



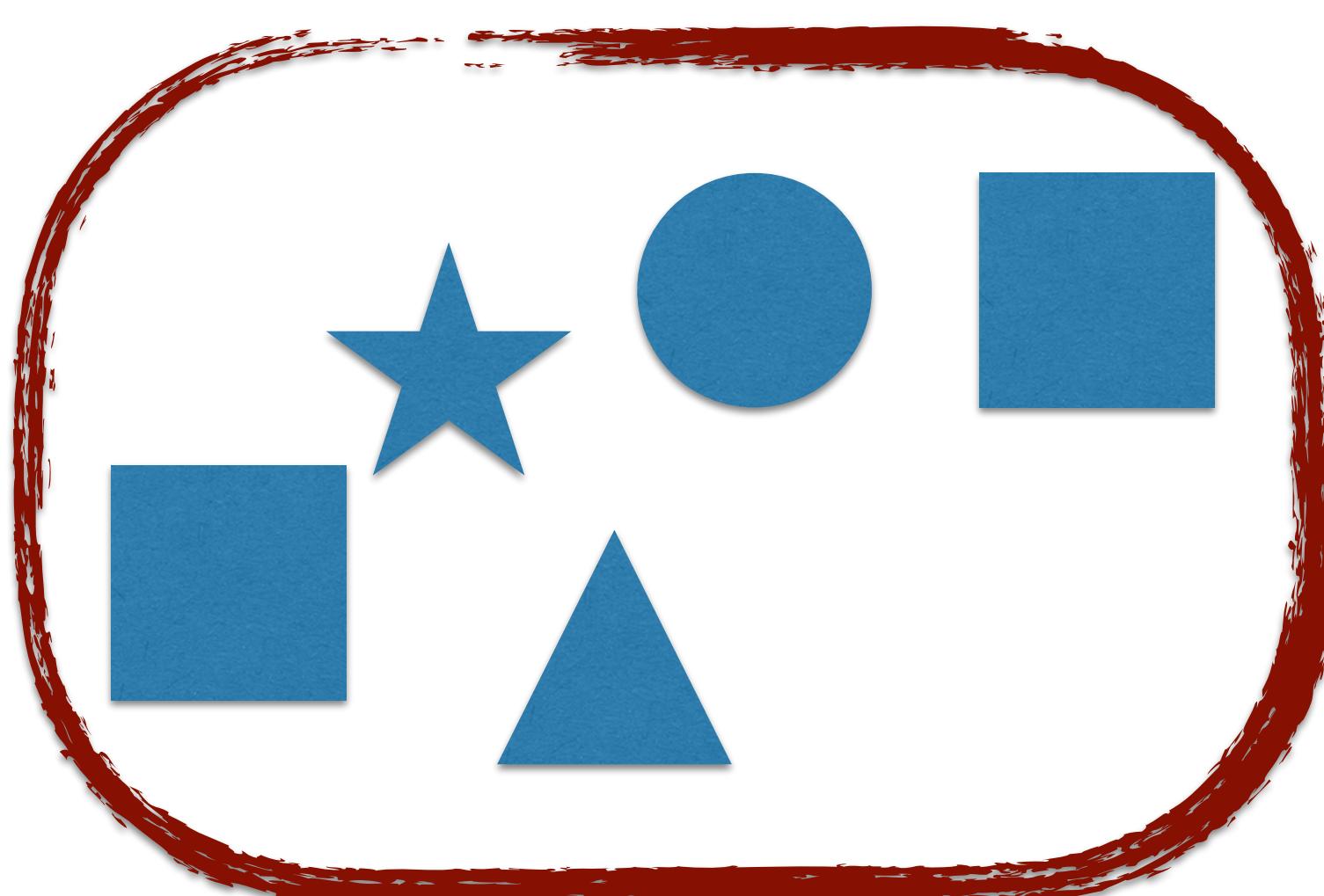
Statistical Concepts and Market Returns

Fundamentals of Statistics

1. Measurement Scales
2. Population and Samples
3. Frequency Distributions

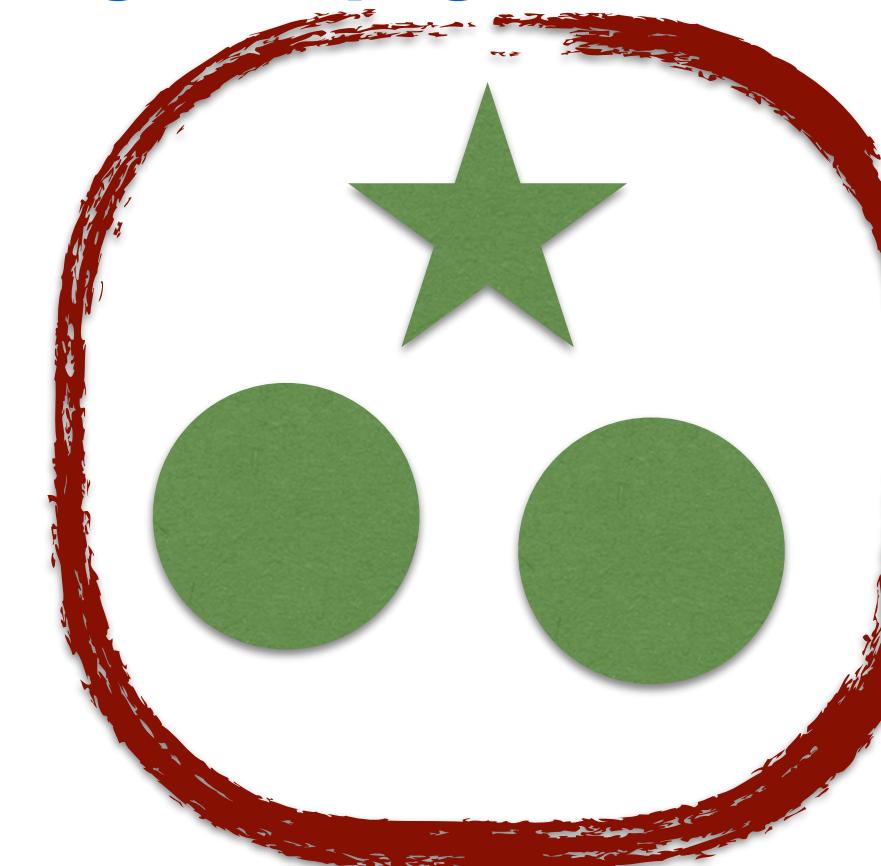
Nominal Scale

✗ Rank

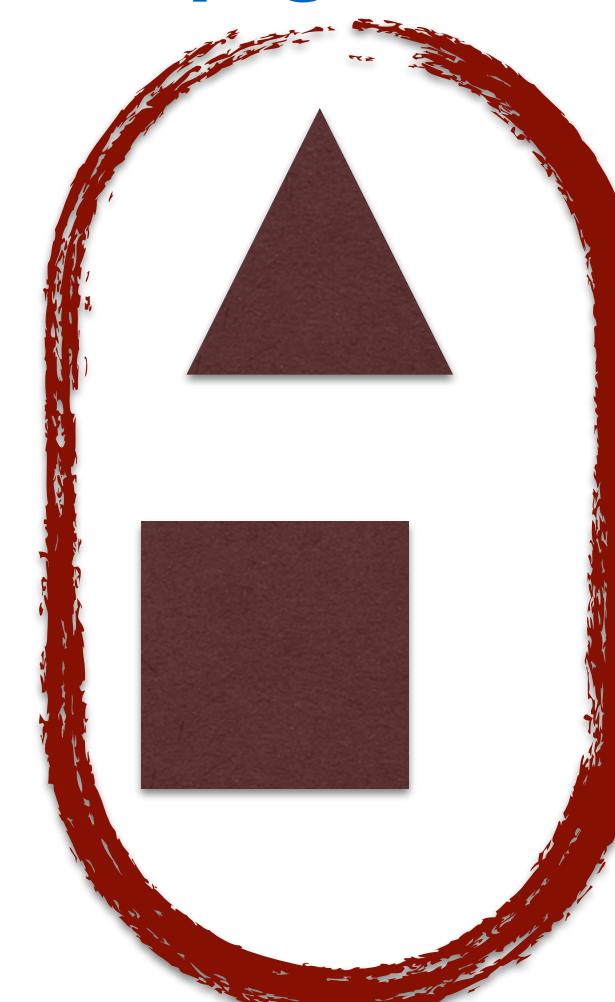


Small cap value funds

