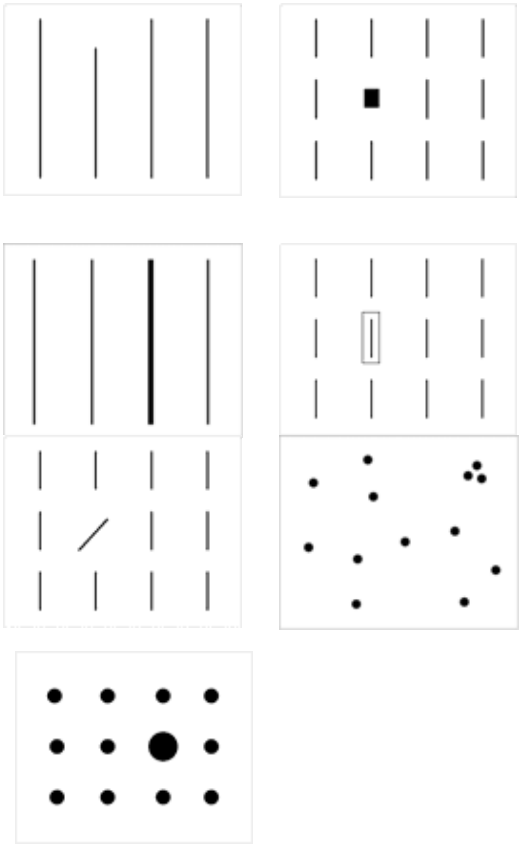
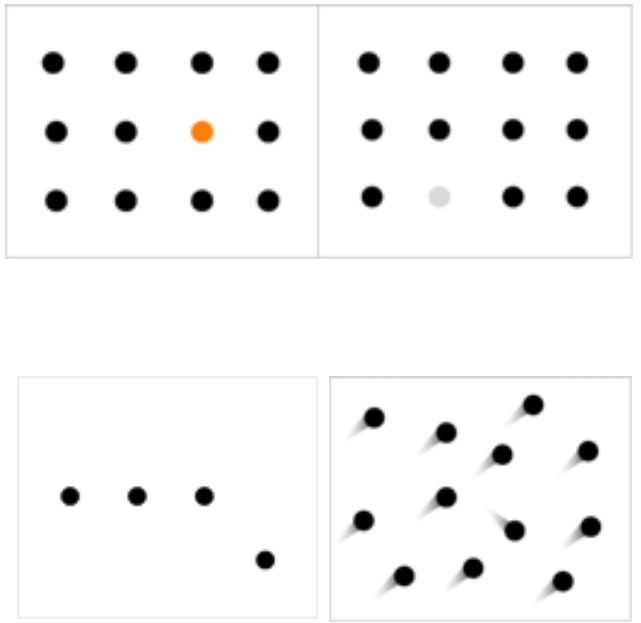
Data Visualization
Visual Business Analytics

