

The background image is a collage. At the top, a basketball hoop and backboard are visible. In the center, a large yellow banner features the Liaoning Flying Leopards logo, which includes a stylized leopards head and the word 'LIAONING'. Below the banner, several basketball players in white jerseys with black numbers are shown in action. The text 'The 2021-2022 Liaoning Flying Leopards; the best championship team in franchise history' is overlaid in a bold, italicized white font. A thin white horizontal line is positioned below the title.

# ***The 2021-2022 Liaoning Flying Leopards; the best championship team in franchise history***

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## Liao Ning Flying Leopard

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- The Liaoning Flying Leopards won the Chinese Basketball Association championships in the 2017 and 2021 seasons. In both 2018 and 2019, the Leopards kept their 2017 lineup but lost to the Southern Tigers. In the past, people thought the 2017 team was better because the team was unstoppable on offense.
- Now that the Flying Leopards have won a championship with an altered lineup and a different coach, some people are considering otherwise. The 2022 team was more versatile, and there have been debates about whether the 2021 is in fact better than the 2017 team.
- Due to such big adjustment in the team in just a few years, we decided to investigate which team should be considered the the best team in franchise history.





## Hypothesis

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- Based on the sheer sensation that the Leopards bring during the 2021 season playoffs as they went 9-0, we think the 2021 season will be a better team.





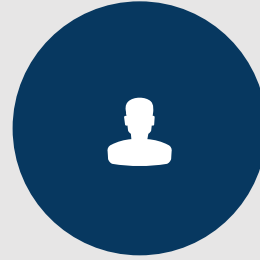
### Data Set



Obtained from  
'Basketball Reference.com'



Filtered the data to remove  
ratings that are unnecessary for  
our calculation.



Added this additional  
data from  
'nbastuffer.com'

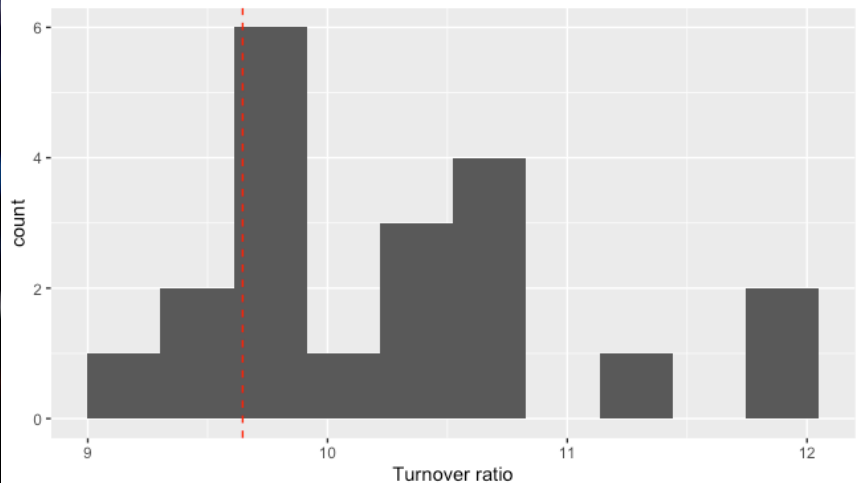


We want to use those metrics  
to compare which is the better  
team between 2017 and 2021  
season.

## Turnover ratio Analysis

Histogram of CBA2017-18 season turnover ratio

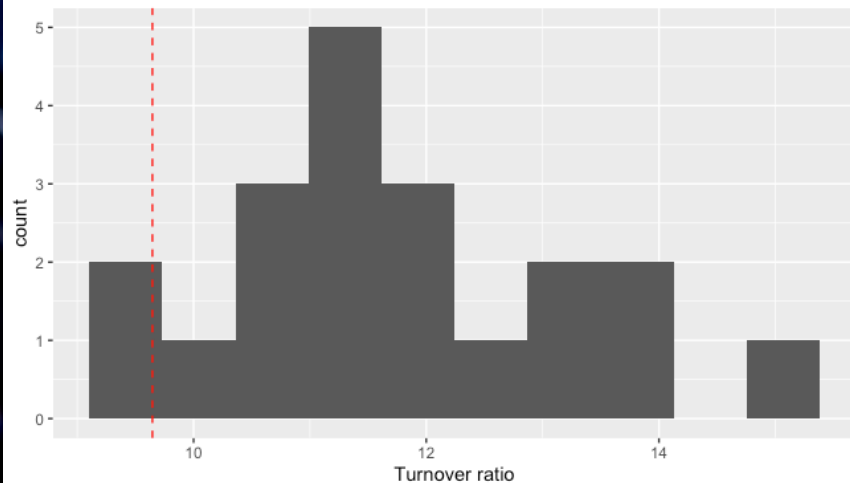
Each dot represents an individual team and the dashed line indicates the leopards, Lower is better



