

# **Has War Really Declined since World War 2?**

**by**

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## Orientation

Numerous scholars have argued that war is in decline.

Numerous scholars have challenged the decline-of-war thesis.

12 minutes is not enough time to survey this terrain, list names etc.

Rather, I'll just dive into one recent debate.

This recent debate flows out of an old insight of the great Lewis Fry Richardson - the distribution of war sizes has a fat tail.

This means that, although bigger wars are less common than smaller ones, the gradient along which war frequencies decline with war sizes is not nearly as steep as it would be if war sizes followed a normal distribution.

More important for today is the implication of the fat-tail discovery for the frequency of truly huge wars that could be stated as follows - truly huge wars are really rare but not really really really rare.

(I define truly huge wars as wars of at least the size of World War 1.)

## The Bad Goldilocks Range

Imagine that every time a war breaks out there's a random draw determining the war's size and that each draw is independent of the others.

Suppose that the probability of truly huge war is 0.006 on each draw.

Then there is about a 1/3 chance that at least 1 war out of 200 will be truly huge.

And, of course, there is a 2/3 chance that we will suffer through 200 wars without a truly huge one erupting.

So this probability of 0.006 can be viewed simultaneously as not too big and not too small.

It's not so small that the risk of a truly huge war can be safely ignored – a  $1/3$  chance of a truly huge one in 200 draws on average is actually pretty alarming.

It's not so big that the seriousness of the risk will necessarily be quickly outed – there is a  $2/3$  probability that this risk can lurk below the surface through 200 wars when showing itself and if this happens then there's a  $2/3$  chance that it will happen again.

This bad Goldilocks property captures the essence of the new attack on the decline-of-war thesis made by Cirrillo and Taleb (2016) and Clauset (2018) (which you've just heard)

Note that the numbers in the above example are not completely arbitrary.

In the dataset of Kristian Gleditsch there are 362 wars through World War 2 (2/362 is roughly equal to 0.006). And there are 212 wars after World War 2.

So using the pre-World War 2 prevalence of truly huge wars to estimate post-World War 2 prevalence suggests that we could be stuck in the bad Goldilocks range.

In the rest of this talk I will continue to focus on tail probabilities for the distribution of war sizes by considering increasingly large pieces of the tail.

## What we do

1. We divide war sizes by contemporaneous world population numbers.

This choice follows much of the decline-of-war literature which stresses the chance of an average person getting killed in a war rather than absolute violence levels.

2. We divide all wars in the Gleditsch dataset (international and civil) into before World War 2 (362 war) and after World War 2 (212 wars).

3. We consider every possible tail, that is, all wars above size  $X$  for all  $X$ .

4. For every value of  $X$  we compute the pre-World War 2 fraction of wars that are of size  $X$  or greater – call this fraction  $Y$ .

5. We also compute the fraction of post-World War 2 wars that are of size  $X$  or greater – call this fraction  $Z$ .

6. We test what we call *no-change hypotheses*, i.e, that there are  $Z$  or fewer wars of size  $X$  or greater in 212 draws given that the probability of drawing wars above size  $X$  is equal to  $Y$  – these probabilities are calculated using binomial distributions.

This is similar in spirit to what Aaron Clauset just showed us except that we are using raw distributions rather than power laws, we have more and better data (Gleditsch dataset) and we test every possible tail.