Choosing Charts based on Data Type

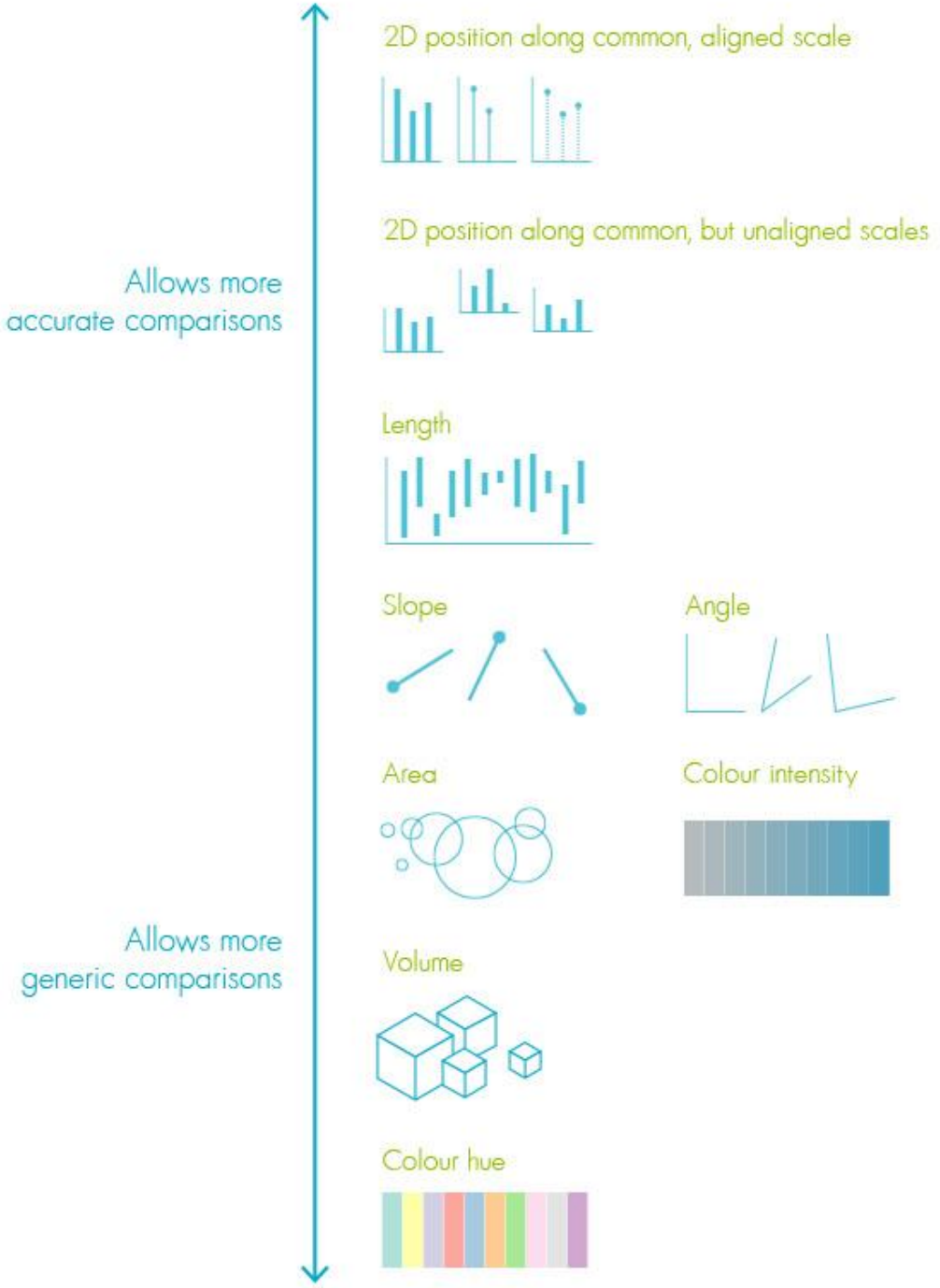
Raghavshyam Ramamurthy
Vivek Anand

Preattentive Attributes





Preattentive Attributes



Measure
Dimension

One Measure + One Dimension

One Measure + Date

One Measure + Geo Spatial

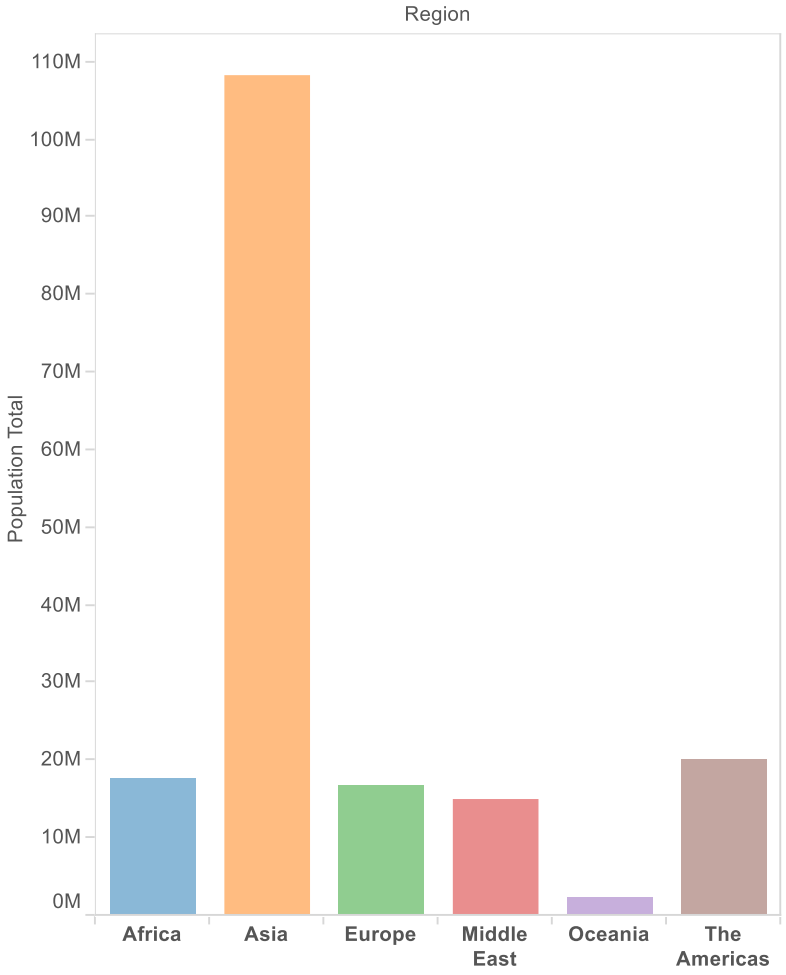
One Measures

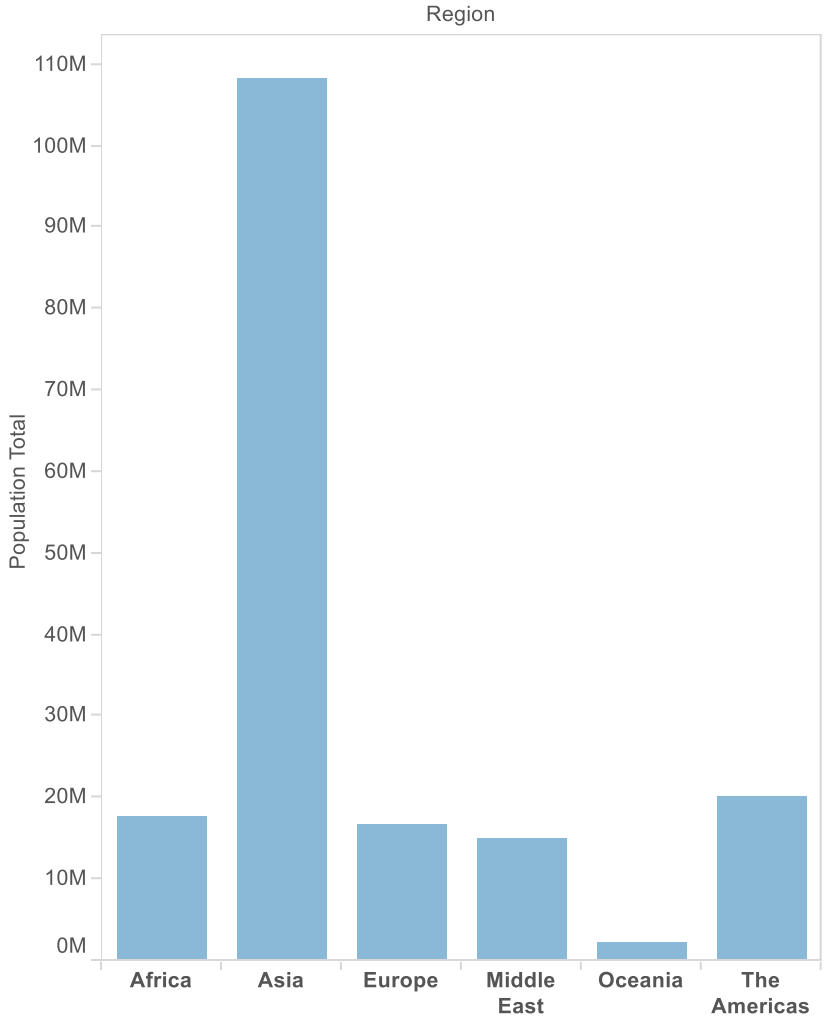
2 Measures