Made by Eddy Yue

Histogram of CBA2021-22 season turnover ratio

Each dot represents an individual team and the dashed line indicates the leopards, Lower is better



Made by Eddy Yue

## Turnover ratio Analysis

Club	mean_turnover_ratio	turnover_ratio_zscore
Fujian Sturgeons	10.26553	-1.27192676
Beikong Fly Dragons	10.26553	-1.17086127
Xinjiang Flying Tigers *	10.26553	-0.93991730
Guangdong Southern Tigers *	10.26553	-0.79353540
Liaoning Flying Leopards *	10.26553	-0.78812305
Zhejiang Guangsha Lions *	10.26553	-0.77774078
Bayi Rockets	10.26553	-0.72106561
Shanghai Sharks *	10.26553	-0.66405137
Guangzhou Long-Lions *	10.26553	-0.48250737
Shandong Golden Stars *	10.26553	-0.37011394
Nanjing Monkey Kings	10.26553	-0.04555247
Qingdao Eagles	10.26553	0.19500635
Beijing Ducks *	10.26553	0.25709259
Shanxi Brave Dragons	10.26553	0.36972221
Zhejiang Golden Bulls	10.26553	0.43280692
Jiangsu Dragons *	10.26553	0.55695360
Shenzhen Leopards *	10.26553	0.68966819
Tianjin Gold Lions	10.26553	1.24111947
Jilin Northeast Tigers	10.26553	2.06234942
Sichuan Blue Whales	10.26553	2.22074478

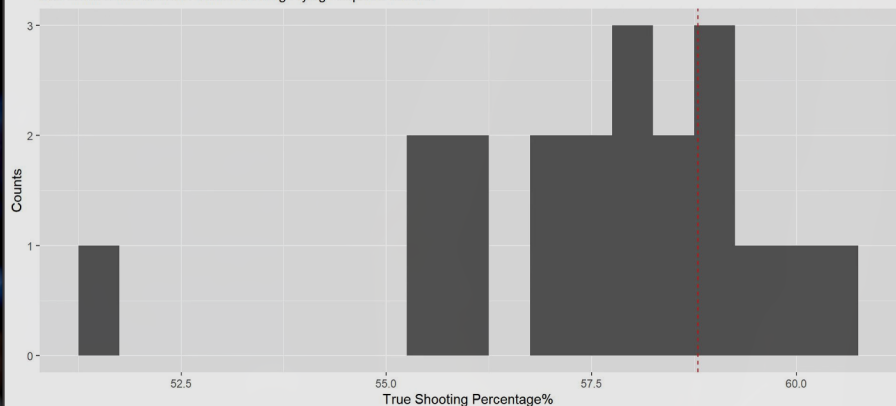
Club	mean_turnover_ratio	turnover_ratio_zscore
Shanxi Loongs	11.69927	-1.72420952
Jilin Northeast Tigers	11.69927	-1.58981276
Guangzhou Loong Lions	11.69927	-0.94430044
Liaoning Flying Leopards	11.69927	-0.76921740
Beijing Ducks	11.69927	-0.74373418
Shenzhen Aviators	11.69927	-0.63481821
Tianjin Pioneers	11.69927	-0.43080162
Xinjiang Flying Tigers	11.69927	-0.29746251
Shanghai Sharks	11.69927	-0.28097270
Zhejiang Golden Bulls	11.69927	-0.13316551
Shandong Heroes	11.69927	-0.09934997
Fujian Sturgeons	11.69927	-0.03147762
Zhejiang Guangsha Lions	11.69927	0.03275107
Qingdao Eagles	11.69927	0.17794084
Nanjing Monkey Kings	11.69927	0.49471910
Guangdong Southern Tigers	11.69927	0.99324871
Ningbo Rockets	11.69927	1.20401975
Beijing Royal Fighters	11.69927	1.24840193
Sichuan Blue Whales	11.69927	1.46253586
Jiangsu Dragons	11.69927	2.06572810