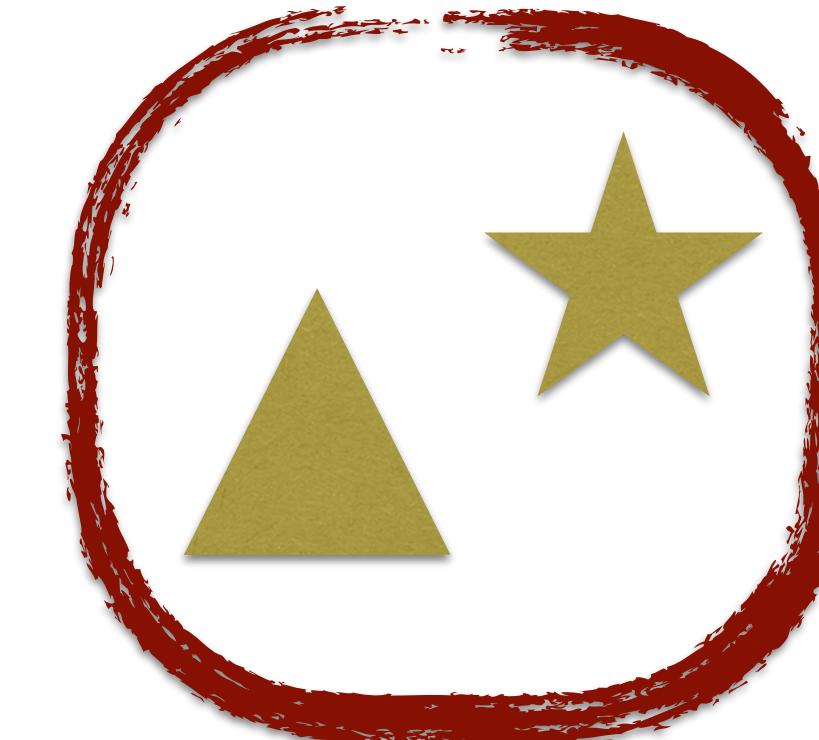
Large cap growth funds



Small cap growth funds



Large cap value funds



Nominal Scale

Interval Scale

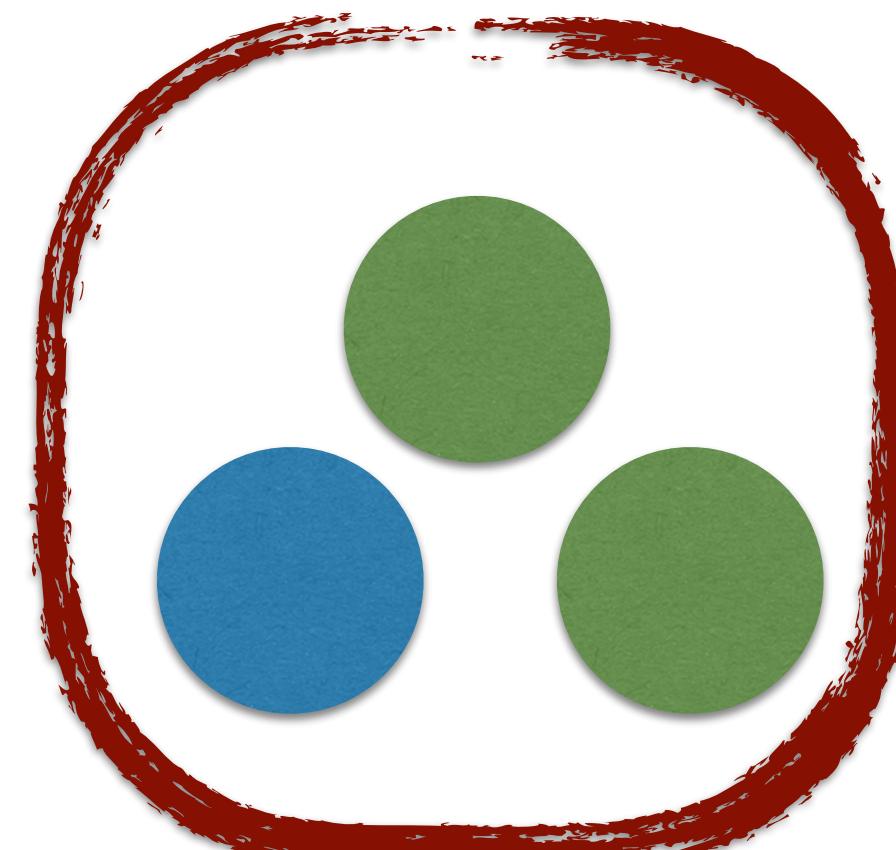
Ratio Scale

Ordinal Scale

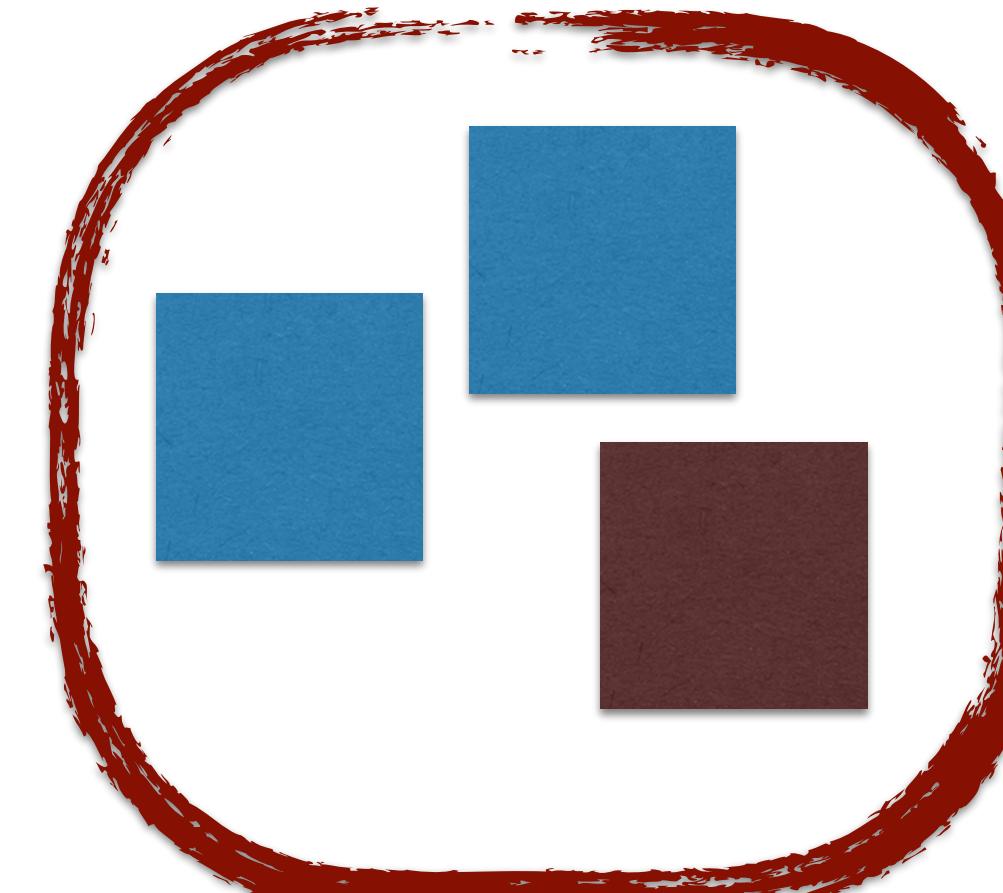
✓ **Rank** *Determine relative position*

