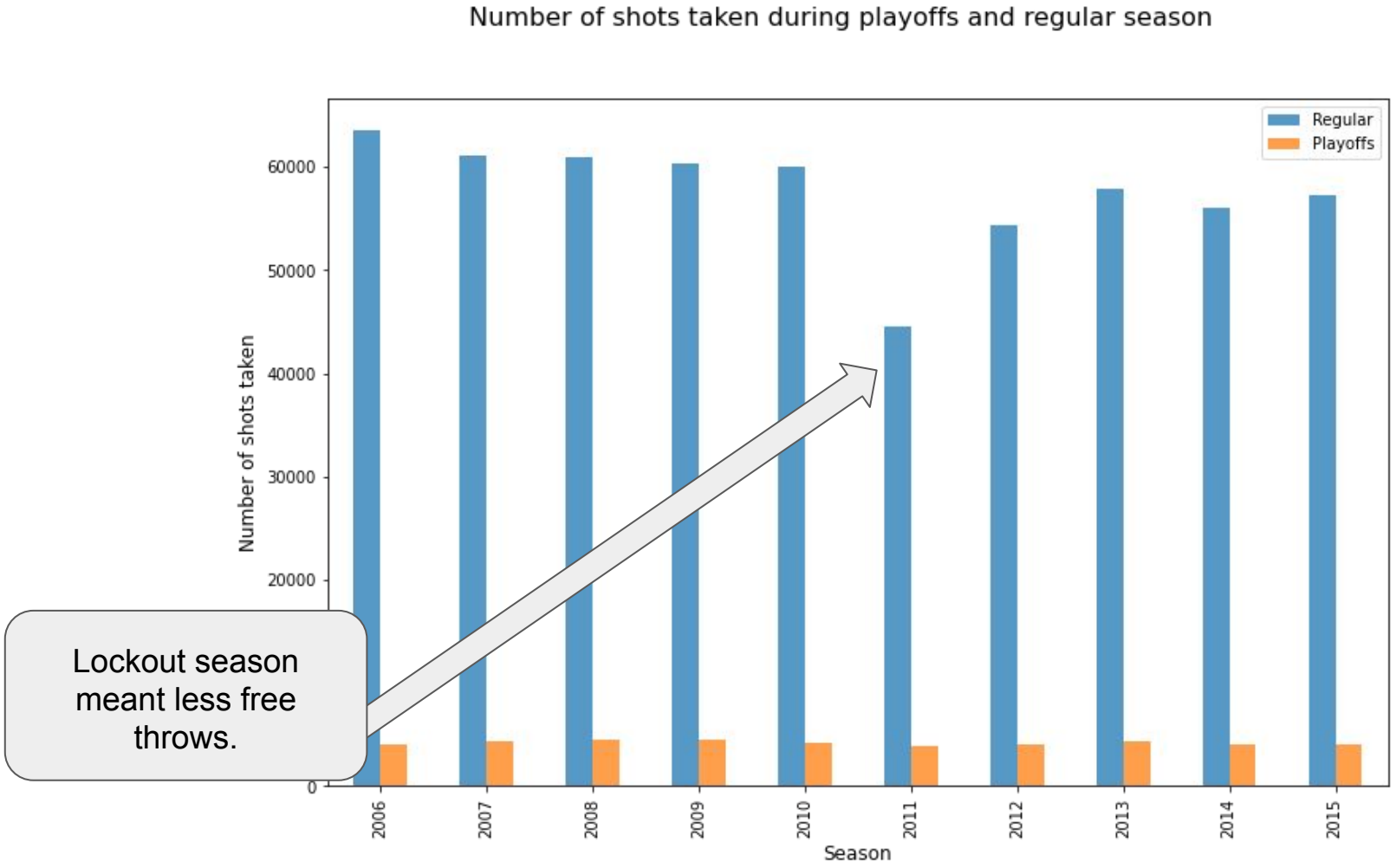
- Although we see no initial evidence:
- Is this trend constant per season?
- Is there discrepancies per quarter?