# True Shooting Percentage Analysis

True Shooting Percentage of all teams in CBA in season 2017-2018

Red-dashed line indicate where Liaoning Flying Leopards located



Season 2017-2018:

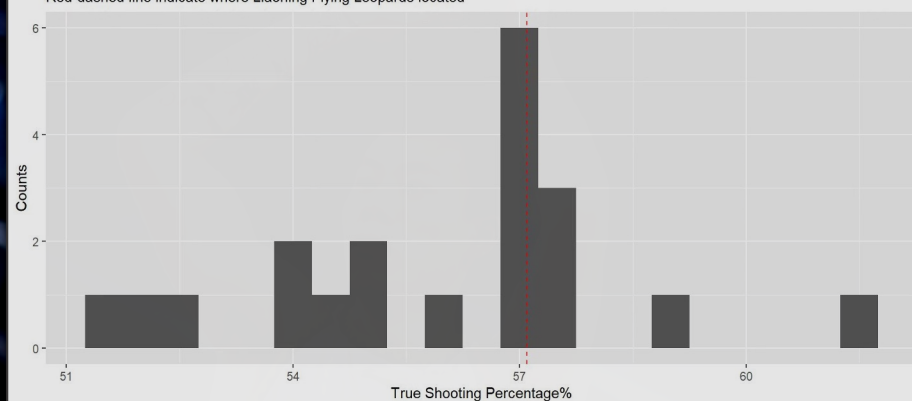
mean: 57.56%

SD: 1.96%

z-score: 0.563

True Shooting Percentage of all teams in CBA in season 2021-2022

Red-dashed line indicate where Liaoning Flying Leopards located



Season 2021-2022:

mean: 55.99%

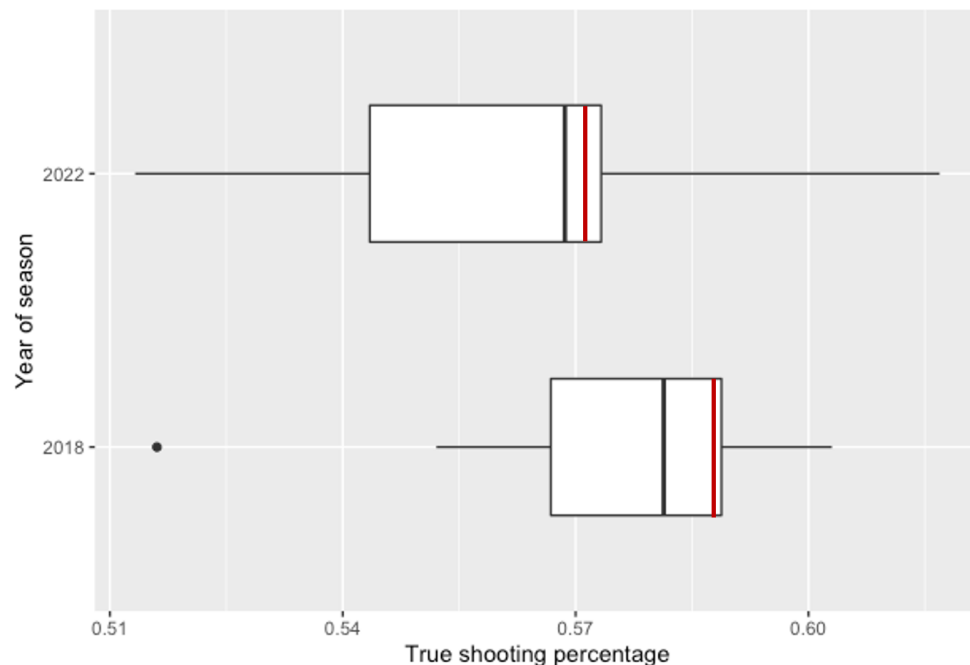
SD: 2.42%

z-score: 0.459



Liaoning Flying Leopard seems to perform better in season 2017-2018 with a higher z score. However, since both z-scores are within 2, that means Liaoning's TSP is not in the top ranking in the league (just solidly above the average). Therefore, we cannot conclude Liaoning Flying Leopard is qualified for the championship on the scale of True Shooting Percentage(TSP)