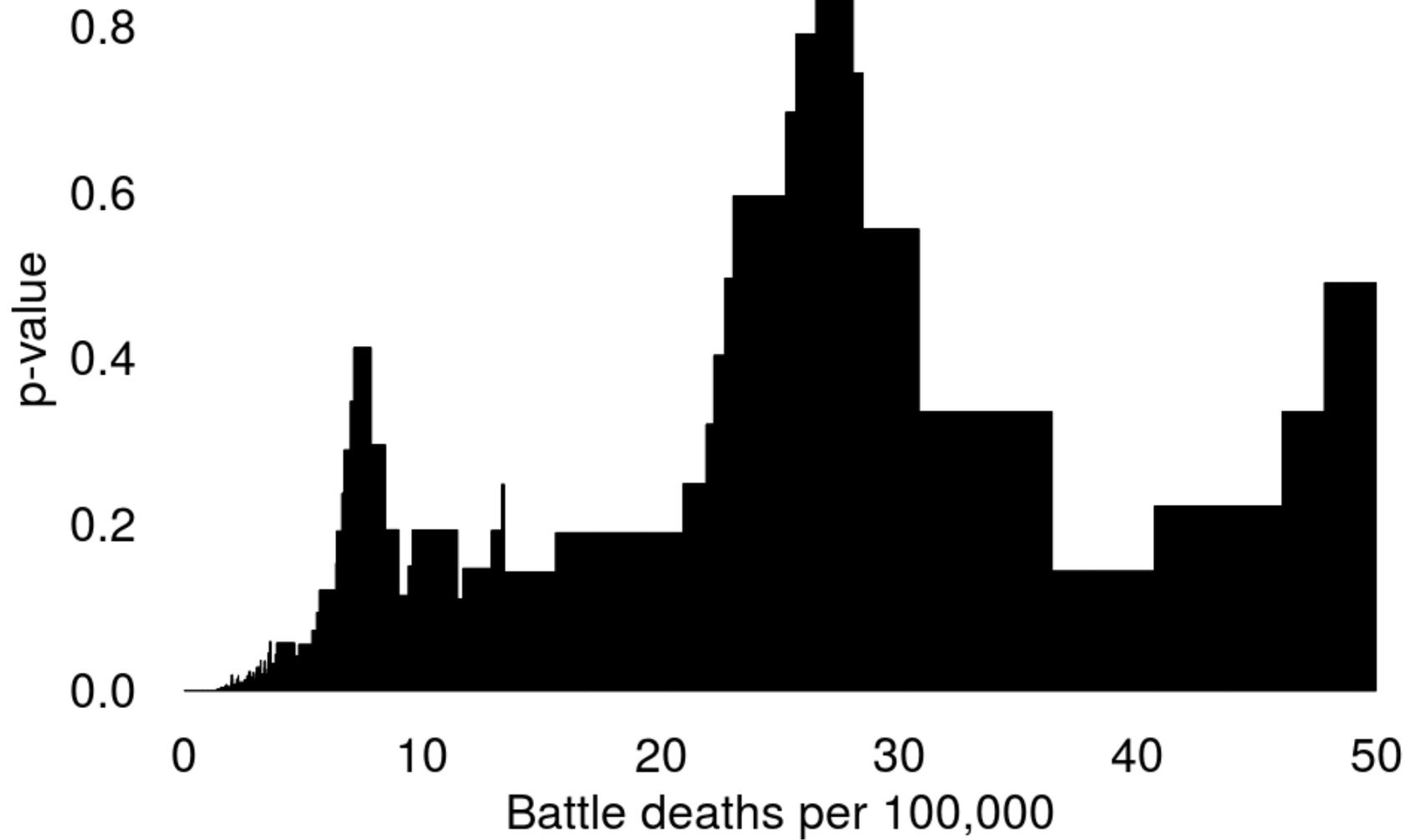
The picture on the next slide gives the results of this exercise.

It only shows the numbers of for tails starting at 50 battle deaths per 100,000 and below but there are just four wars above this size so it's almost a complete picture.

World 2 (size 781) and World War 1 (size 499) are so massive compared to everything else that they would stretch the picture, making it hard to read in the most interesting section.

The other two, the American Civil War (52) and the Chinese Civil War (51) are just barely above 50 so it seemed most elegant to just start at 50.

# Break point: 1945



Please read the graph from right to left and imagine slowly moving down to smaller and smaller values on the X axis.

When you hit a war before World War 2 it steps down and when you hit a war after World War 2 it steps up.

