

# The German Tank Problem

Early in 1943, the Economic Warfare Division of the American Embassy in London started to analyze markings and serial numbers obtained from captured German equipment in order to obtain estimates of German war productions and capacity.

Various kinds of captured enemy equipment were studied as information on Germany's war potential was the frame of reference which shaped the pattern of allied mobilization and strategy.

Ruggles and Brodie "An Empirical Approach to Economic Intelligence in WWII"

Suppose German tank parts have serial numbers that are sequential, starting at 0001. There are an unknown number of tanks,  $n$ , in the German war capacity. You capture a small number of tanks and record their serial numbers. Assuming they are a random sample of all  $n$  tanks, what do you do with the numbers to get a good estimate of the total?

- ~ Form a group of 4 Statisticians.
- ~ Obtain a population of tank serial numbers.
- ~ Select 5 numbers at random to represent 5 captured tanks. Record the numbers to the right.


- ~ Using your 5 serial numbers, develop an estimate of the total number of German tanks.
- ~ Explain your estimate and method in the space to the right. We will analyze your approach using a Fathom Simulation.

Explain how you reached your estimate. Note any statistics used, calculations performed, or theory applied to reach your conclusion.

ESTIMATE

Is your method an unbiased estimator of the true number of German tanks?