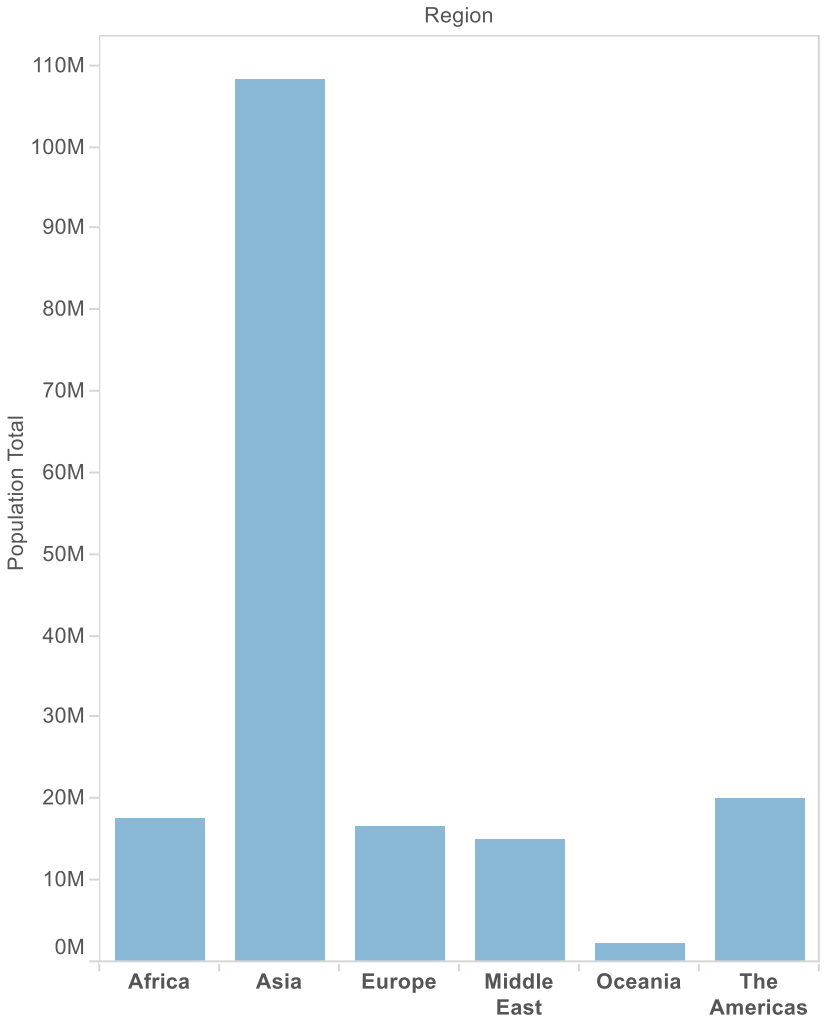
One Measure + Many Dimensions

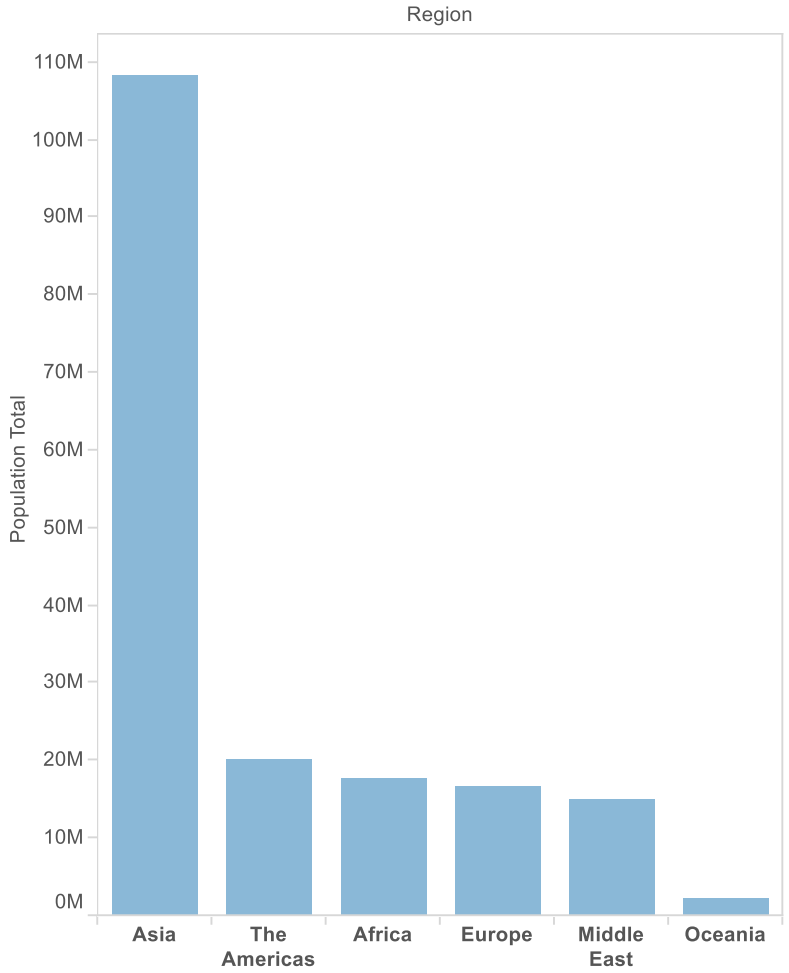
One Dimension + Many Measures

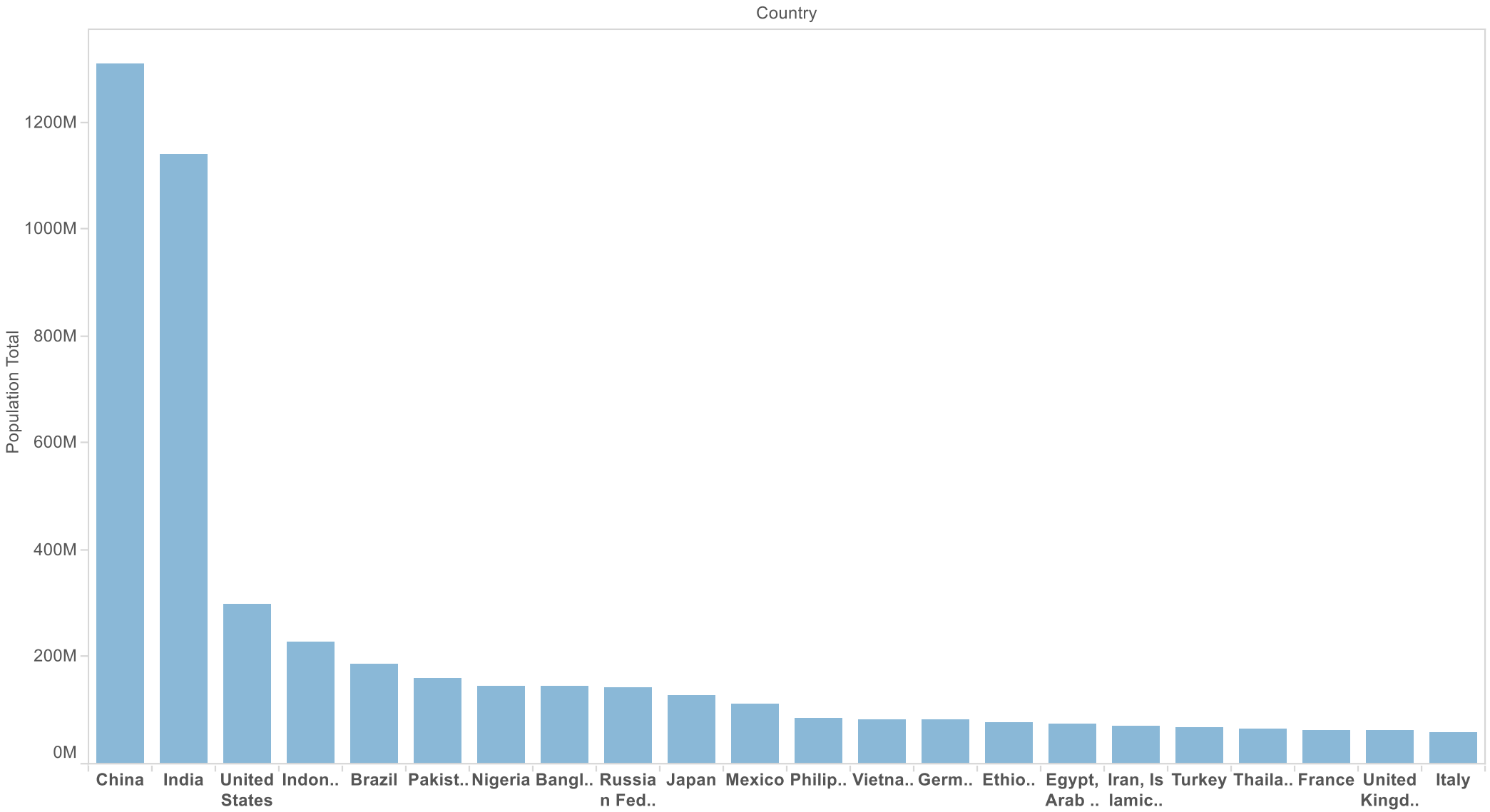
One Measure + One Dimension

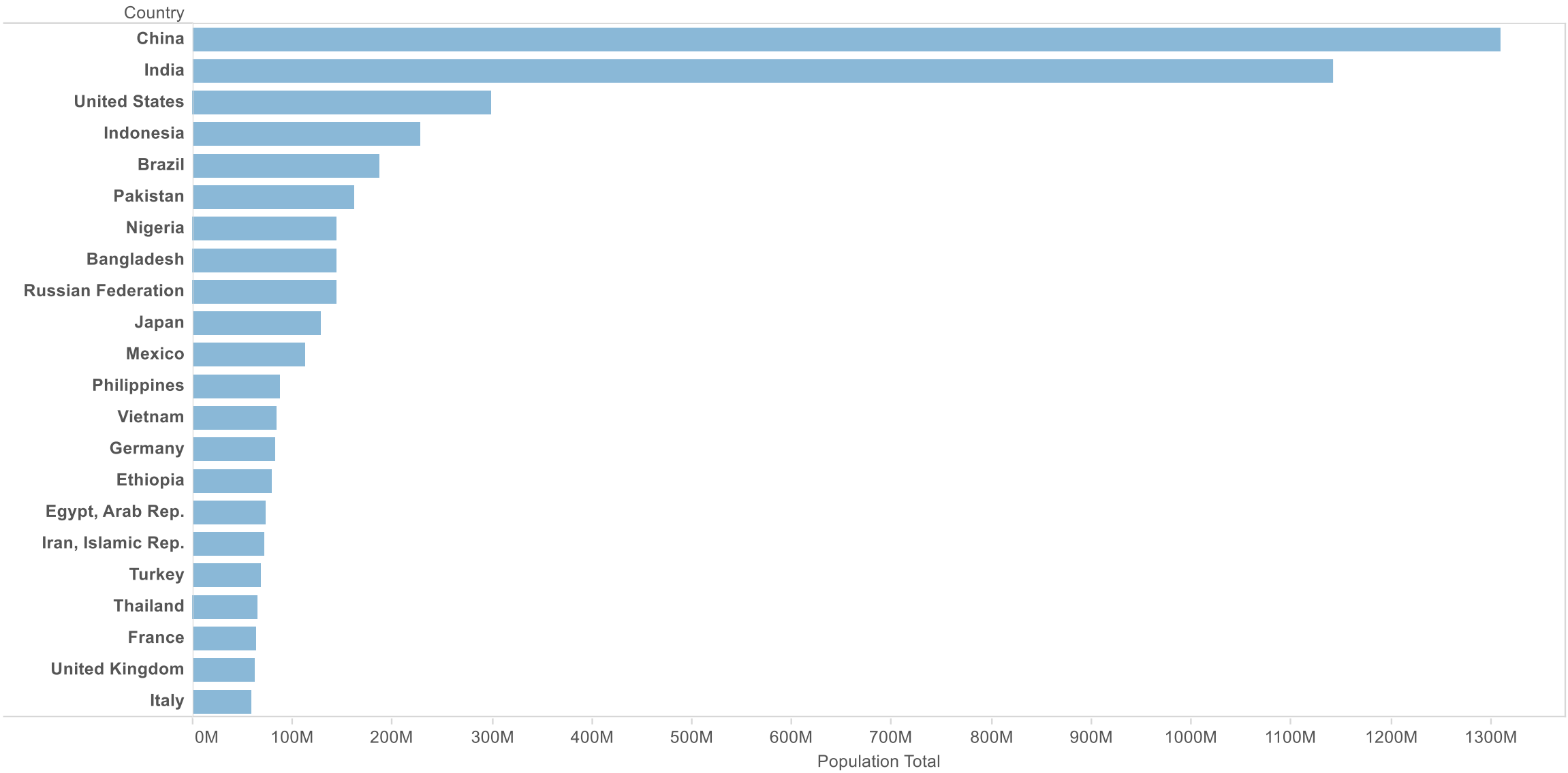

Region
110M
100M
90M
80M
70M
60M
50M
40M
30M
20M
10M
0M
Population Total
Africa
Asia
Europe
Middle East
Oceania
The Americas