Free Throw Percentage by Season

How do playoffs affect free throw percentage by season?

season_start	
2006	67612
2007	65500
2008	65355
2009	64804
2010	64137
2011	48459
2012	58376
2013	62290
2014	60131
2015	61355




Number of shots taken during playoffs and regular season
Regular
Playoffs
Number of shots taken
60000
50000
40000
30000
20000
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Season
Lockout season meant less free throws.

season_start	playoffs	shot_made	
2006	0	0	15712
		1	47784
	1	0	1059
		1	3057
2007	0	0	14933
		1	46183
	1	0	1073
		1	3311
2008	0	0	13964
		1	46936
	1	0	1071
		1	3384
2009	0	0	14550
		1	45807
	1	0	1101
		1	3346
2010	0	0	14177
		1	45775
	1	0	947
		1	3238
2011	0	0	11016
		1	33471
	1	0	977
		1	2995
2012	0	0	13478
		1	40820
	1	0	1017
		1	3061
2013	0	0	14123
		1	43778
	1	0	1040
		1	3349
2014	0	0	14013
		1	42069
	1	0	1113
		1	2936
2015	0	0	13942
		1	43362
	1	0	1024
		1	3027

Shots made/missed regular

Shots made/missed in playoffs

Sum of shots made + missed in 1st box = total shots taken in regular
Sum of shots made + missed in 2nd box = total shots taken in playoffs

Regular

season_start	
2006	63496
2007	61116
2008	60900
2009	60357
2010	59952
2011	44487
2012	54298
2013	57901
2014	56082
2015	57304

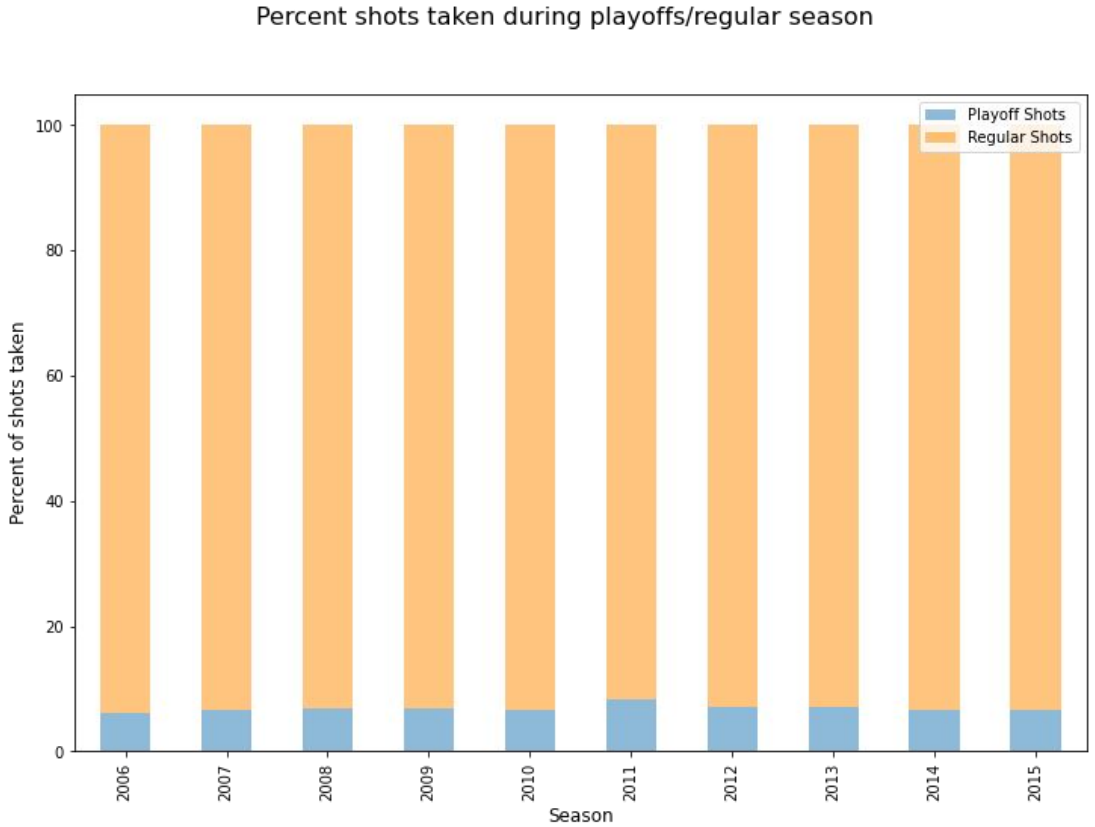
Playoffs

season_start	
2006	4116
2007	4384
2008	4455
2009	4447
2010	4185
2011	3972
2012	4078
2013	4389
2014	4049
2015	4051

