Throwing Garbage Time in the Trash

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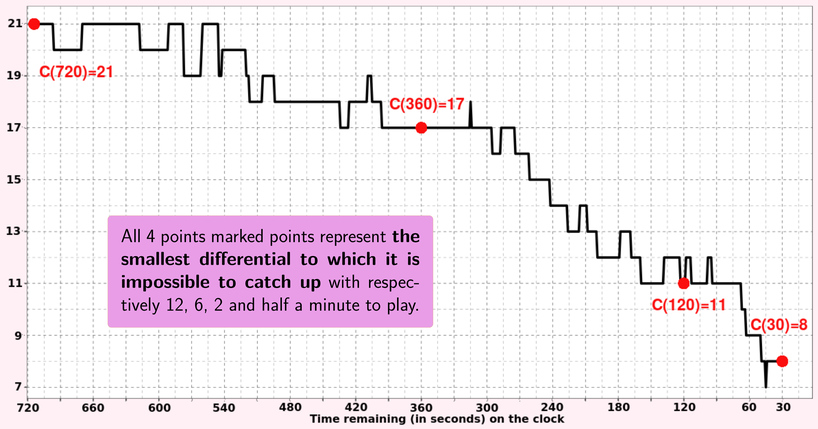
Introduction

Despite its prevalence across professional sport, garbage time - that forgotten moment in sports when the winner is already determined, the fans have begun funneling out, and tactics, fighting spirit and team work all seem to disappear - has been drastically under-studied from an analytical perspective. Using more than 12000 NBA regular season games data (all played between 2007 and 2017), **we rigorously analyze garbage time by splitting box score metrics by game state** (competitive or garbage time).

A statistical definition

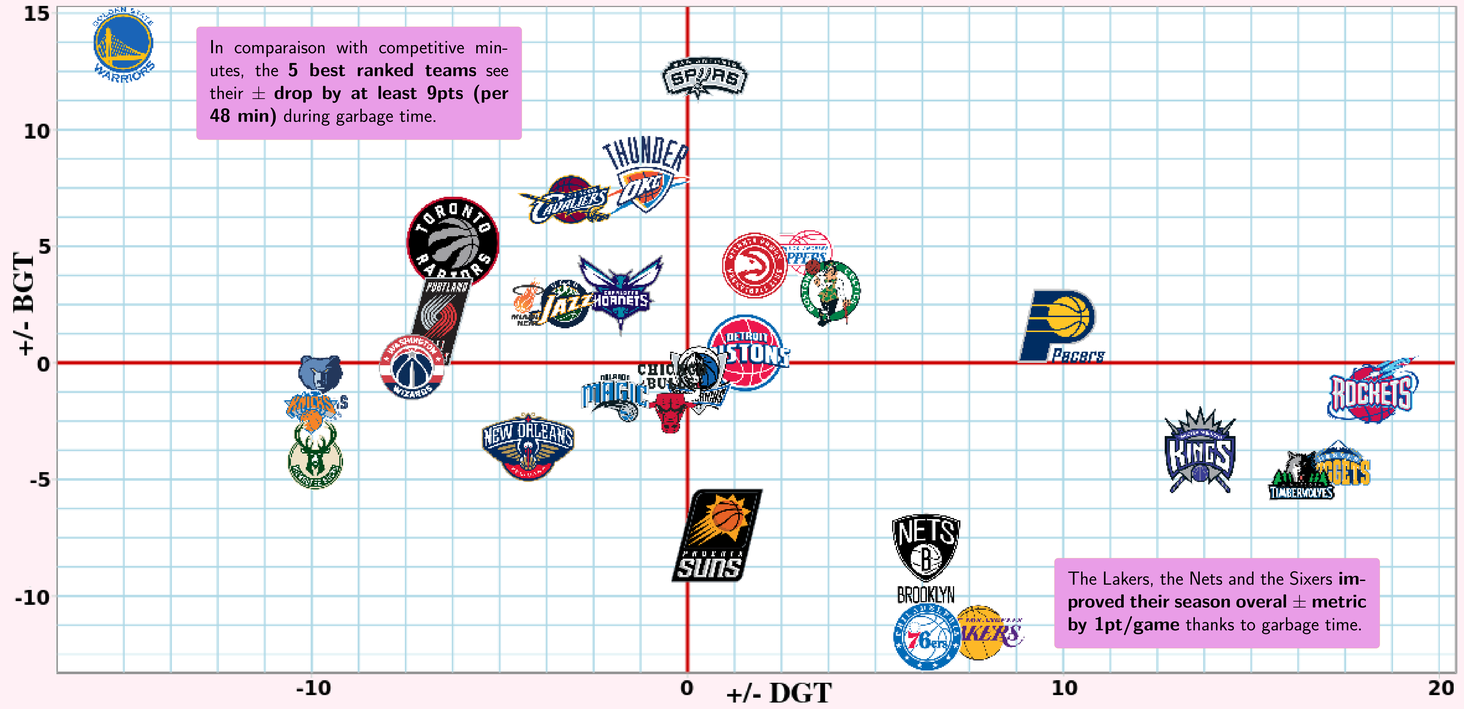
Since the moment when a game becomes a blowout rests upon the players and coaches' personal feeling, one needs to provide a quantifiable definition of garbage time. We decide a game stands in garbage with t seconds remaining on the 4^{th} quarter clock **if the scoreboard gap with t seconds to play is larger than the value** $\mathcal{C}(t)$ plotted in the curve below.