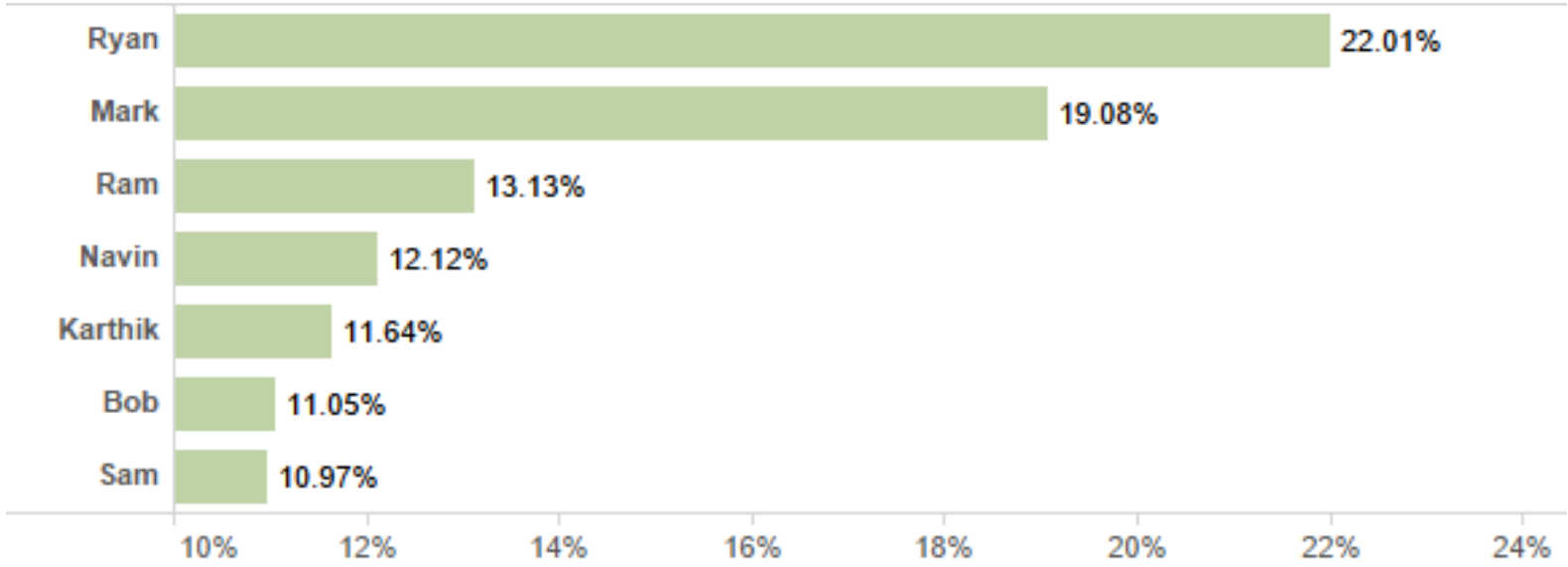

Region
110M
100M
90M
80M
70M
60M
50M
40M
30M
20M
10M
0M
Population Total
Africa
Asia
Europe
Middle East
Oceania
The Americas

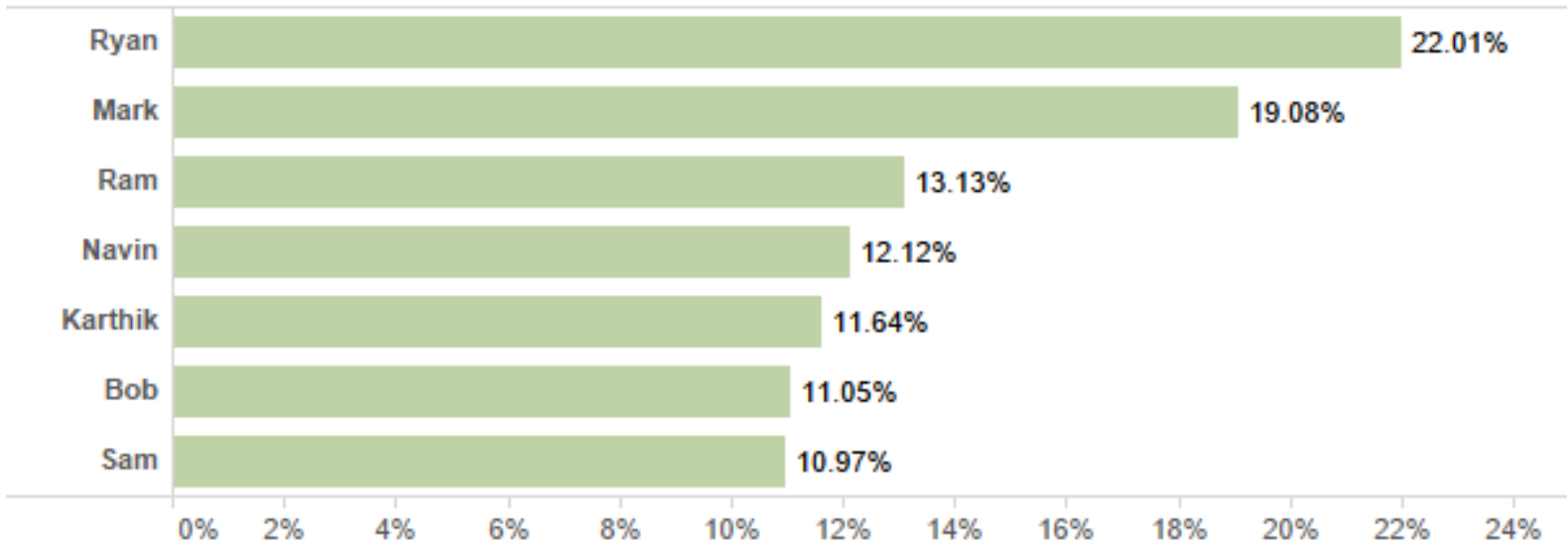

Region
Population Total
110M
100M
90M
80M
70M
60M
50M
40M
30M
20M
10M
0M
Africa
Asia
Europe
Middle East
Oceania
The Americas

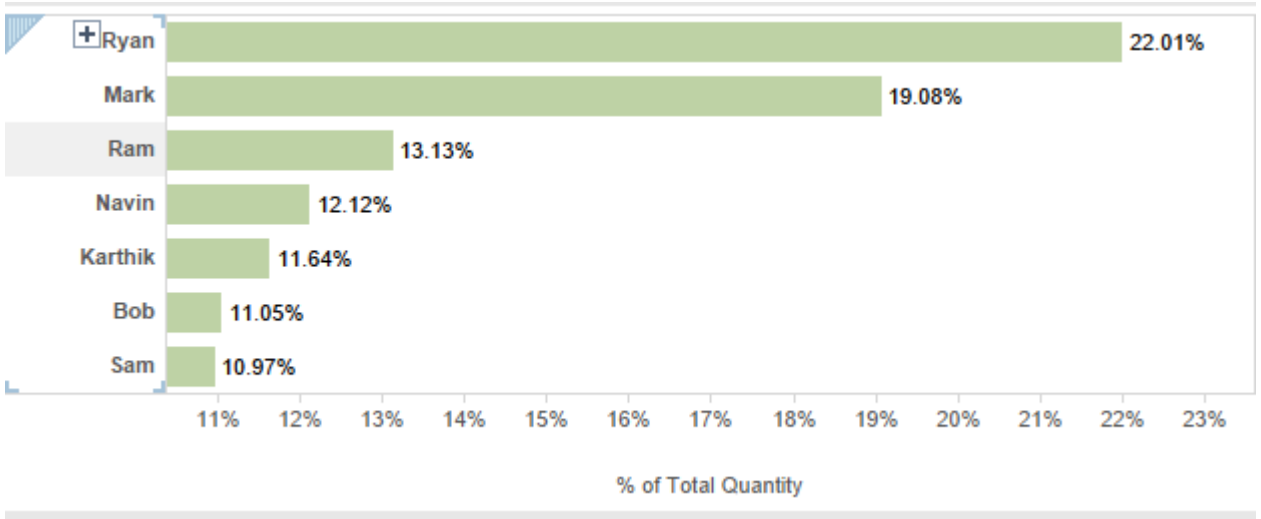

Region
Population Total
110M
100M
90M
80M
70M
60M
50M
40M
30M
20M
10M
0M
Asia
The Americas
Africa
Europe
Middle East
Oceania