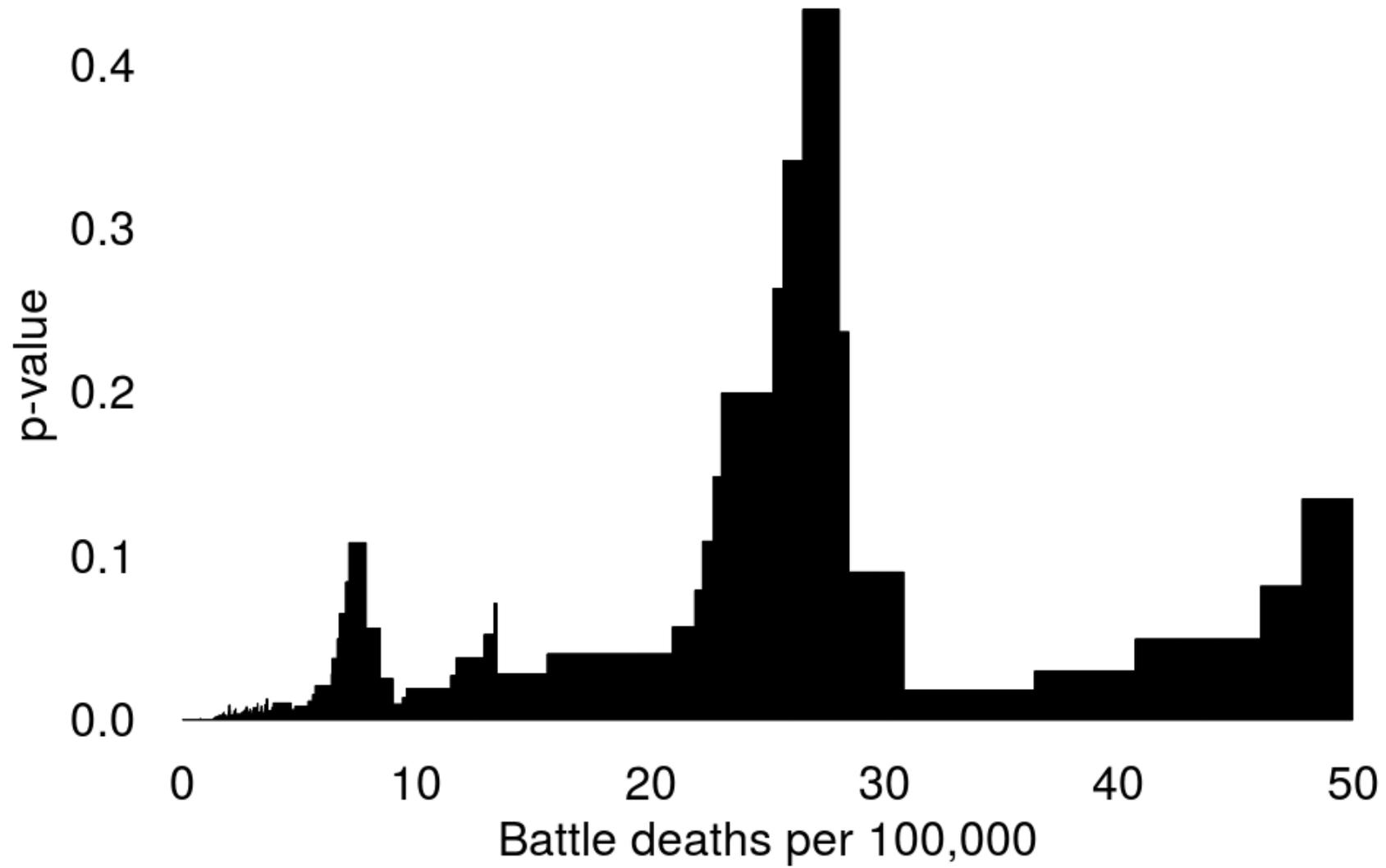
The third Sino Japanese War, the Russian Civil and the Pakistan-Bengal War, all before World War 2, pull p down below 0.2.

But then the Korean War, Vietnam Phase 2, the Iran-Iraq War and the Second South Sudan pull it way up above 0.8 – in fact the tail from around the 26-28 range on up is actually fatter post-World War 2 than it is pre-World War 2

Still the tails have tended to thin out since World War 2 although we don't come remotely close to rejecting a no-change hypothesis at anything like a standard level.

However, the picture looks very different if we consider 1950 as the break point.

### Break point: 1950



Now we get strong rejections of the no-change hypothesis as soon as we move much below 50.

Even when the run of post-1950 wars with sizes between 26 and 28 comes we can still say that the no-change hypothesis is probably false.

We have only looked at these two potential change points.

We should look at all possible change points and have some system for selecting the most appropriate one, but we haven't done that yet.

## Conclusions

First, we make two caveats

1. We looked only at the time series of war sizes (population adjusted) but we think that a full analysis should look at a broad array of evidence of the sort you see in the decline of war literature (see, for example, the books of Steven Pinker and Joshua Goldstein)
2. Our two changes points are fairly arbitrary, at least for now.

Still, we think we find pretty good evidence in favour of the decline or war thesis.