

# Law of Large Numbers

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What is the average income of Indian Citizen?

Population



2000 \$

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2000 \$

Sample



1200 \$

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2000 \$

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2800 \$

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2000 \$

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2500 \$

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2000 \$

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2200 \$



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2000 \$

Sample



2050 \$

# Law of Large Numbers

- As Sample Size increases:
  - Sample becomes more representative of Population
  - Sample mean gets closer to the population mean



# Central Limit Theorem

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What is the average income of Indian Citizen?

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2000 \$

1 Sample



2300 \$

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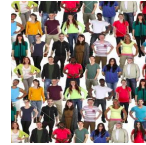


2000 \$

Large number of Samples



1583 \$



3205 \$



1669 \$



2184 \$

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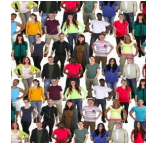


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Average of "Average Incomes"  
from each sample = 2005.23 \$

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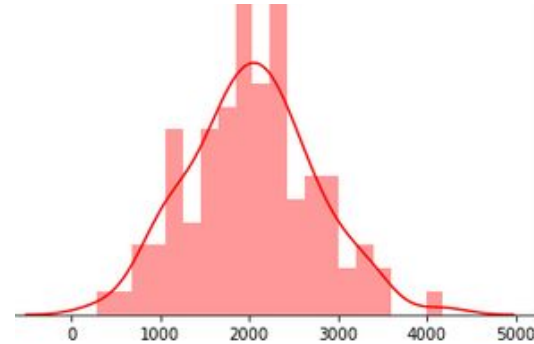
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- If the sample size is large enough, distribution of Sample Means approximates a Gaussian Distribution
- Mean of samples approximate the Population Mean.
- Random Samples
- Distribution of a Sample can be Non Gaussian but Means of Samples will follow Gaussian Distribution
- Instead of collecting entire population data we can gather a subset of data from a population and use the statistics of that sample to draw conclusions about the population.

Thank You!