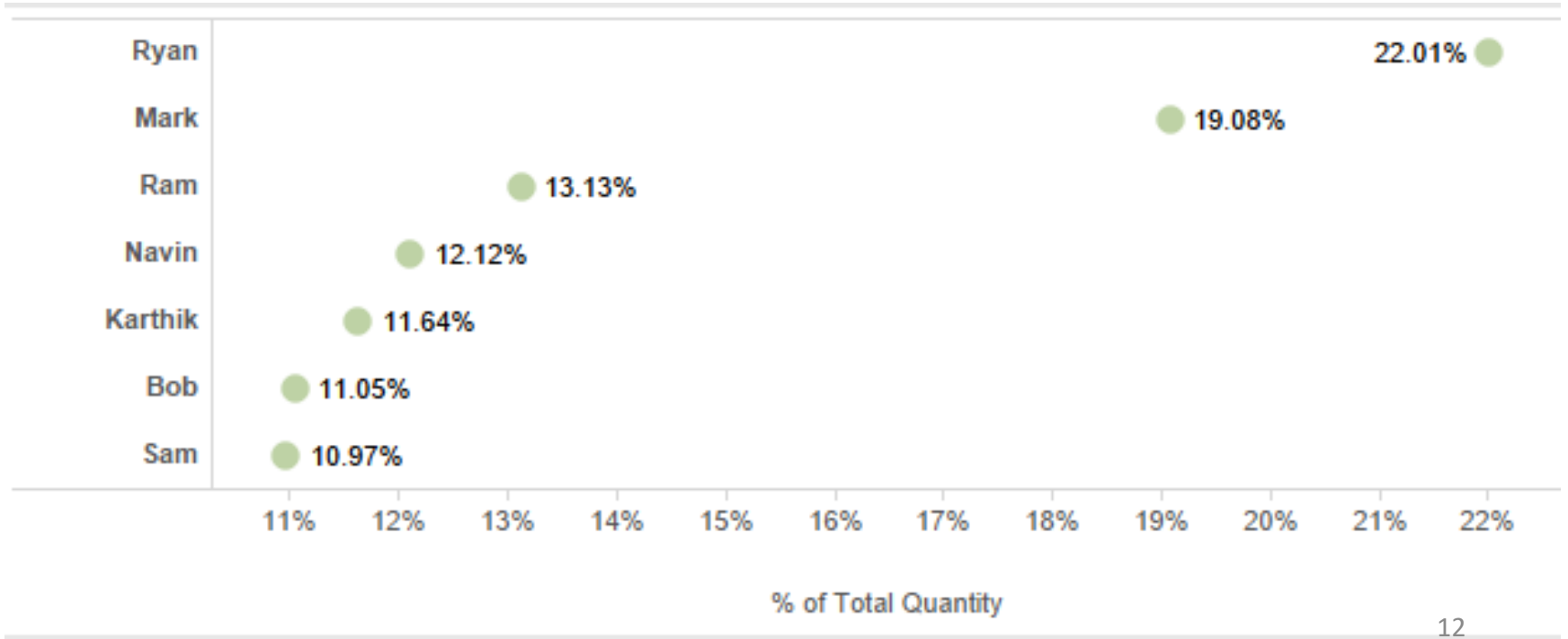

Country
Population Total
1200M
1000M
800M
600M
400M
200M
0M
China
India
United States
Indon..
Brazil
Pakist..
Nigeria
Bangl..
Russian Fed..
Japan
Mexico
Philip..
Vietna..
Germ..
Ethio..
Egypt, Arab ..
Iran, Islamic..
Turkey
Thaila..
France
United Kingd..
Italy

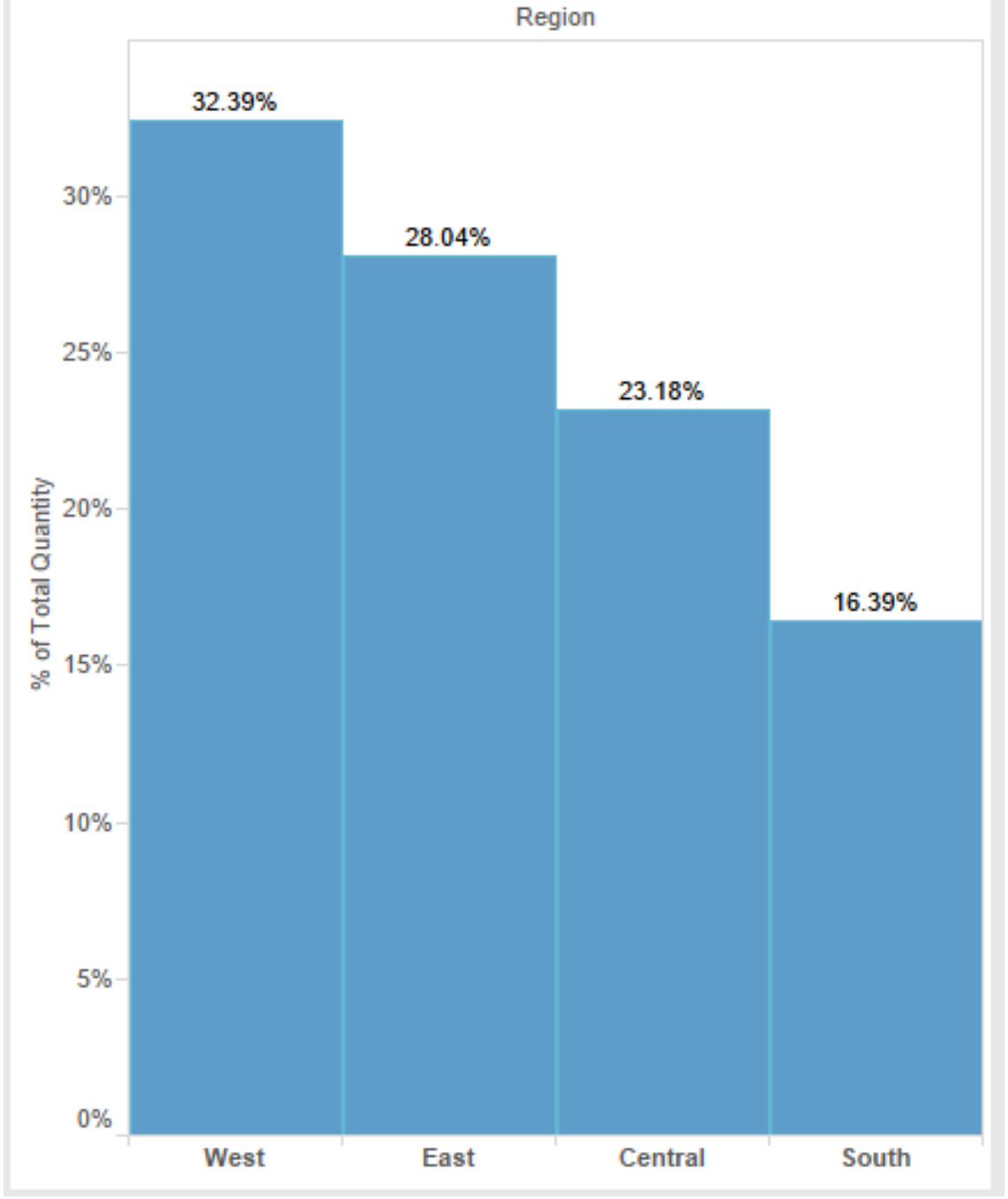

Country
China
India
United States
Indonesia
Brazil
Pakistan
Nigeria
Bangladesh
Russian Federation
Japan
Mexico
Philippines
Vietnam
Germany
Ethiopia
Egypt, Arab Rep.
Iran, Islamic Rep.
Turkey
Thailand
France
United Kingdom
Italy
0M
100M
200M
300M
400M
500M
600M
700M
800M
900M
1000M
1100M
1200M
1300M
Population Total