In our model, we set $\mathcal{C}(t)$ to be equal to **one plus the second biggest gap a team reached to fill** (filling meaning at least forcing an overtime) **with t seconds remaining**.

A sharp momentum flip

Despite being heavily dominated in previous minutes, losing teams have a strong momentum during garbage time, **cutting the score deficit by a mean of +0.25 points per minute**. This dominance (+12/game), worthy of all time elite teams, is **in opposition to tight 4^{th} quarters situations** (without garbage time), where winning teams have a **2.70 points mean ascendant**. One notes that **all high ranked teams** see their ± average before garbage time (BGT) **drop severely during garbage time** (DGT).



We plot ± averages BGT and DGT (per 48 minutes) for the 2015/2016 regular season. **The Warriors** were by far and **simultaneously the most dominant team before garbage time (+13.78) and the worst during garbage time (-15.66)**. Despite more than 40 early blowouts, they ranked second in overall +/- after the Spurs that year.

A significant phenomenon

During the 2015/2016 regular season, all teams played between **5.54%** and **11.22%** of their season minutes in garbage time, i.e. up to **9 full games with nothing at stake**. One notes **20% of early blowouts** (more than 8 minutes to play) while more than half of the games are still tight with two minutes to play.

Impact on individual metrics

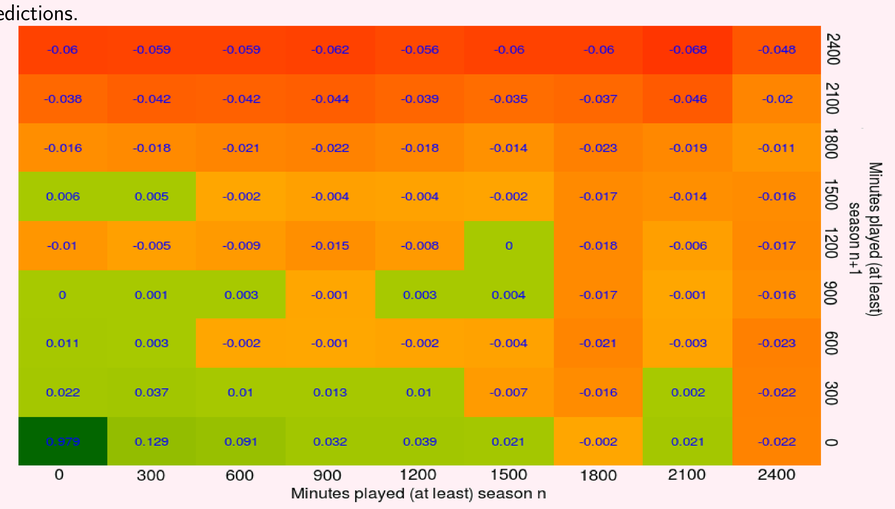
As **lack of competition** is particularly accentuated during the very last minutes, we consider a player's garbage time stats to be his stats in the garbage time which occurs **in the last 3 minutes of the game**. Both following tables highlight players with a **strong statistical evolution** (per 36 minutes) during garbage time (2015/2016 regular season). San Antonio center **Boban Marjanovic sets a prime example**, as he clearly was less efficient during garbage time while **playing a fair share of his minutes (21%) in garbage time**, impacting