Due to NBA lockout

Playoffs vs. Regular

season_start		season_start	
2006	6.087677	2006	93.912323
2007	6.693130	2007	93.306870
2008	6.816617	2008	93.183383
2009	6.862231	2009	93.137769
2010	6.525095	2010	93.474905
2011	8.196620	2011	91.803380
2012	6.985748	2012	93.014252
2013	7.046075	2013	92.953925
2014	6.733632	2014	93.266368
2015	6.602559	2015	93.397441



season_start	shot_made	
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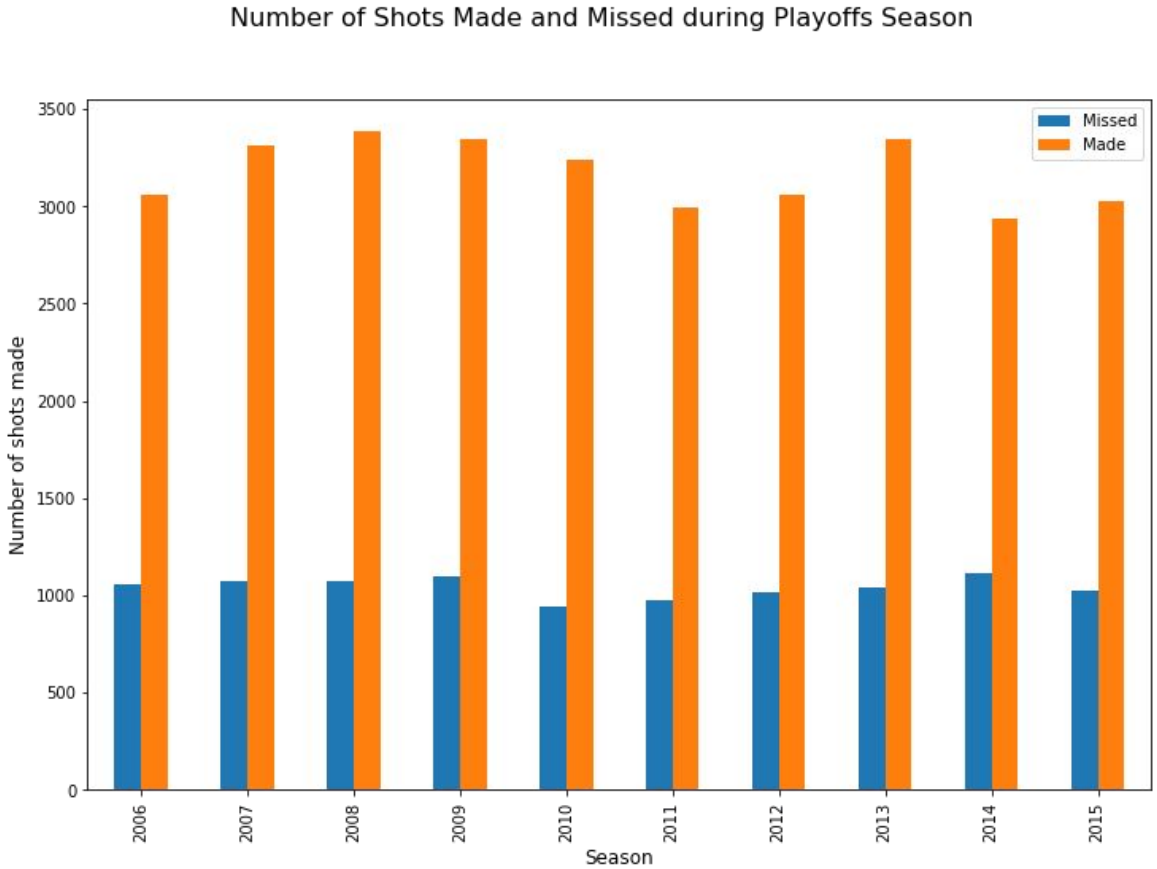
	1	3057
2007	0	1073
	1	3311
2008	0	1071
	1	3384
2009	0	1101
	1	3346
2010	0	947
	1	3238
2011	0	977
	1	2995
2012	0	1017
	1	3061
2013	0	1040
	1	3349
2014	0	1113
	1	2936
2015	0	1024
	1	3027