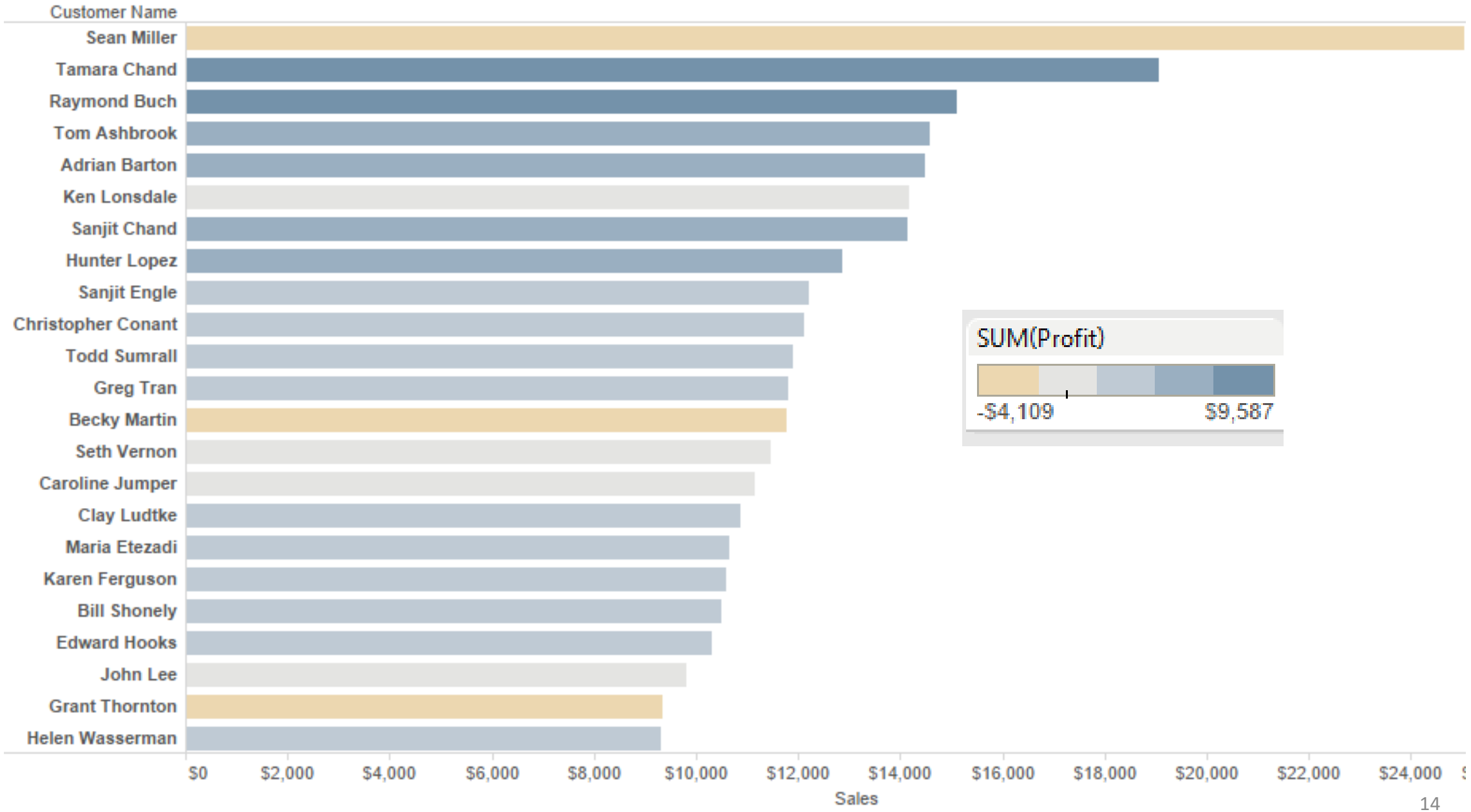

Ryan
Mark
Ram
Navin
Karthik
Bob
Sam
22.01%
19.08%
13.13%
12.12%
11.64%
11.05%
10.97%
10%
12%
14%
16%
18%
20%
22%
24%

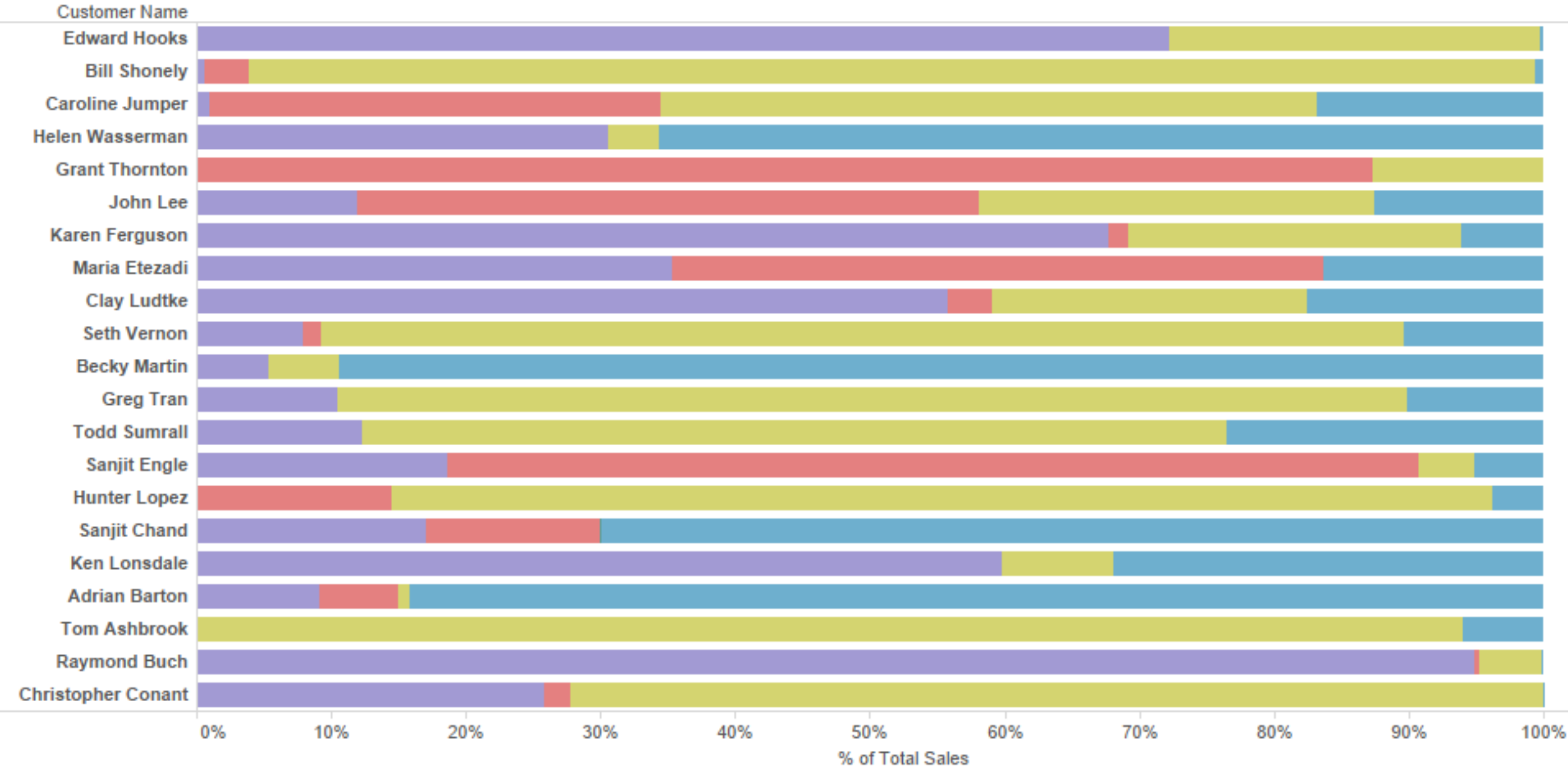

Ryan
Mark
Ram
Navin
Karthik
Bob
Sam
22.01%
19.08%
13.13%
12.12%
11.64%
11.05%
10.97%
0%
2%
4%
6%
8%
10%
12%
14%
16%
18%
20%
22%
24%

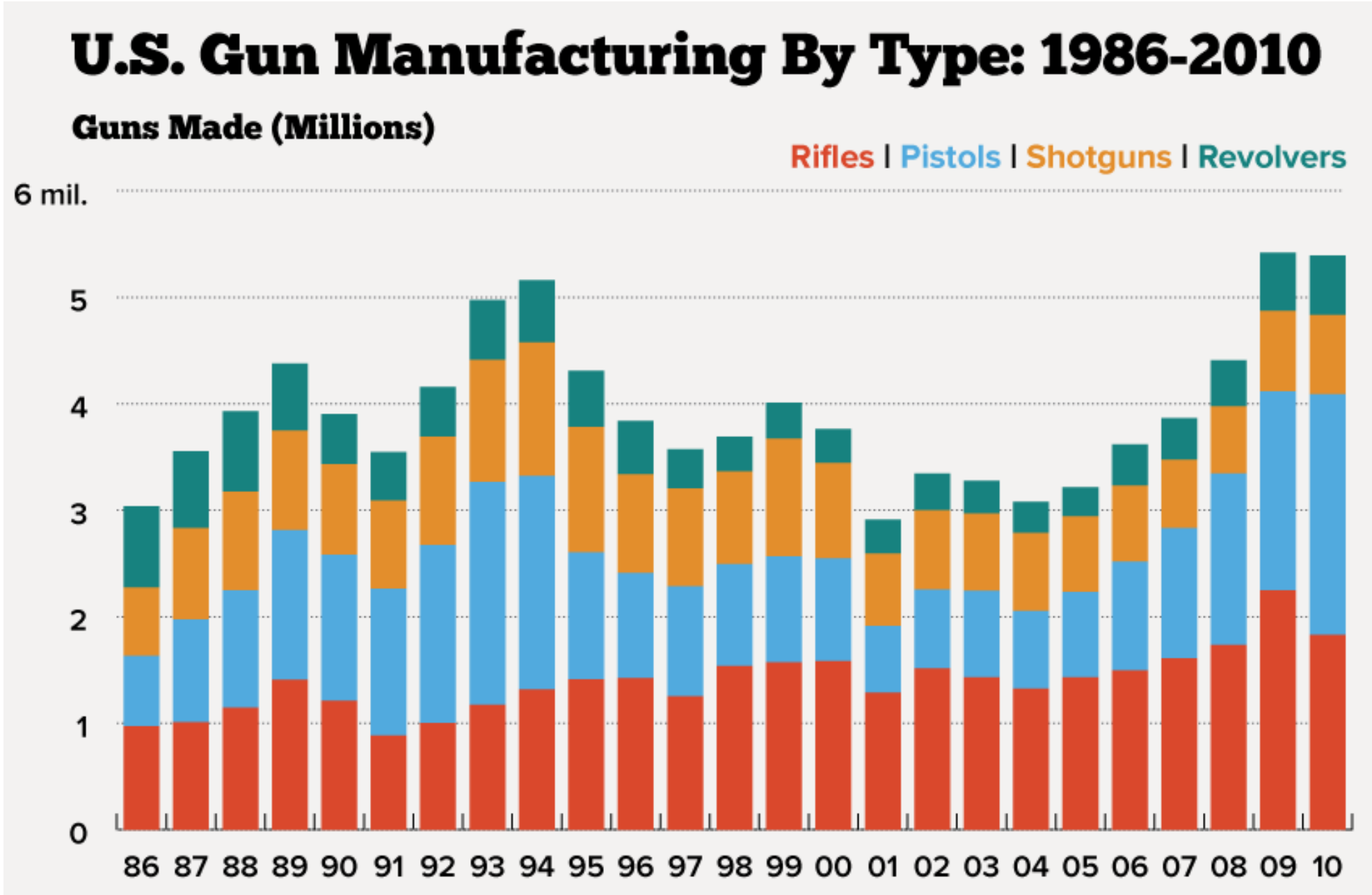

Ryan
Mark
Ram
Navin
Karthik
Bob
Sam
22.01%
19.08%
13.13%
12.12%
11.64%
11.05%
10.97%
11%
12%
13%
14%
15%
16%
17%
18%
19%
20%
21%
22%
23%
% of Total Quantity