Boxplot of CBA2021-22 and 2017-18 season true shooting percentage



Season 2017-2018:

mean: 57.56%

SD: 1.96%

z-score: 0.563

Season 2021-2022:

mean: 55.99%

SD: 2.42%

z-score: 0.459



Liaoning Flying Leopard seems to perform better in season 2017-2018 with a higher z score. However, since both z-scores are within 2, that means Liaoning's TSP is not in the top ranking in the league (just solidly above the average). Therefore, we cannot conclude Liaoning Flying Leopard is qualified for the championship on the scale of True Shooting Percentage(TSP)



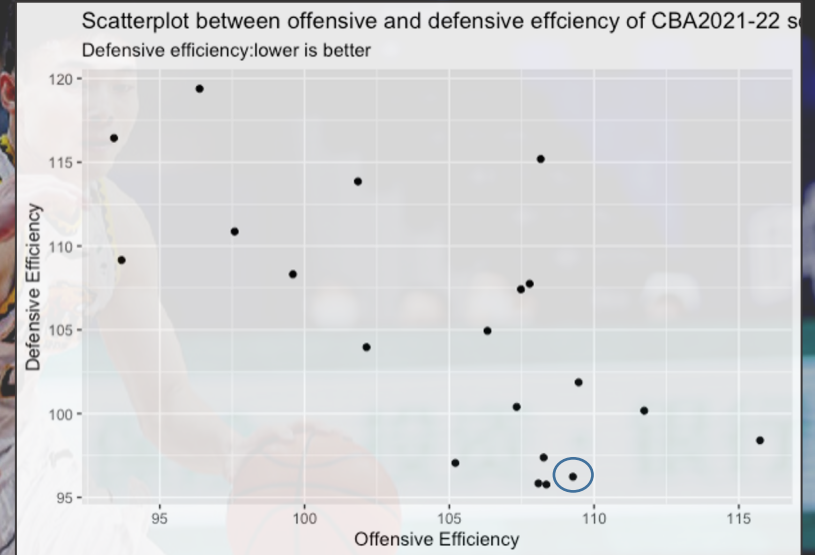
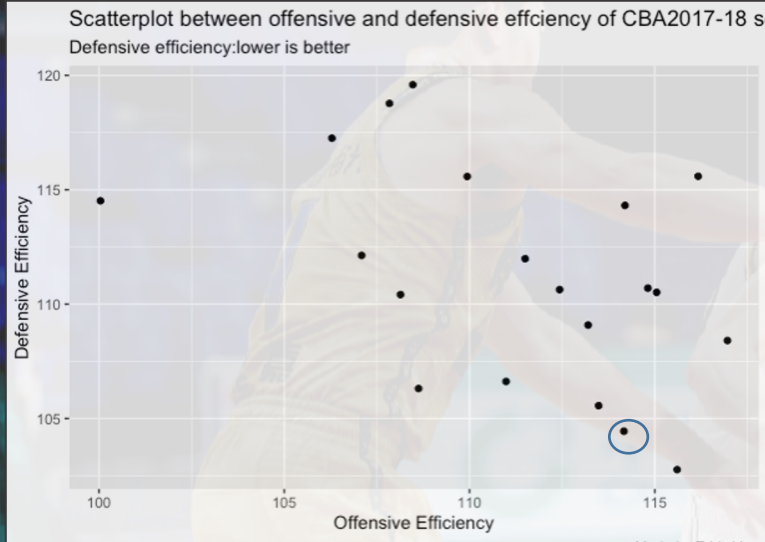
Possible Reason Why Liaoning's TSP is getting relatively lower in season 2021:

2 strong foreign players left in 2021-2022 season

Name	Usage Percentage	True Shooting Percentage
Lester Hudson	27.9% (17.3%)	63.1% (54%)
Brandon Bass	28.7% (17.3%)	63.1% (54%)