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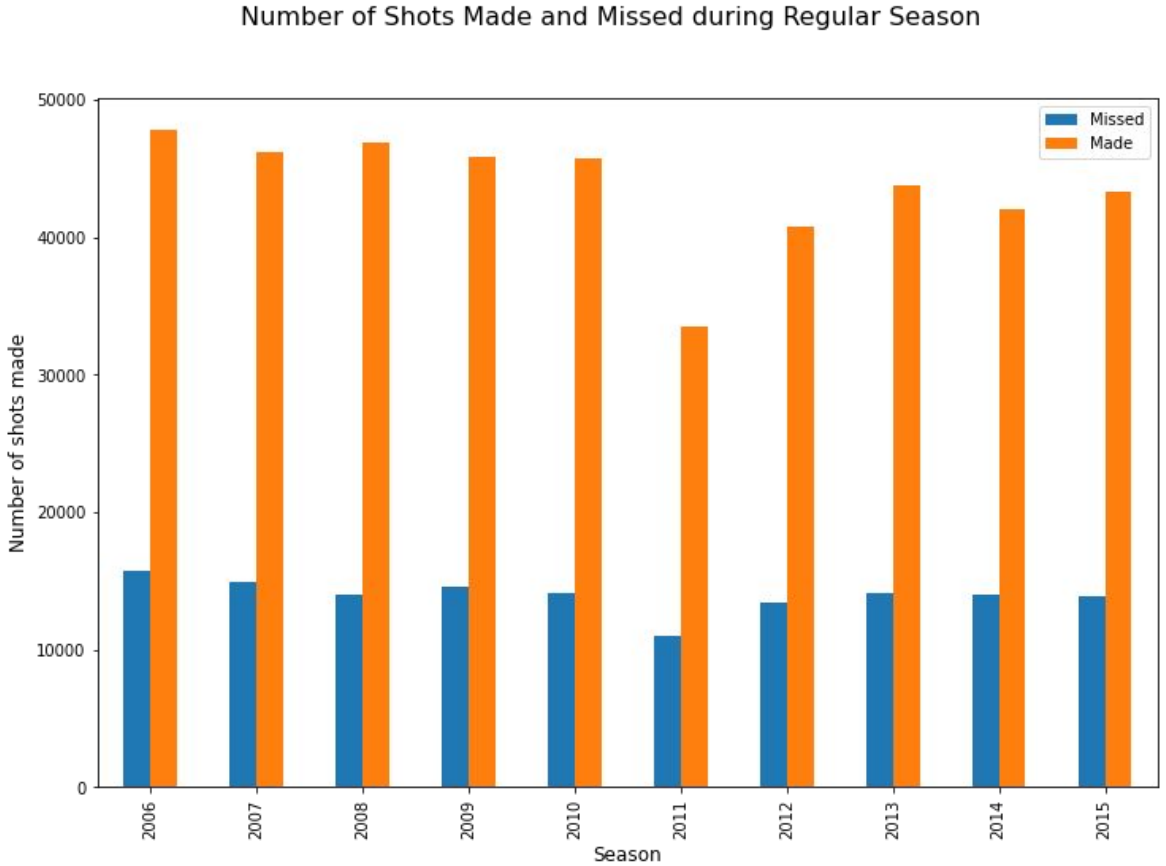