Ryan
Mark
Ram
Navin
Karthik
Bob
Sam
22.01%
19.08%
13.13%
12.12%
11.64%
11.05%
10.97%
11%
12%
13%
14%
15%
16%
17%
18%
19%
20%
21%
22%
% of Total Quantity

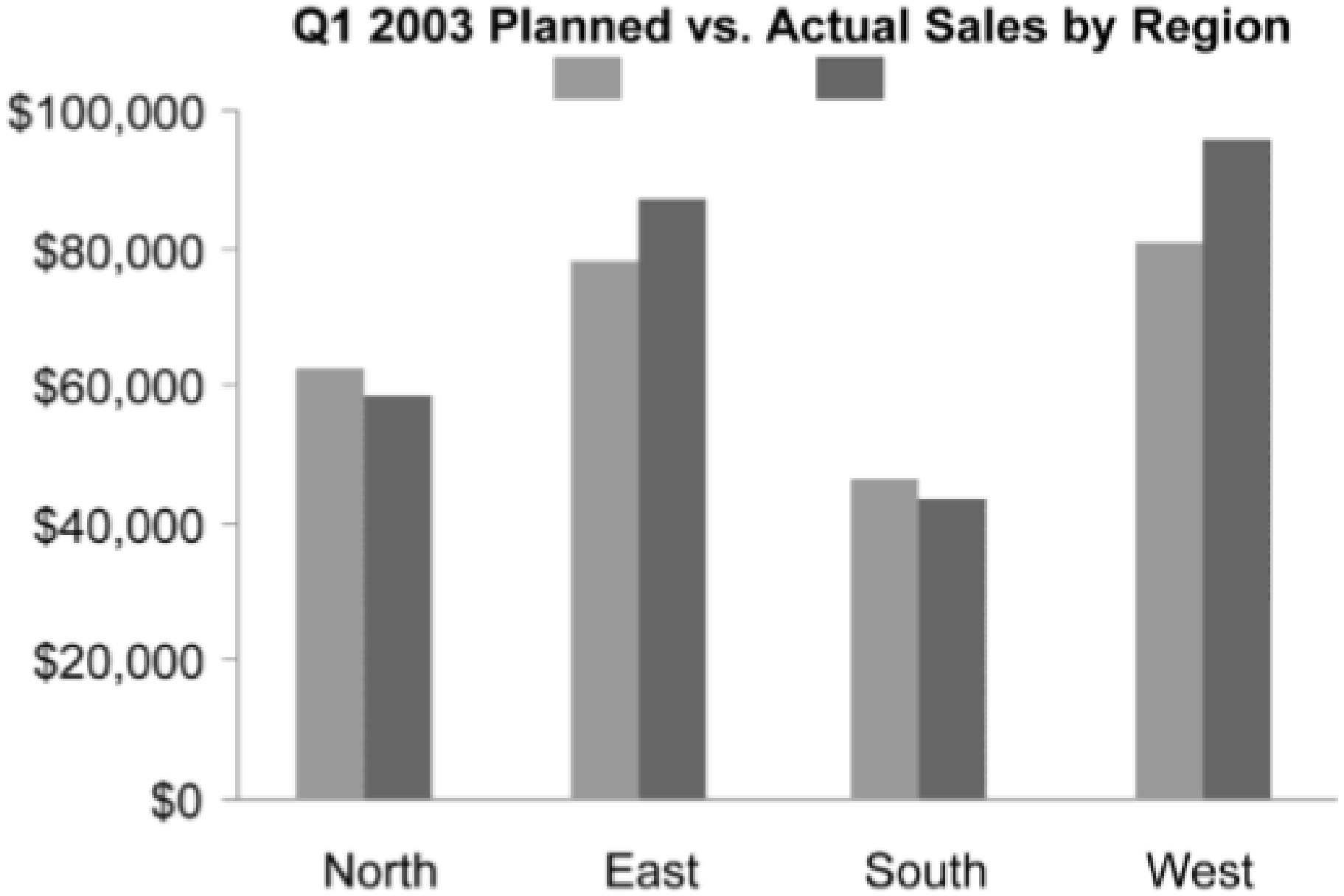

Region
32.39%
28.04%
23.18%
16.39%
30%
25%
20%
15%
10%
5%
0%
% of Total Quantity
West
East
Central
South

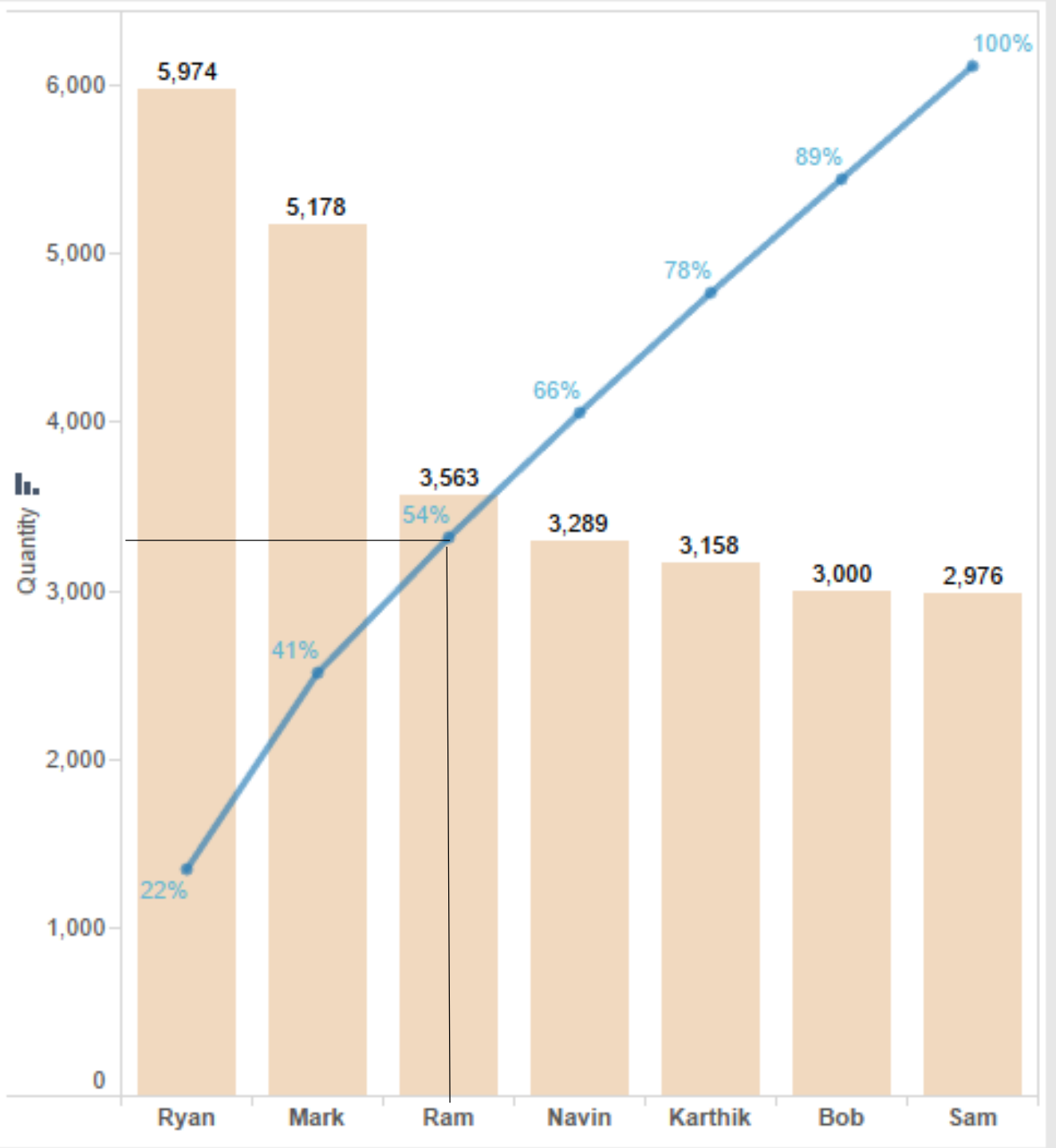

Customer Name
Sean Miller
Tamara Chand
Raymond Buch
Tom Ashbrook
Adrian Barton
Ken Lonsdale
Sanjit Chand
Hunter Lopez
Sanjit Engle
Christopher Conant
Todd Sumrall
Greg Tran
Becky Martin
Seth Vernon
Caroline Jumper
Clay Ludtke
Maria Etezadi
Karen Ferguson
Bill Shonely
Edward Hooks
John Lee
Grant Thornton
Helen Wasserman
SUM(Profit)
-$4,109
$9,587
$0
$2,000
$4,000
$6,000
$8,000
$10,000
$12,000
$14,000
$16,000
$18,000
$20,000
$22,000
$24,000
Sales