✗ **Measure**
on a scale

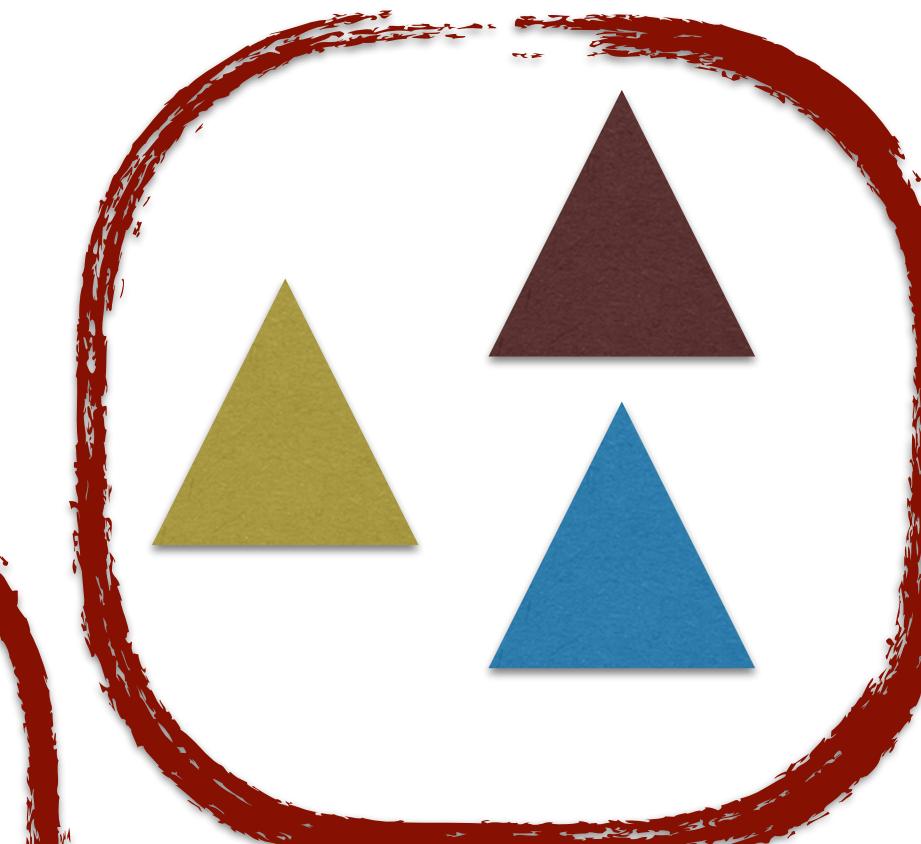
Quartile 4



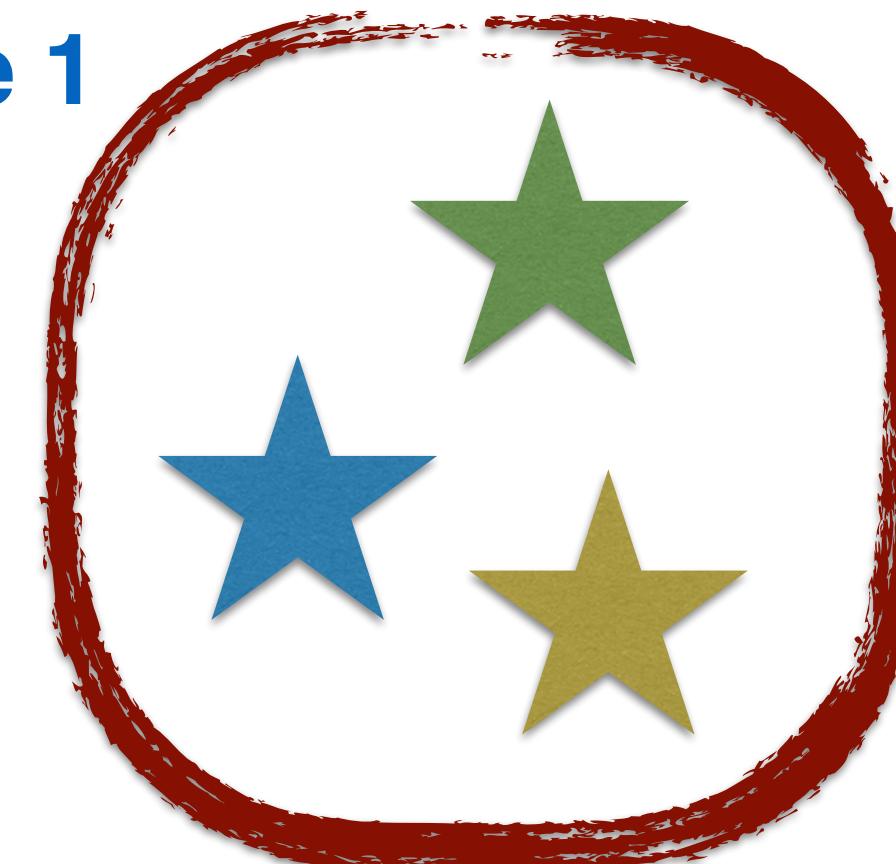
Quartile 3



Quartile 2



Quartile 1



✓ “Funds in Q1
outperform funds in Q2”

✗ “Funds in Q1
outperform funds in Q2
by 20%”

