



## BEHAVIORAL FINANCE

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### Holy Cow the Rangers are Worse than the Cubs!

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I'm taking a break from the factor timing wars to demonstrate something really important – that hockey's New York Rangers not winning the Stanley Cup from 1940-1994 was a greater achievement ("achievement" being, you know, really bad in this context) than baseball's Chicago Cubs not winning the World Series from 1908-2015. Besides a break, it's also a nice math/probability reminder about looking at everything, not just headline numbers that seem applicable to investing. Furthermore, it's apropos now as my New York Rangers just got eliminated from the hockey playoffs (after a very sad effort versus the Penguins) extending their latest, now 20+ year streak of no Cups, while the Cubbies are among the early favorites for this year's World Series.

So, the Rangers failed to win the Stanley Cup for 54 years from 1940-1994 while the Cubs have failed to win the World Series for 107 years from 1908 up to, well, now. 107 is way worse than 54, no? No.

In 1940 there were only 7 teams in the NHL (no, not the "original six" which started in 1942). In 1968 it went to 12. In 1971 to 14. In 1973 to 16. It kept increasing until there were 26 teams when the Rangers [finally won the cup in 1994](#). If the Rangers had a  $1/7$  chance of winning the Cup when there were 7 teams (so a  $6/7$  chance of not winning the cup), all the way up to a  $1/26$  chance when there were 26 teams (or a  $25/26$  chance of not winning the cup) the probability of them not winning over all of 1940-1994 comes from multiplying those chances of not winning each year. You get a probability of 0.17% or a 1 out of 583 chance of such a streak happening.

Doing the same exercise for the Cubs, there were already 16 teams when they last won in 1908. That has grown to 30 now. If they had a  $1/16$  chance of winning The Series in 1909 and a  $1/30$  chance now, and using the right number of teams the whole way, the total probability of them losing the entire time is merely 0.40% or 1 out of 253.

The Rangers' futility streak was more than twice as improbable as the Cubs' (though, of course we're still comparing two small probabilities – nobody's right to whine is lost here!)

Of course both streaks aren't quite as improbable as they look. They come from identifying ex post the most legendary losing runs in sports. For instance, for the Cubs the chance that any one of the sixteen teams they started with would achieve a 0.40% chance level of futility was actually 6.2% or about one out of 16 (as opposed to the chance of one particular team being that futile). That's surprising but not exactly hitting Powerball (or whatever the opposite is). The Rangers are, again, way more shocking as the chance that one of the seven teams they started with would hit it this bad was only one out of about 84 (one out of 98 if you use six teams as happened two years later). And none of this adjusts for the ex post bias that I'm only looking at these two already very famous streaks, ignoring other sports without such anomalous results (or those with them but not as well-known, certainly by me).

Some other possibly confounding arguments exist. My colleague Toby Moskowitz has argued that the Cubs have exceptional fan loyalty compared to other teams, specifically the White Sox in the same city. That means the team generates more revenue from cutting beer prices than by spending the same amount of money on players; Cubs fans prefer inebriated losing to sober winning. He goes so far as to say that the Cubs have actually enjoyed more World Series success since 1908 (seven losing appearances, more than the 5.4 expected by chance) than they deserve, given their overall team statistics and win-loss record (0.493 over the period from 1909 to 2015). Given they've had seven appearances it also shows how knife-edge a series like a "never winning" streak can be.

In hockey, the Montreal Canadiens supposedly had some advantages for many years in hockey (lasting perhaps until the early 1980s) that helped them win a disproportionate number of championships. That could make the Ranger's streak somewhat more probable (and yeah baseball people are going to mention the Yankees and maybe the Cardinals). More generally, my basic assumption that each year you have a  $1/N$  chance (with  $N$  being the number of teams) is highly questionable in any given year.

There can be level differences that last the entire time. Say, for instance, the Rangers just happened to have extra cheap owners for the whole period, as perhaps suggested by their 0.487 win/loss record and only making three Stanley Cup championship round appearances versus an expected 11.8 appearances if things were truly random, and of course winning zero of those three. One such level difference may be that both New York and Chicago are major population and media centers which should imply more revenue from fielding winning teams, advantages in attracting players and more competition from other sports and entertainment options—including competing professional teams in the same sport in the same metropolitan area (this could in fact be good if competition forces them to field a better team, or even bad if it reduces the revenue advantage I just mentioned). This should probably make both streaks less likely. It might be easier to explain losing streaks like these if they happened in small markets (though again the Toby Moskowitz argument goes the other

way – where fans like Chicago’s are actually less demanding reducing the need to spend – there are no easy answers to the net of these many possible effects!).

Finally, there is very likely “serial correlation” in winning and losing (this is a separate idea from long-term level differences where some teams are just forever better or worse, though I admit it can be hard to always tell the difference – as examples of level difference, I think New York Yankees or Montreal Canadiens, as examples of serial correlation, I think New York Islanders or Edmonton Oilers of the 1980s). There are dynasties that I don’t think are just the outcome of ex post random trials (and whatever the opposite of dynasties are). It’s hard to be precise about this but such serial correlation will generally increase the chances of big streaks and outlying numbers of championships for some teams (in both directions), but over decades these should mostly even out unless there are systemic forces at work (I say “mostly” as any tendency for streak will make even full period crazy looking results somewhat more likely).<sup>1</sup>

But, still, I think the numbers are so strikingly different it’s hard to argue with the basic conclusion (and many of the above arguments apply to both sports with neither clearly standing out). The Rangers from 1940-1994 were just way worse than the Cubs from 1908-2015 (or, perhaps, were way more unlucky as their chance of no championships by random chance was way smaller!).<sup>2</sup>

If Cubs fans are curious, they will surpass the Rangers in probabilistic futility if they can go until 2040 without winning the World Series, assuming major league baseball continues with 30 teams.

I now return to topics of a more directly financial nature.

It’s a beautiful day for mathy arguments, let’s play two!

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[1] Another thing that may have a minor effect is playoff structure. For many years the NHL was known, and sometimes ridiculed, for admitting a large fraction of teams into the playoffs. The playoffs are, of course, shorter than the regular season and should likely lead to more random outcomes (imagine if you just let everyone in the playoffs). Thus allowing more teams into the playoffs would likely make the results a bit more like 1/N. Because 1/N type odds make long losing streaks less likely this effect probably makes the Rangers achievement mildly more amazing.

[2] If Ranger fans are feeling competitive (in a “who has it worse” sense) they can take some perverse solace in another calculation: the chance they would win only one cup over the whole 1941-2015 period is about as bad as the Cub’s 1909-2015 streak. Of course another point is nobody has been around for the whole Cub’s streak (as an adult fan) so, if we want to, we can debate who has it worse on whole new more personal dimensions.

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