## Efficiency analysis

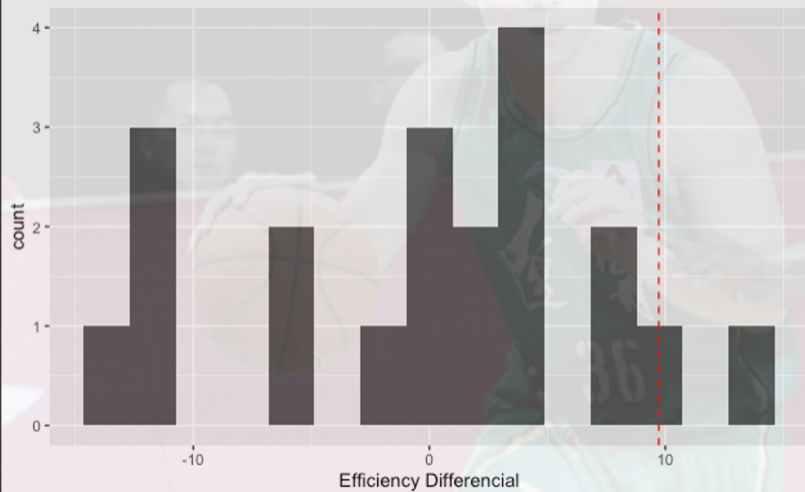


- Scatterplot showing the moderately strong negative association between defensive efficiency and offensive efficiency.
- $r=-0.45$  for 2018,  $r=-0.69$  for 2022.
- The graph from 2021-22 season scattered diagonally whereas the 2017-18 season mostly gathered on the right side, indicating a decrease in league efficiency. So why did that happen?

## Efficiency analysis

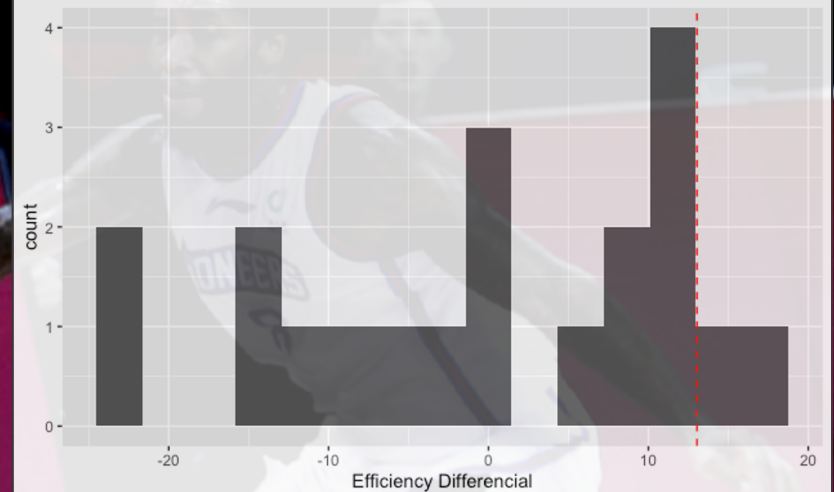
Histogram of CBA2017-18 season efficiency differential

Dashed line indicates the Leopards



Histogram of CBA2021-22 season efficiency differential

Dashed line indicates the Leopards



- There are more teams less efficient overall and less teams at around the same level of efficiency than the Leopards from 2017-18 compared to 2021-22
- Which means teams are allowing the Leopards to score more points on them than they do verses the Leopards, on average, and vice versa



## Efficiency analysis

ave_Offensive_Efficiency	sd_Offensive_Efficiency	ave_Defensive_Efficiency
111.2483	4.202624	111.26
sd_Defferensive_Efficiency	ave_Efficiency_Dfferencial	sd_Efficiency_Differencial
4.77083	-0.0117528	7.654983

2017-18 season

ave_Offensive_Efficiency	sd_Offensive_Efficiency	ave_Defensive_Efficiency
104.889	6.068819	105.0185
sd_Defferensive_Efficiency	ave_Efficiency_Dfferencial	sd_Efficiency_Differencial
7.475873	-0.1294527	12.46496

2021-22 season

So the Flying Leopards are more likely going to play against weaker teams than stronger teams in 2017-18 season and vise versa.  
Thus 2021-22 season are a more competitive season overall.  
As a result, if the efficiency differential for 2017 to 18 is higher than the 2021-22 season, we have to account for the competitiveness of the seasons. But if not, then the conclusion will be pronounce.