Fundamentals of Statistics

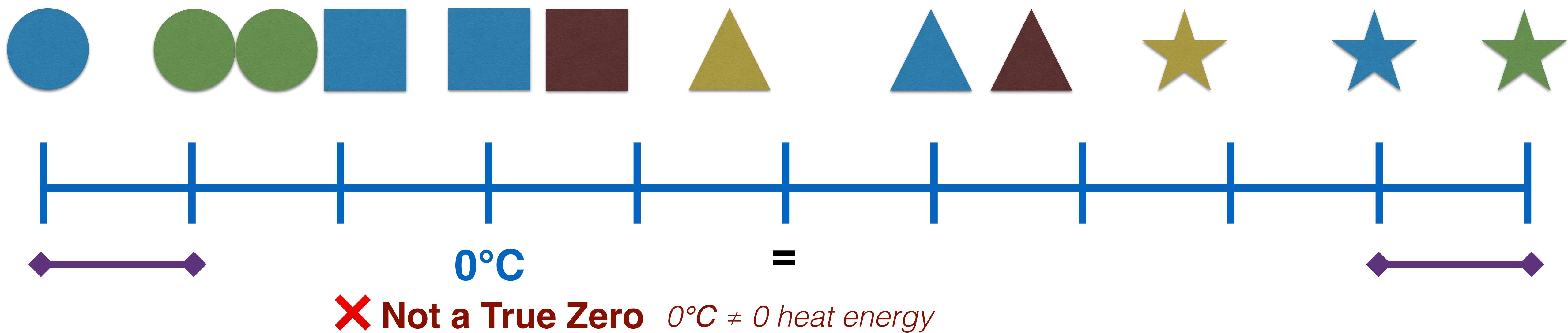
Nominal Scale

Ordinal Scale

Ratio Scale

Interval Scale

- ✓ Rank
- ✓ Measure
- ✗ True Zero

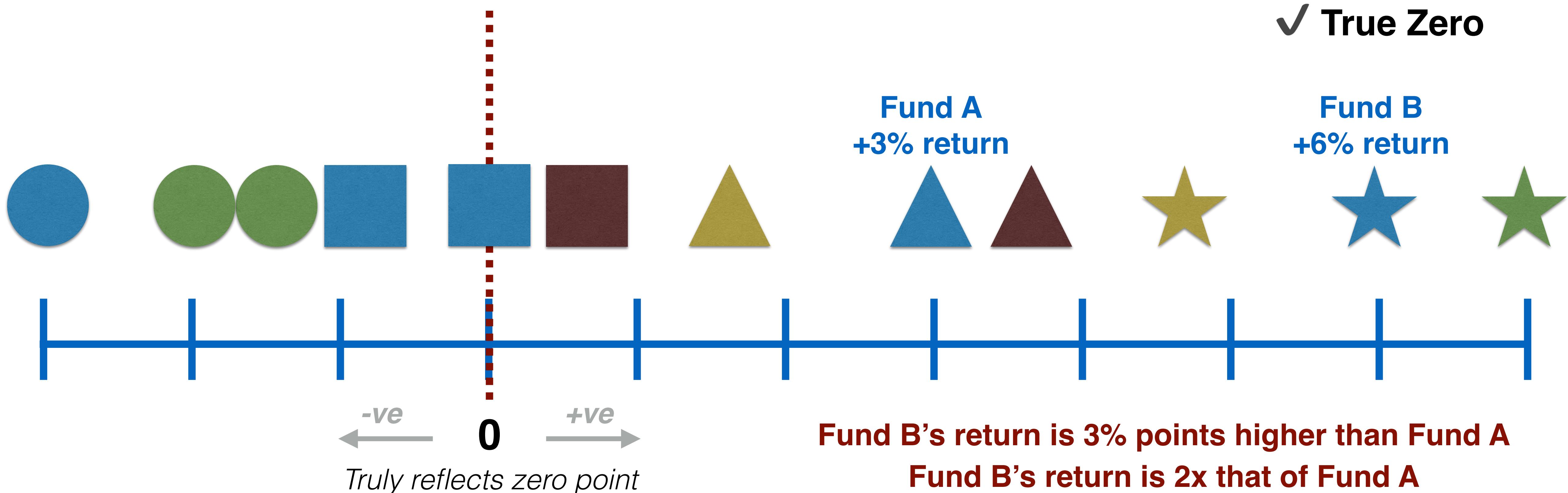


Nominal Scale

Ordinal Scale

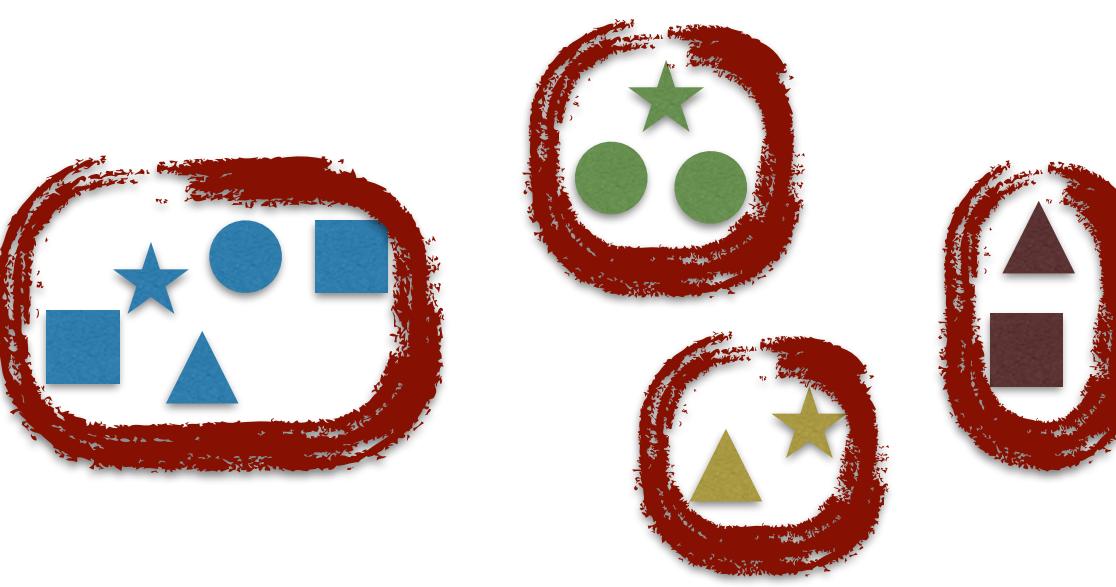
Interval Scale

Ratio Scale



Nominal Scale

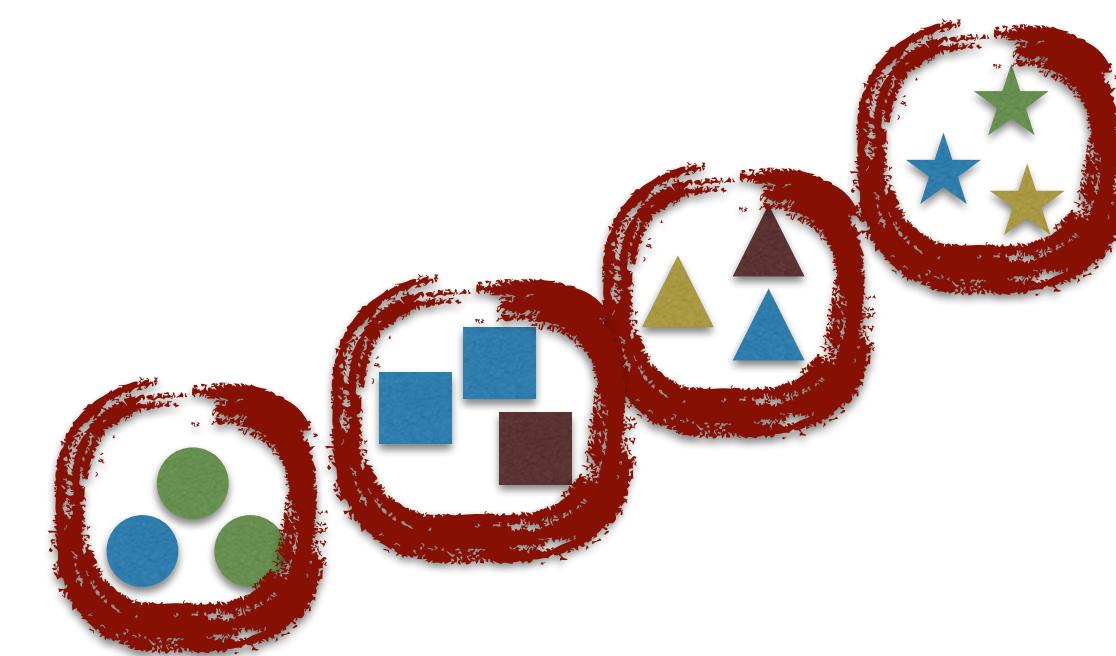
✗ Rank



Ordinal Scale

✓ Rank

✗ Measure

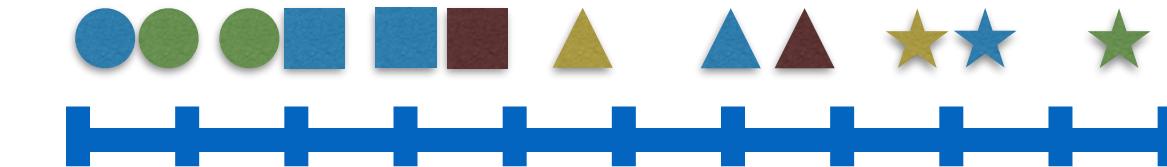


Interval Scale

✓ Rank

✓ Measure

✗ True Zero

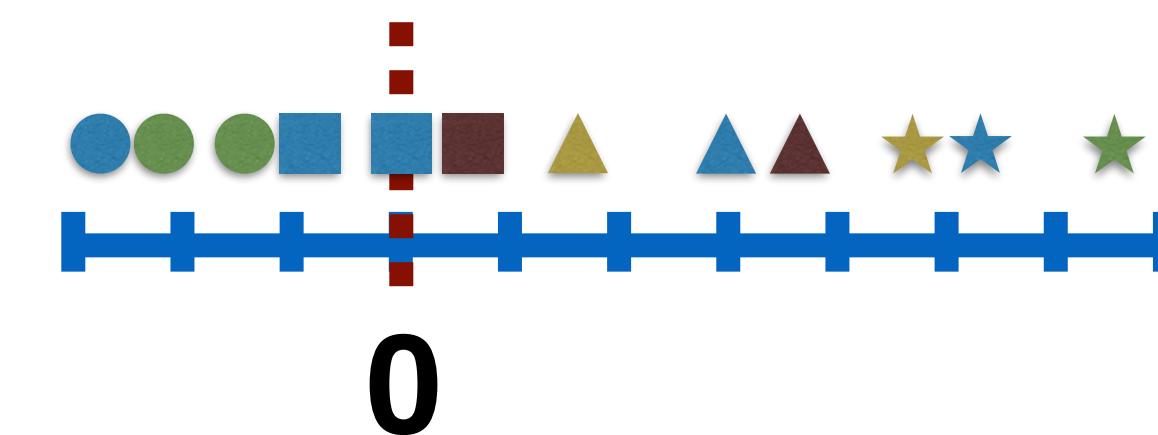


Ratio Scale

✓ Rank

✓ Measure

✓ True Zero



Fundamentals of Statistics

1. Measurement Scales

2. Population and Samples

3. Frequency Distributions



Analyse Monthly Returns of Bubble Inc. Stock for the period 1990 to 2016

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Jan	28.6	39.0	-7.7	28.7	2.2	33.9	2.9	0.2	1.8	30.3	-12.9	-8.2	38.0	6.4	-15.1	-4.8	-13.7	-17.3	20.5	-6.1	-4.1	35.3	11.8	19.3	-16.2	-19.3	-9.7	
Feb	4.5	30.0	10.0	-13.4	9.8	2.2	28.5	-8.7	20.7	14.2	29.3	2.5	-7.8	-1.6	12.2	-16.4	32.0	-19.0	14.7	-8.9	2.3	32.7	-10.4	35.6	-13.0	30.0	6.5	
Mar	20.4	-6.1	-21.4	-19.3	0.6	23.1	33.3	18.5	-1.8	-0.7	18.5	21.1	30.6	34.3	-2.2	21.6	17.6	-19.0	35.6	24.4	27.4	21.0	7.6	-20.2	22.1	6.7	-16.1	