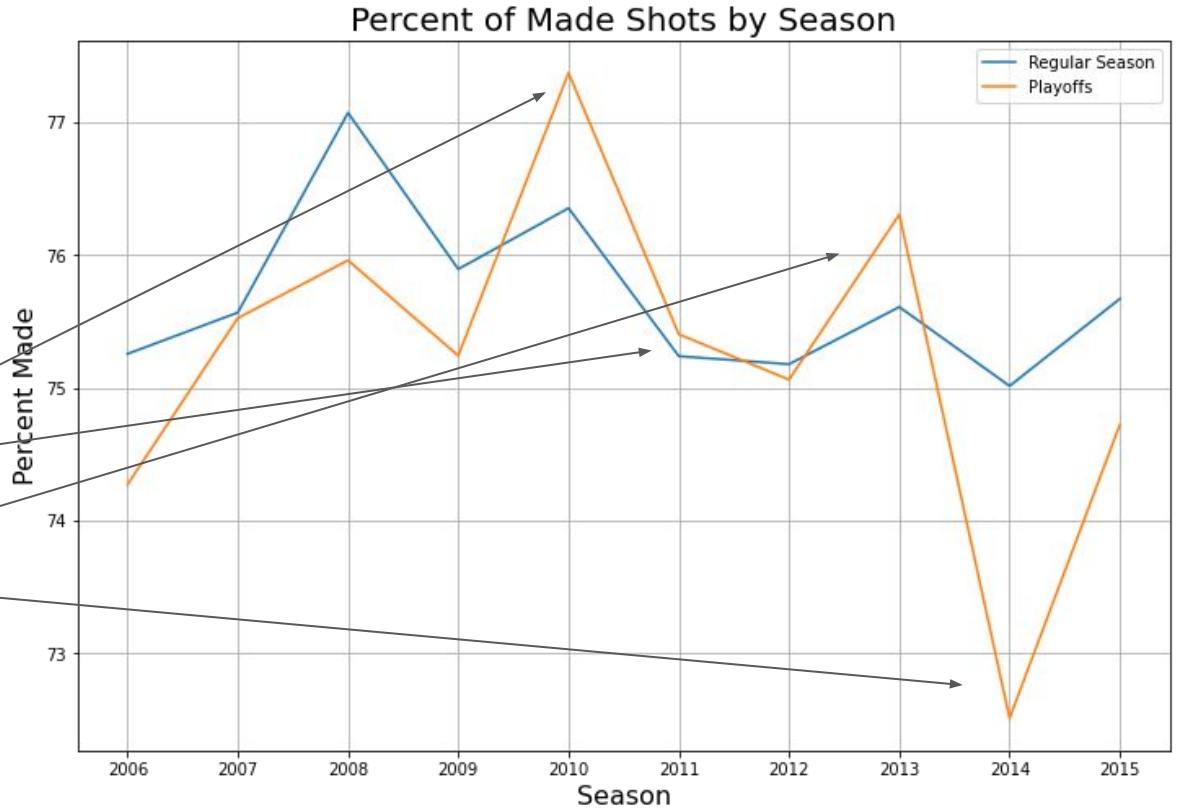
	1	42069
2015	0	13942
	1	43362