## Efficiency analysis

### 2017-18

Club	Offensive_Efficiency	Defensive_Efficiency	Efficiency_Differential
Zhejiang Guangsha Lions *	115.6013	102.7648	12.8364467
Liaoning Flying Leopards *	114.1659	104.4446	9.7213329
Shandong Golden Stars *	116.9577	108.4092	8.5484561
Guangdong Southern Tigers *	113.4823	105.5616	7.9206829
Xinjiang Flying Tigers *	115.0487	110.5163	4.5323823
Shenzhen Leopards *	110.9850	106.6193	4.3657355
Jiangsu Dragons *	113.1995	109.0836	4.1158440
Beijing Ducks *	114.8110	110.7001	4.1109852
Zhejiang Golden Bulls	108.6244	106.3093	2.3150799
Shanghai Sharks *	112.4299	110.6352	1.7946550
Fujian Sturgeons	116.1686	115.5892	0.5793943
Guangzhou Long-Lions *	114.1948	114.3158	-0.1210359
Shanxi Brave Dragons	111.4998	111.9853	-0.4855677
Beikong Fly Dragons	108.1363	110.4158	-2.2795416
Nanjing Monkey Kings	107.0882	112.1292	-5.0410080
Qingdao Eagles	109.9372	115.5813	-5.6441193
Tianjin Gold Lions	107.8387	118.7758	-10.9371387
Sichuan Blue Whales	106.2865	117.2547	-10.9682335
Jilin Northeast Tigers	108.4691	119.5915	-11.1224871
Bayi Rockets	100.0410	114.5179	-14.4769189

### 2020-21

Club	Offensive_Efficiency	Defensive_Efficiency	Efficiency_Differential
Zhejiang Guangsha Lions	115.73252	98.40252	17.32999869
Liaoning Flying Leopards	109.26933	96.23160	13.03772508
Beijing Ducks	108.35106	95.77004	12.58101968
Zhejiang Golden Bulls	108.07612	95.83789	12.23823204
Shanxi Loongs	111.73255	100.17474	11.55780792
Shanghai Sharks	108.25766	97.38053	10.87712119
Xinjiang Flying Tigers	105.20860	97.05480	8.15380012
Shenzhen Aviators	109.46754	101.86555	7.60198757
Guangdong Southern Tigers	107.32409	100.40049	6.92360623
Jilin Northeast Tigers	106.31800	104.93865	1.37935262
Tianjin Pioneers	107.47483	107.41566	0.05917032
Shandong Heroes	107.77298	107.74558	0.02739527
Qingdao Eagles	102.13946	103.95960	-1.82014192
Guangzhou Loong Lions	108.15820	115.18778	-7.02957602
Beijing Royal Fighters	99.59745	108.31188	-8.71443595
Fujian Sturgeons	101.84524	113.85113	-12.00588353
Sichuan Blue Whales	97.58543	110.86178	-13.27635382
Jiangsu Dragons	93.67883	109.15822	-15.47939368
Nanjing Monkey Kings	96.37395	119.38060	-23.00665671
Ningbo Rockets	93.41659	116.44042	-23.02383009



The 2020-21 Leopards had a lower offensive efficiency, but their defensive efficiency got better, thereby, having a higher efficiency differential.

The background of the slide features a basketball game celebration. At the top, a blue banner with white Chinese text "2021-2022中国男子篮球职业联赛" (2021-2022 Chinese Men's Basketball Professional League) is visible. The main area is a yellow overlay with white text. At the bottom, there's a dark area showing basketball players and a "全体育" (All Sports) logo.

# Conclusion

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The 2022 Leopards have a more flexible squad compared to previous years. The two talented forwards Zhenlin Zhang and Changze Wu have used their athletic abilities to compensate for the lack of fire power and they also improved the defense of the team. Moreover, the Leopards can now have single guard lineups, which they did not have enough players to achieve in past seasons.

Although this decreased offensive abilities of the team, the leap in defensive efficiency outweighs the lack of fire power. Also, Dejun Han had no substitute in 2018, the only substitute was Meng Wei, which is far less capable than Dejun Han. As a result, the team had to make one of the forward Xiaoxu Li play 5. In the 2022 season, Dejun Han got Rongzhen Zhu as a substitute which made the team more flexible in game. Thus, the 2022 Leopards are a better team overall, than 2018.

# Citations

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