Apr	-6.4	16.6	21.0	-16.1	23.3	31.6	-14.0	2.5	12.9	32.8	8.6	4.7	8.9	12.3	-17.8	-9.9	-18.5	-19.0	-14.3	30.0	-20.3	1.7	32.8	-5.0	-15.9	21.2	-11.1	
May	30.4	26.8	-8.7	6.4	16.9	36.2	11.9	-1.5	-19.2	38.4	36.8	6.8	32.7	6.8	32.0	-14.0	17.3	-11.9	26.0	27.1	21.6	12.6	1.0	-21.5	6.6	22.2	-1.3	
Jun	0.0	32.5	-3.2	36.3	-8.3																			31.8	14.7	-14.6	-2.5	-21.1
Jul	0.2	3.7	-6.3	-16.8	-15.1																			37.2	24.9	9.9	21.8	-19.5
Aug	35.7	36.1	3.0	23.9	14.7	21.1	36.7	37.0	-14.4	2.9	8.6	29.8	-8.8	-5.6	18.2	20.1	-1.1	-0.9	19.3	34.8	8.1	26.8	34.8	15.0	-7.7	-20.2	-7.7	
Sep	39.0	27.5	-1.5	-21.0	12.9	25.1	5.5	-14.7	-18.0	37.3	7.2	1.5	-8.0	19.8	-21.8	28.0	29.1	-12.8	6.0	-20.0	8.1	-17.0	32.4	18.0	6.8	-5.4	26.5	
Oct	-5.9	-20.3	2.3	-2.1	39.0	3.2	6.2	-5.2	0.7	-14.0	-22.0	11.2	30.8	15.8	11.2	13.6	17.8	21.0	-16.3	34.2	-11.0	5.3	36.1	8.8	-25.4	33.1	-14.1	
Nov	-1.9	-1.3	-21.7	-20.9	-1.2	-15.2	28.1	28.4	-16.5	-8.5	30.5	1.5	3.6	36.1	-21.9	-18.8	27.0	2.4	26.6	27.2	24.6	-7.3	-11.4	-7.9	28.6	-1.9	-17.6	
Dec	34.4	38.5	34.2	-19.9	-12.6	-7.1	37.1	-7.1	21.9	30.9	28.2	28.9	-7.9	-0.3	2.3	-9.3	14.2	3.7	38.6	6.3	3.0	15.4	-3.9	2.2	-23.8	14.9	-17.6	

Sample

- subset of the population

Statistic

27 x 12 = 324 observations

Population - set of ALL possible members of a group of interest

Parameter - measure used to describe a characteristic of the population
- e.g. mean, std dev