	Regular	Playoffs
2006	75.255134	74.271137
2007	75.566137	75.524635
2008	77.070608	75.959596
2009	75.893434	75.241736
2010	76.352749	77.371565
2011	75.237710	75.402820
2012	75.177723	75.061305
2013	75.608366	76.304397
2014	75.013373	72.511731
2015	75.670110	74.722291



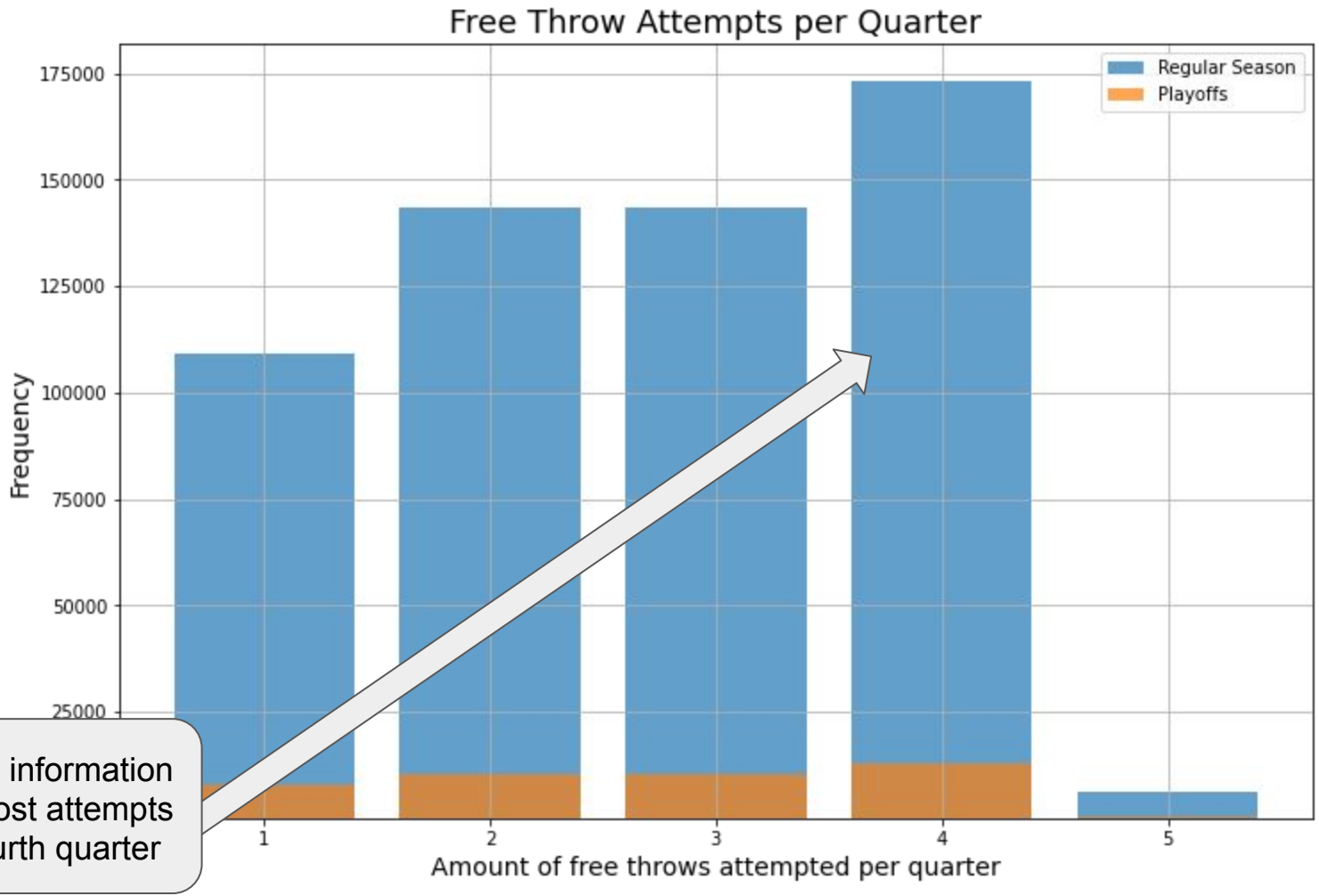
Analysis

Conclusion

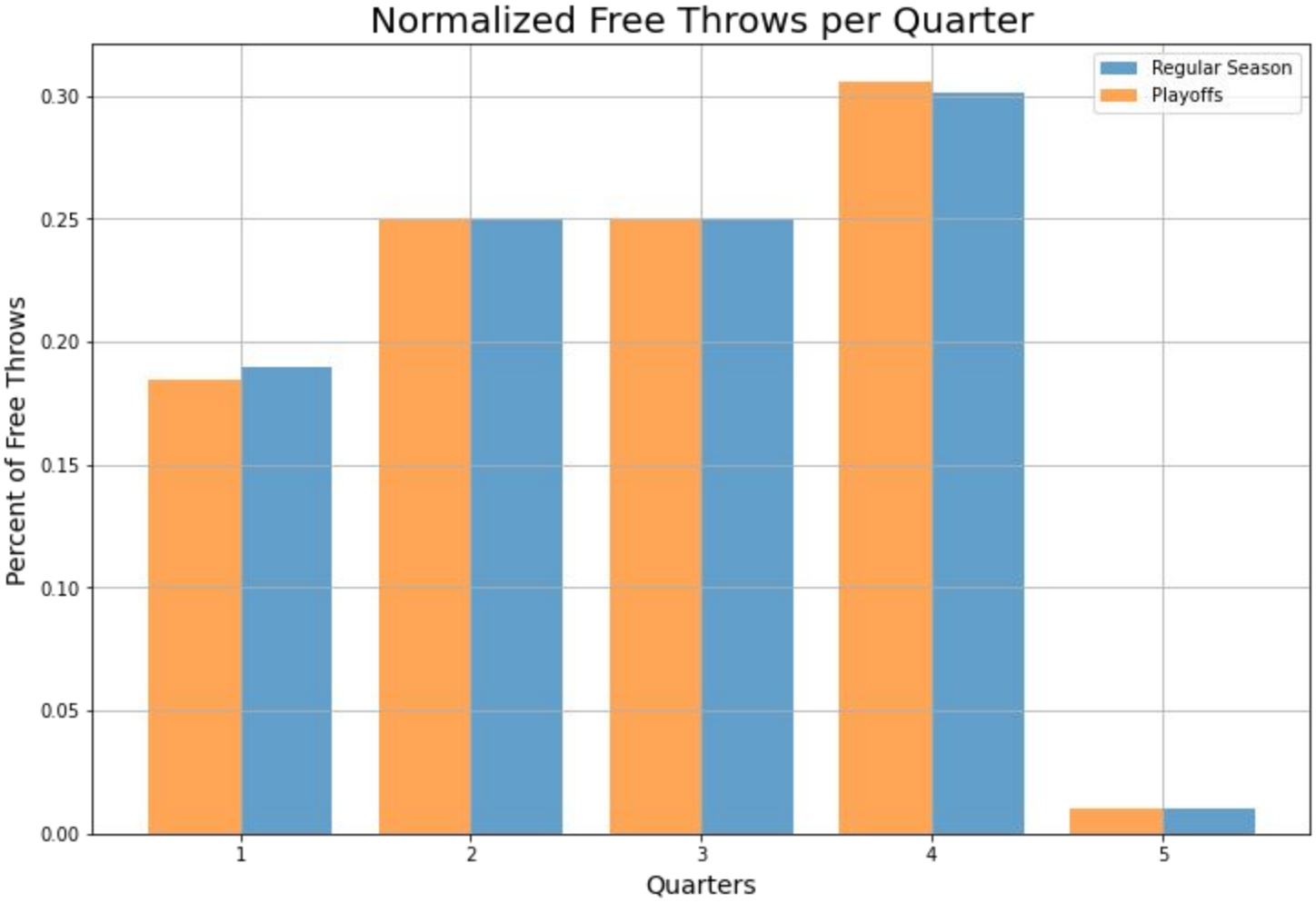
- Each season is different
    - Vary on teams that are playing that season
    - The pressure of environment
        - Away games vs home games
        - Players shooting

Free Throw Percentage per Quarter

- How does the time affect the free throw percentage?
- Are there any differences of percentage between regular season and playoffs?
- Overtime periods are all combined together as fifth quarter.



Not much information except most attempts in the fourth quarter


Normalized Free Throws per Quarter
Regular Season
Playoffs
Percent of Free Throws
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1
2
3
4
5
Quarters

Analysis

- The number of free throw attempts (POs vs Regular, Normalized)
- The ratio of free throw attempts per quarter is quite similar.
    - The current (tempo?) of games always appears in a similar aspect. (Doesn’t matter the game in playoffs or regular season)

	Playoffs	Regular Season
1	75.269923	75.655328
2	74.509617	75.383395
3	75.420587	76.093240
4	75.579862	75.614947
5	79.861111	77.703938