substantially his season averages. **General skepticism** over Marjanovic's All Star worthy stats (per 36 minutes) which were attributed to his presence in worthless minutes was somewhat unfair. Moreover, defensive pressure decay allows some **major players to have a more selfish approach** during garbage time as highlighted in the second table, whether the players alter their performances **intentionally or not**.

Player Name	FG% BGT	FG% DGT	+/- FG%	REB BGT	REB DGT	+/- REB	AST BGT	AST DGT	+/- AST	Total Min	% Min DGT
Kilpatrick	45.8	77.8	+32%	3.1	6.3	+103.2%	1.6	2.7	+68.8%	616	6.5
Wiggins	48.5	65.2	+16.7%	3.6	6.5	+80.6%	1.9	3.2	+68.4 %	2805	2.4
Oubre	43.5	52.8	+9.3%	6.5	11.6	+78.5%	0.5	1.9	+280.0%	668	13.9
I. Clark	43.7	47.6	+3.9%	3.8	6.3	+65.8%	3.5	6.3	+80.0%	573	17.9
Marjanovic	66.7	62.5	-4.2%	14.0	13.3	-5%	1.6	0.7	-56.2%	493	21.0
R. McCallum	42.2	33.3	-8.9%	3.8	2.4	-36.8%	5.0	2.4	-52.0%	474	15.9
P. Goerge	44.2	30.8	-13.4%	7.3	5.6	-23.3%	3.9	2.8	-28.2%	2777	1.9
Redick	49.1	33.3	-15.8%	2.4	0.7	-70.8%	1.8	0.0	-100.0%	2072	2.3

Player Name	FGA BGT	FGA DGT	Evol FGA	AST BGT	AST DGT	Evol AST	Minutes Played	% Min DGT
Jennings	11.7	25.4	+118.0%	7.2	2.9	-59.7%	864	4.3
Gobert	5.2	9.7	+86.5%	1.5	1.0	-33.3%	1877	2.0
Capela	8.0	14.1	+72.4%	1.0	0.0	-100%	1470	2.3
M. Barnes	10.4	17.8	+71.1%	2.6	0.0	-100%	2174	3.3
Westbrook	17.3	28.2	+63.0%	10.8	8.1	-25.0%	2724	1.3
J. Terry	10.5	16.5	+57.1%	3.0	0.8	-73.3%	1246	3.7
J. Johnson	10.8	16.4	+51.8%	4.2	2.0	-73.3%	2683	2.1
Fournier	11.9	16.6	+39.5%	3.0	1.0	-66.7%	2525	1.5

Improving predictions

We compare the usual estimators' efficiency (same metric, same player, previous year) including (GTI) or not including (GTE) garbage time. Here we plot $10 \times (\mathrm{RMSE}^{\mathrm{GTE}} - \mathrm{RMSE}^{\mathrm{GTI}})$ for offensive rebounds predictions.



Two **thresholds** appear at **1500 and 1800 season minutes** for offensive rebounds and assists predictions. Beyond that limit, **removing garbage time from the data improves predictions** (orange area).