Fundamentals of Statistics

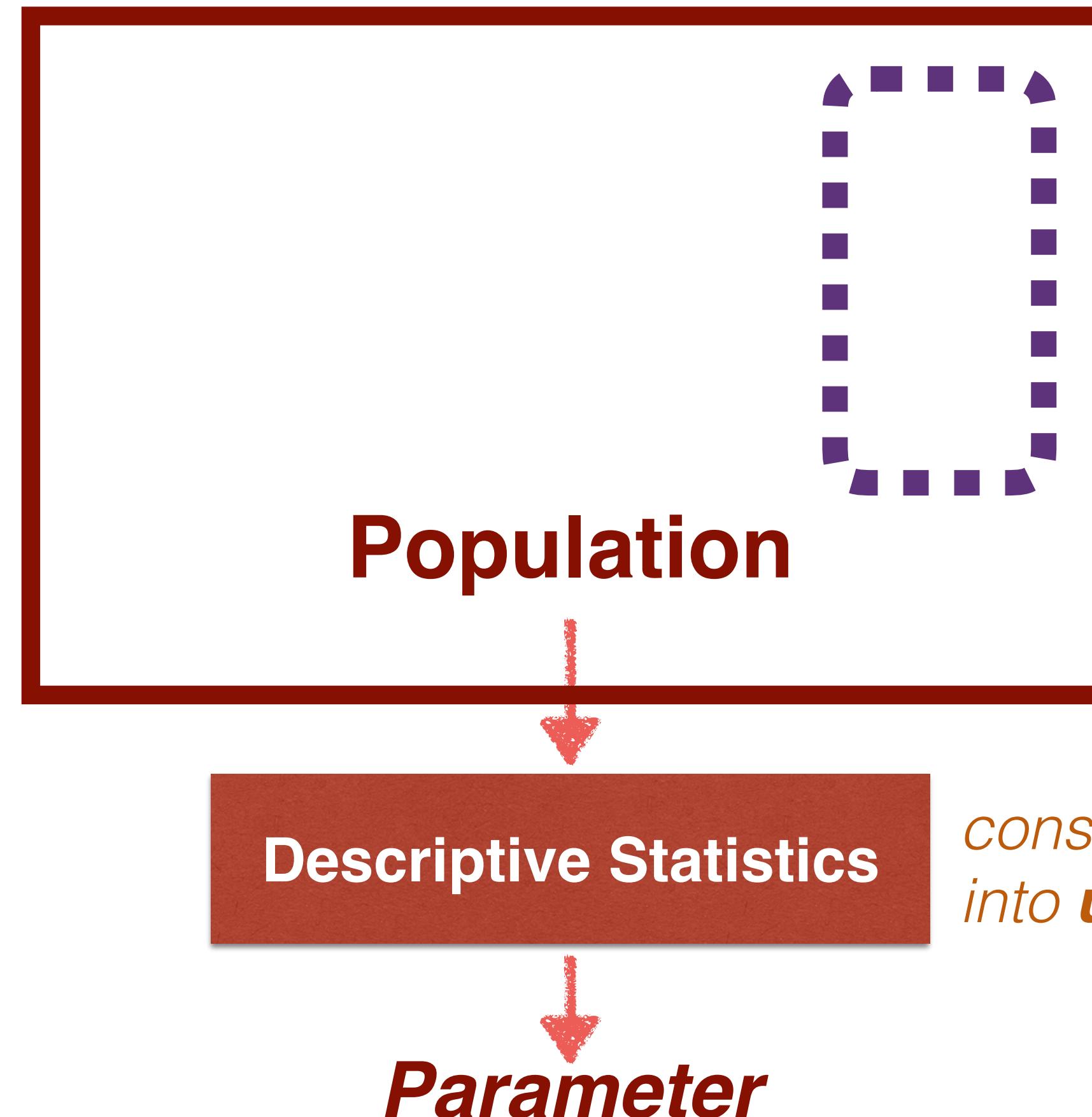
1. Measurement Scales

2. Population and Samples

3. Frequency Distributions



Analyse Monthly Returns of Bubble Inc. Stock for the period 1990 to 2016



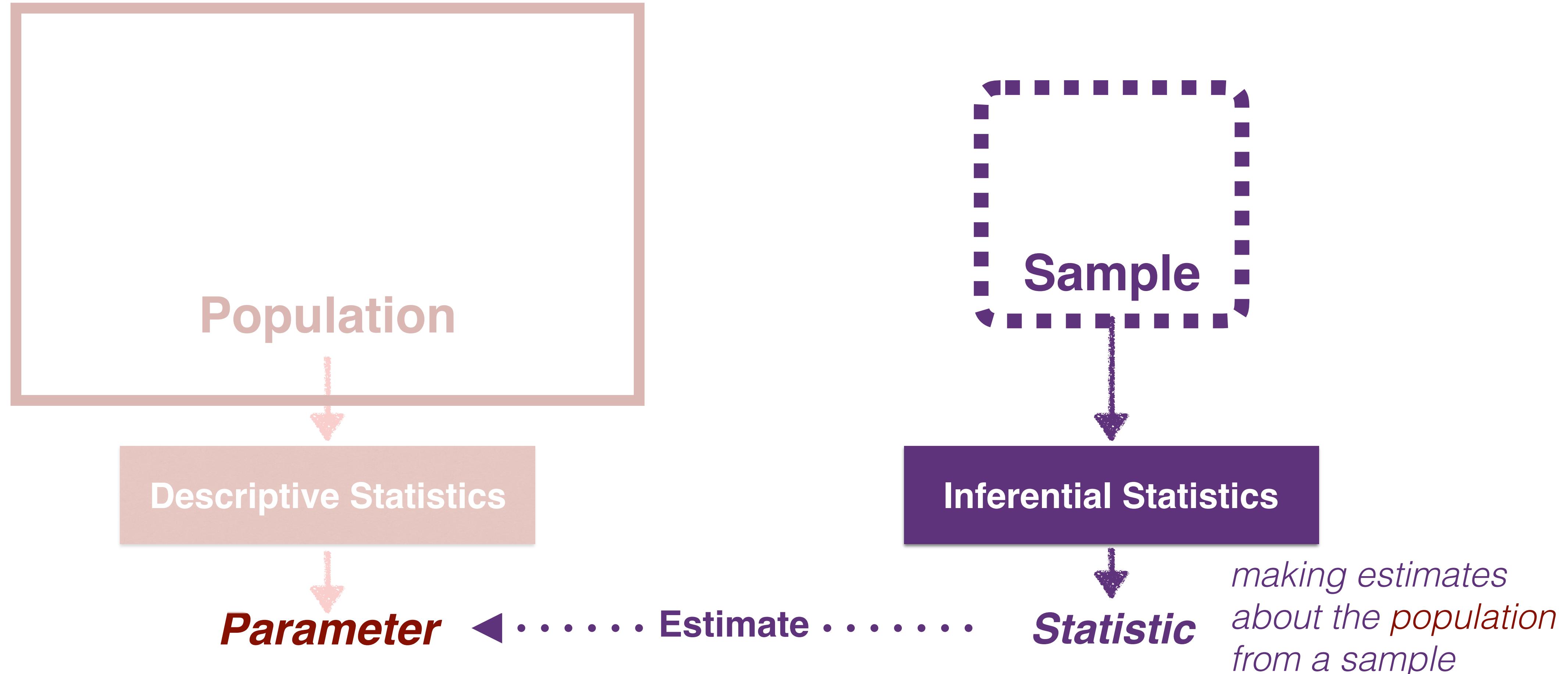
What if population is too large?

What if you can't get all the data?

*consolidating a mass of data
into **useful information***



Analyse Monthly Returns of Bubble Inc. Stock for the period 1990 to 2016



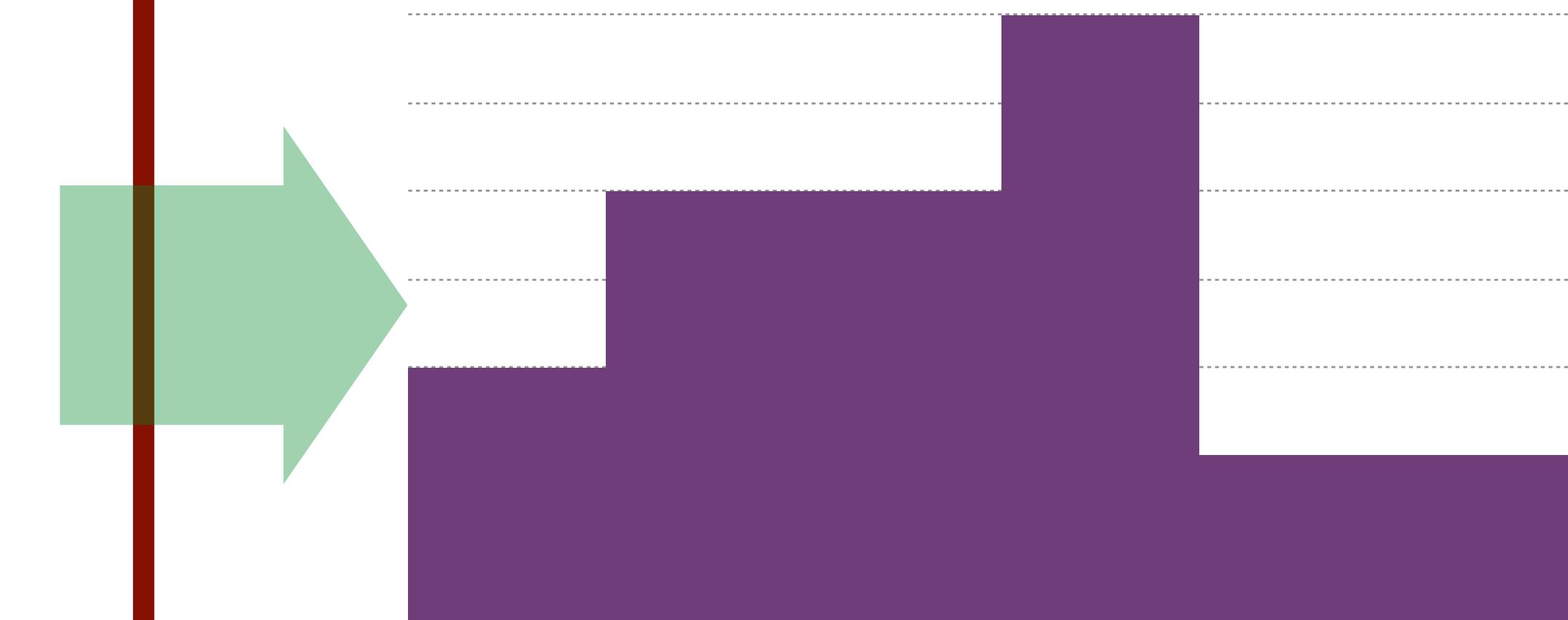


Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016



-19.3	21.8	-6.7	31.2
36.0	-19.9	-8.1	12.8
16.7	11.2	9.1	22.1
11.2	0.4	15.2	-8.5
12.2	5.9	12.0	4.2
-2.5	-11.2	-0.5	8.9