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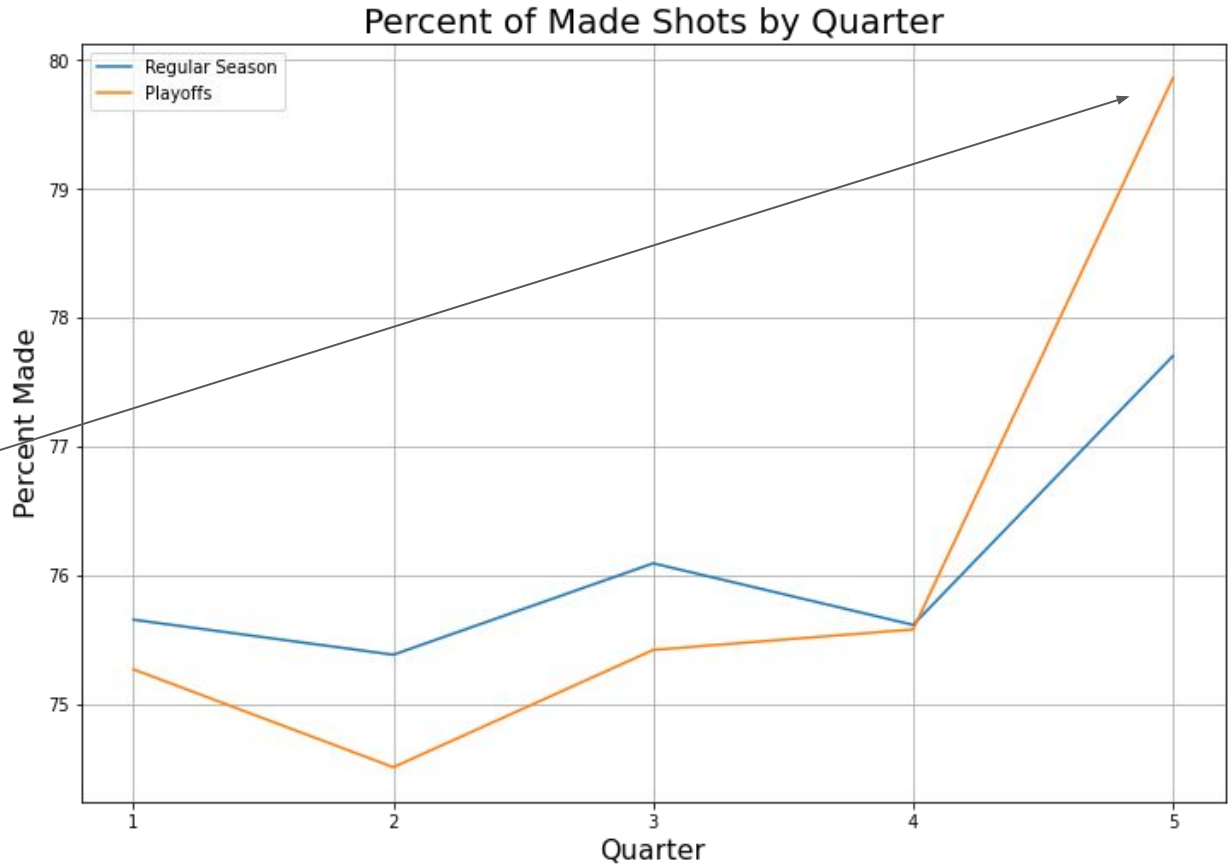

Analysis

- The percentage of made free throw shots. (POs vs Regular)
- The first quarter shows higher percentage than the second quarter.
- After half time, the third quarter has higher percentage than the fourth quarter.
- In the overtime, we can say that players are in the zone.
    - The desire of winning.
    - Interesting fact is for the first to fourth quarters, playoffs have a lower percentage, but in overtime it becomes much higher than in regular season.

Final Conclusions

Free Throw Percentage Per Season

- Not much trend in regards to playoffs vs regular season
- We conclude this is due to outside factors
  - Players/Atmosphere
  - World Factors
  - Refs
  - etc.

Final Conclusions

Free Throw Percentage Per Player

- Small shift in histogram towards higher percentage
- The shift is not significant enough to say playoffs have an affect

Free Throw Percentage Per Player

- Throughout the game playoff percent is less than regular season
- Large, noticeable jump at fourth quarter and in overtime

Final Conclusions

Free Throw Percentage per Quarter

- The playoffs do not affect free throw shooting percentage. Overall, the regular season vs playoffs comparison showed similar results.

- Players only shoot at the free throw line considerably better during overtime especially during the playoffs. Most likely since best players are playing and rising to the occasion.