Population



Descriptive Statistics

Frequency Distribution

Parameter



Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

-19.3	21.8	-6.7	31.2
36.0	-19.9	-8.1	12.8
16.7	11.2	9.1	22.1
11.2	0.4	15.2	-8.5
12.2	5.9	12.0	4.2
-2.5	-11.2	-0.5	8.9

Frequency Distribution

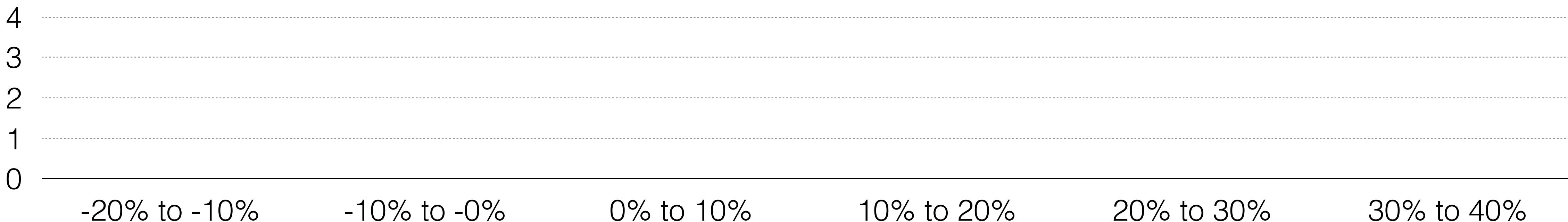
STEP 1

Define the Intervals

~5 to 10 intervals

Find the min and max

min=-19.9%, max=36.0%





Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

Frequency Distribution

STEP 2

Tally and Count the Observations

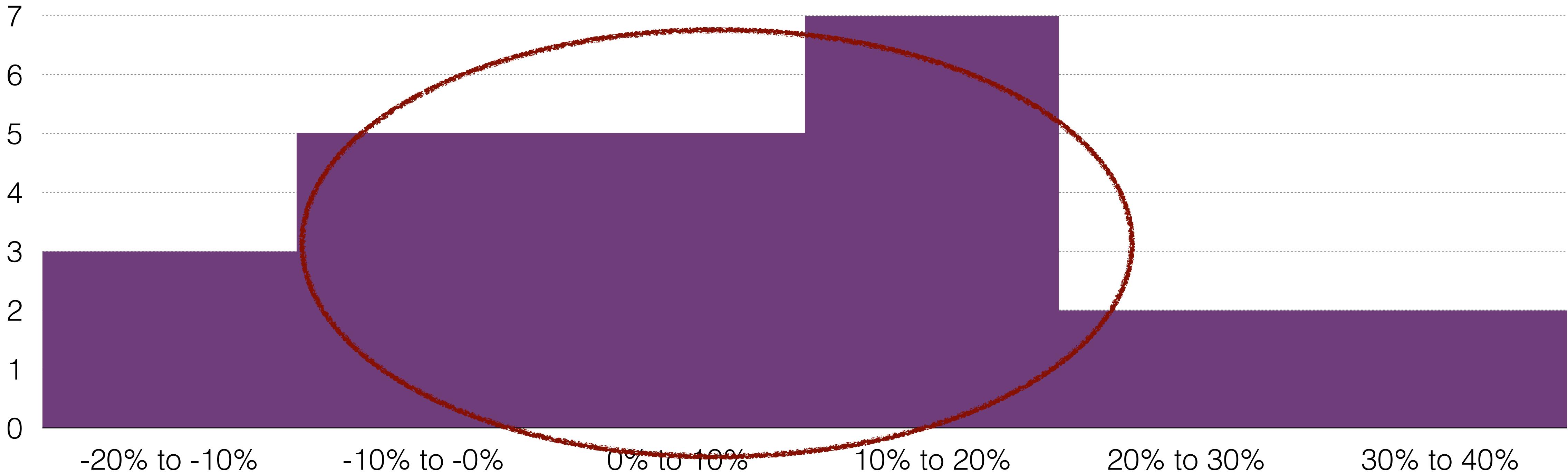




Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

Histogram

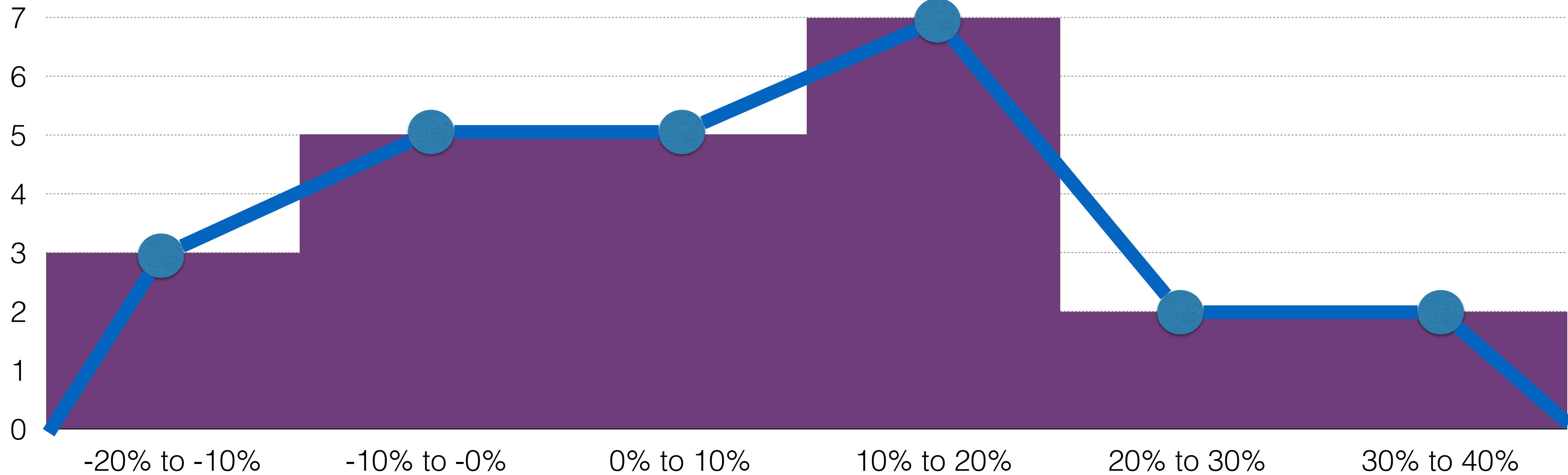
Frequency Distribution





Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

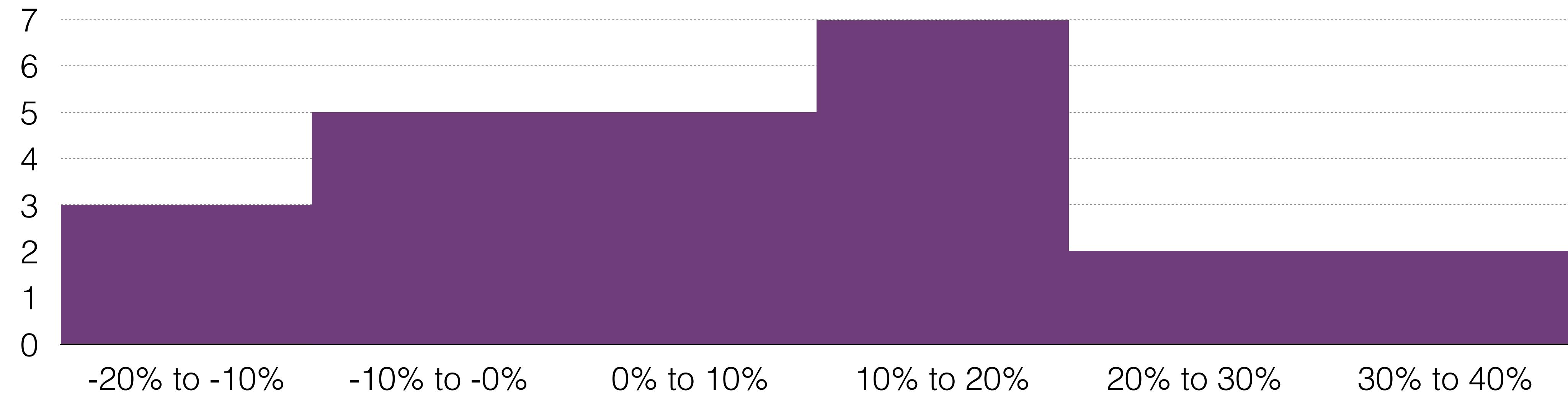
Frequency Polygon





Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

Absolute Frequency



Absolute Frequency

3	5	5	7	2	2
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Fundamentals of Statistics

1. Measurement Scales

2. Population and Samples

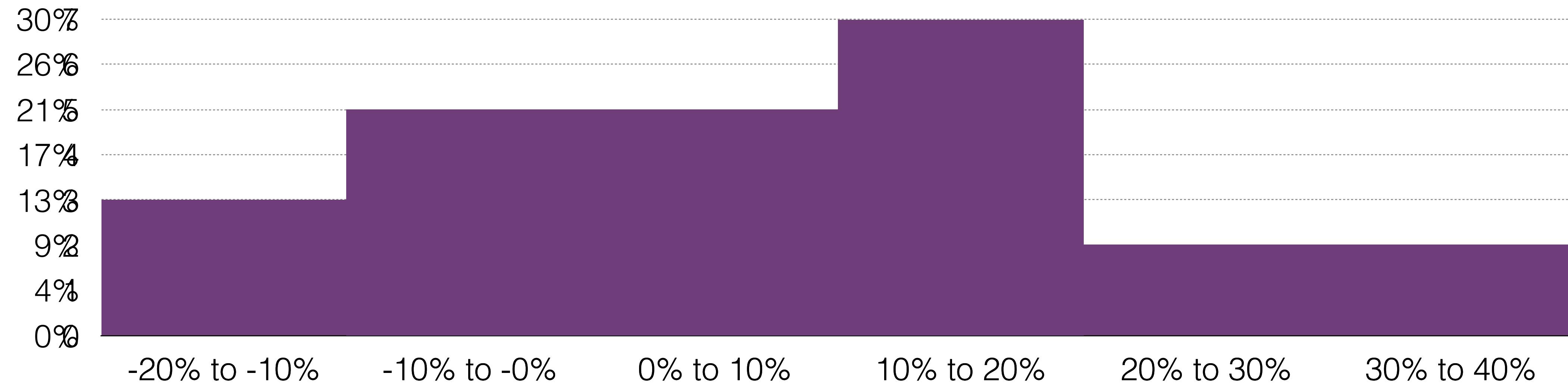
3. Frequency Distributions



Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016

$$\frac{\text{Absolute Frequency}}{\text{Total Observations}} = \text{Relative Frequency}$$

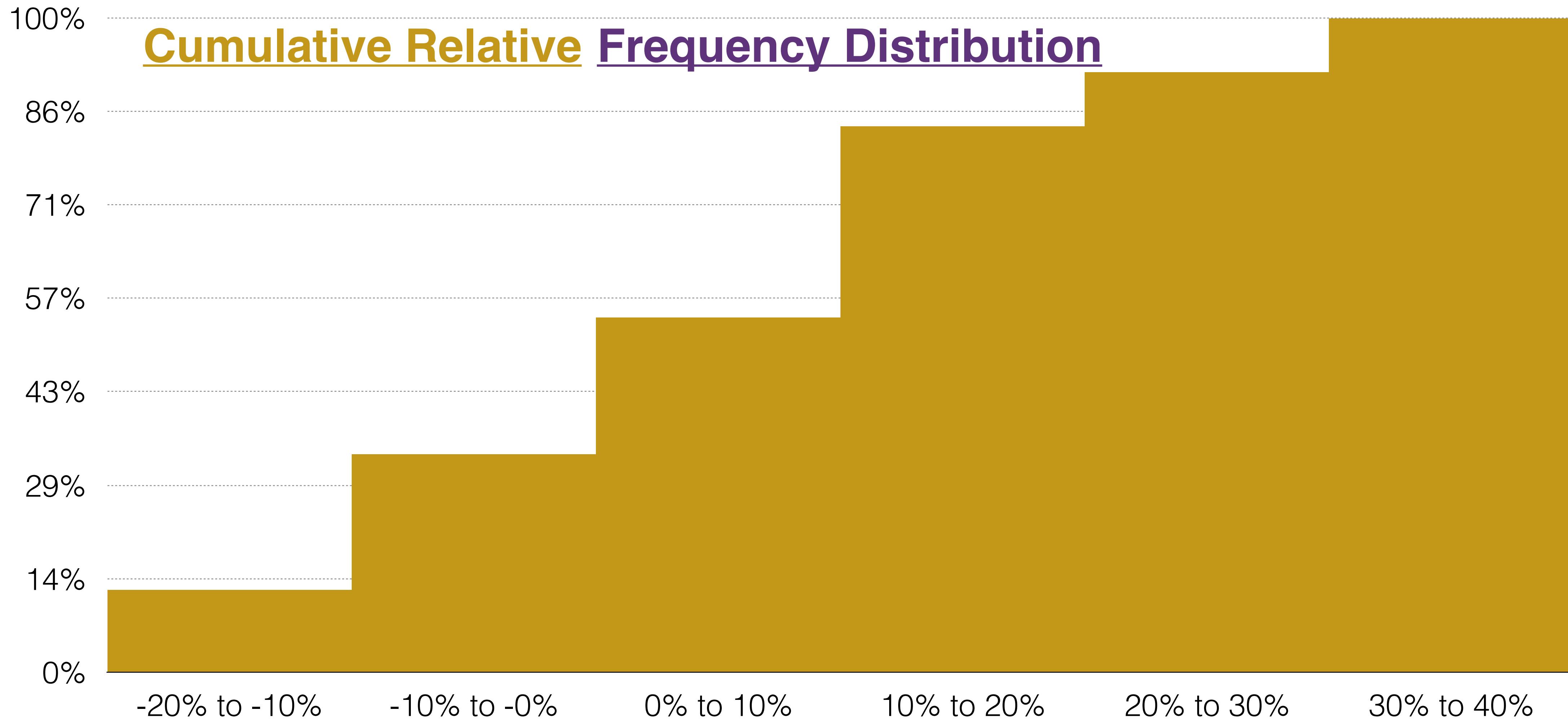
Frequency Distribution



Absolute Frequency	3	5	5	7	2	2
Relative Frequency	12.5%	20.8%	20.8%	29.2%	8.3%	8.3%



Analyse Monthly Returns of Bubble Inc. Stock for the period 2015 to 2016





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