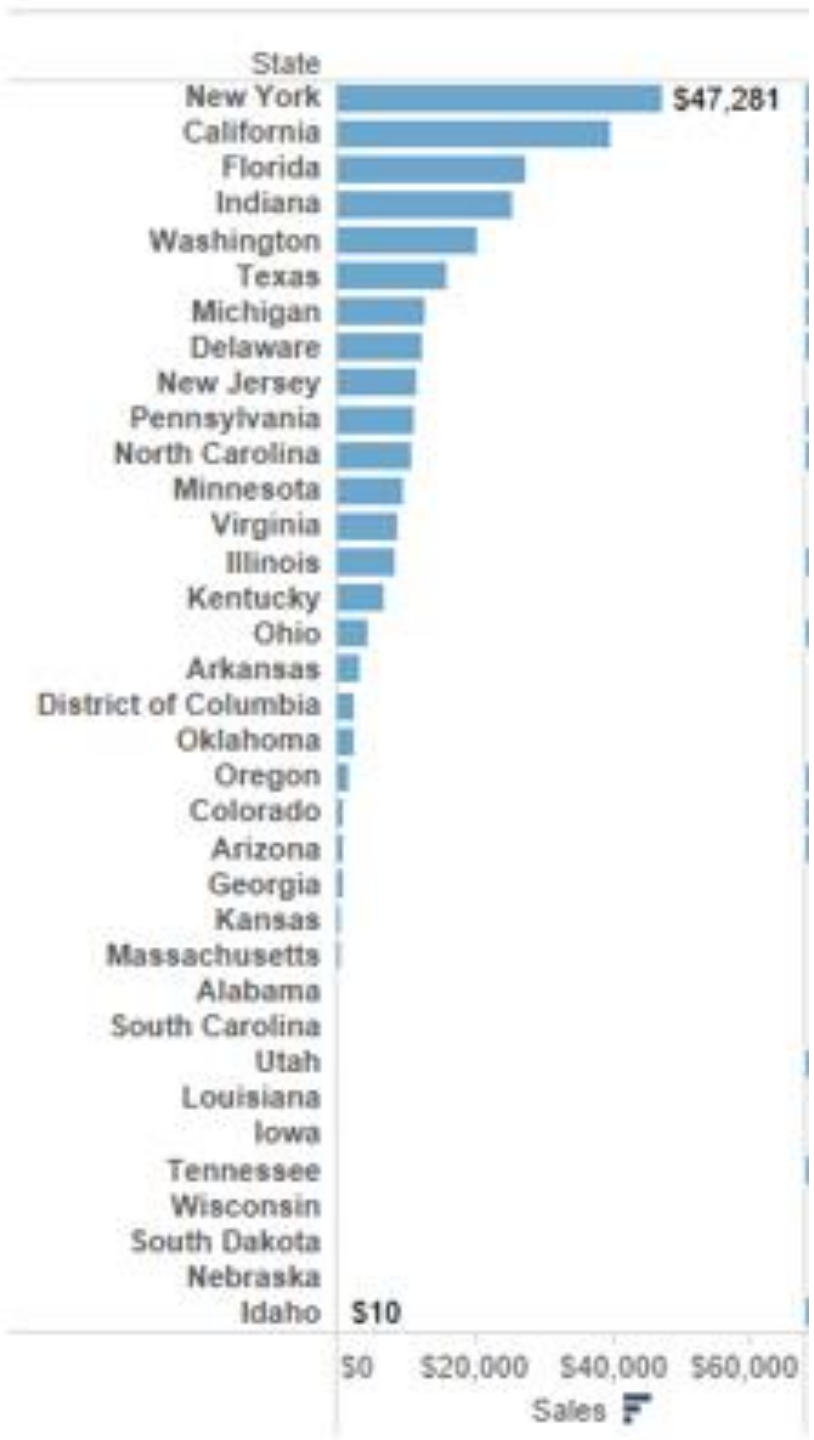

Customer Name
Edward Hooks
Bill Shonely
Caroline Jumper
Helen Wasserman
Grant Thornton
John Lee
Karen Ferguson
Maria Etezadi
Clay Ludtke
Seth Vernon
Becky Martin
Greg Tran
Todd Sumrall
Sanjit Engle
Hunter Lopez
Sanjit Chand
Ken Lonsdale
Adrian Barton
Tom Ashbrook
Raymond Buch
Christopher Conant
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% of Total Sales

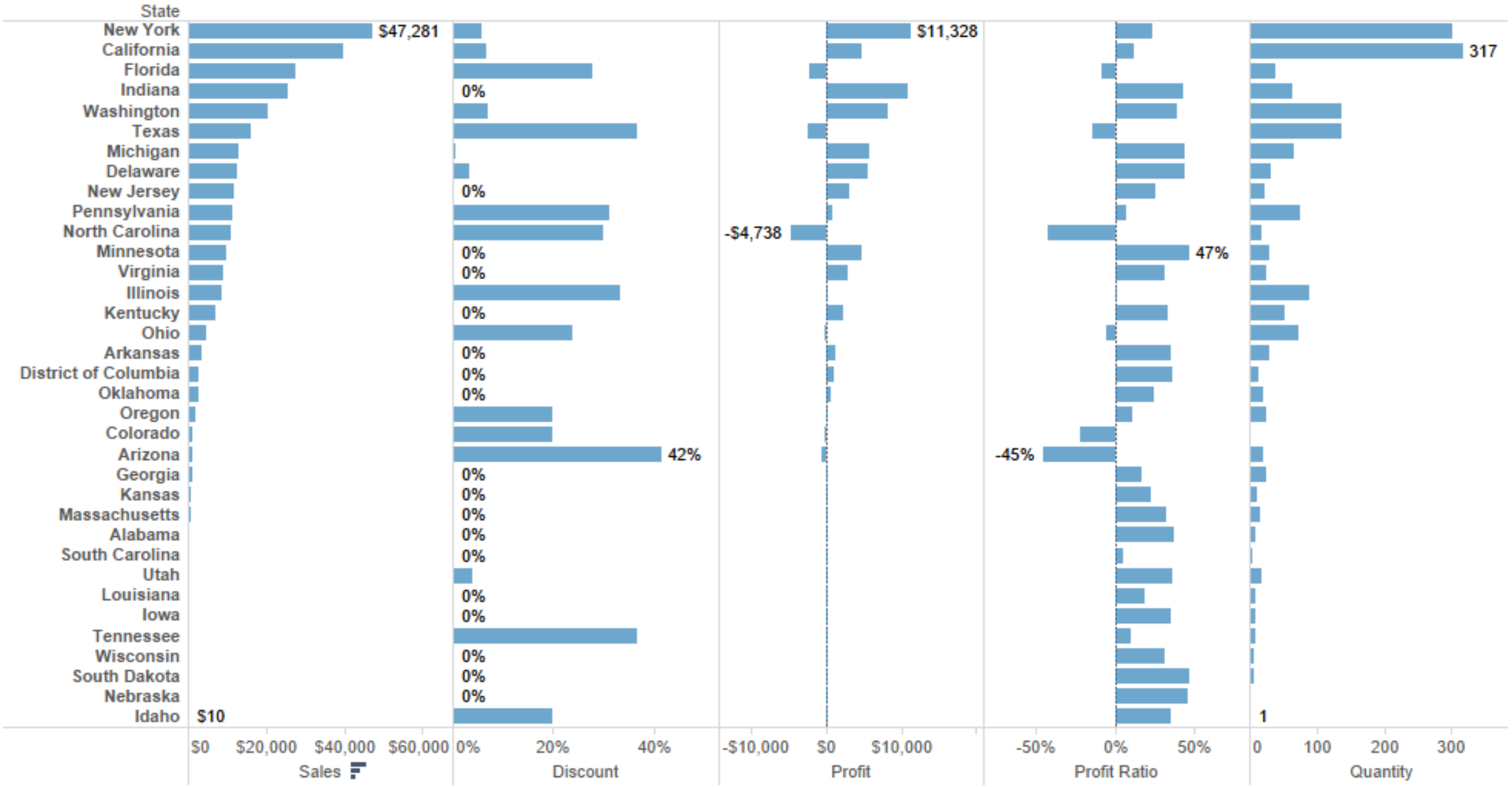


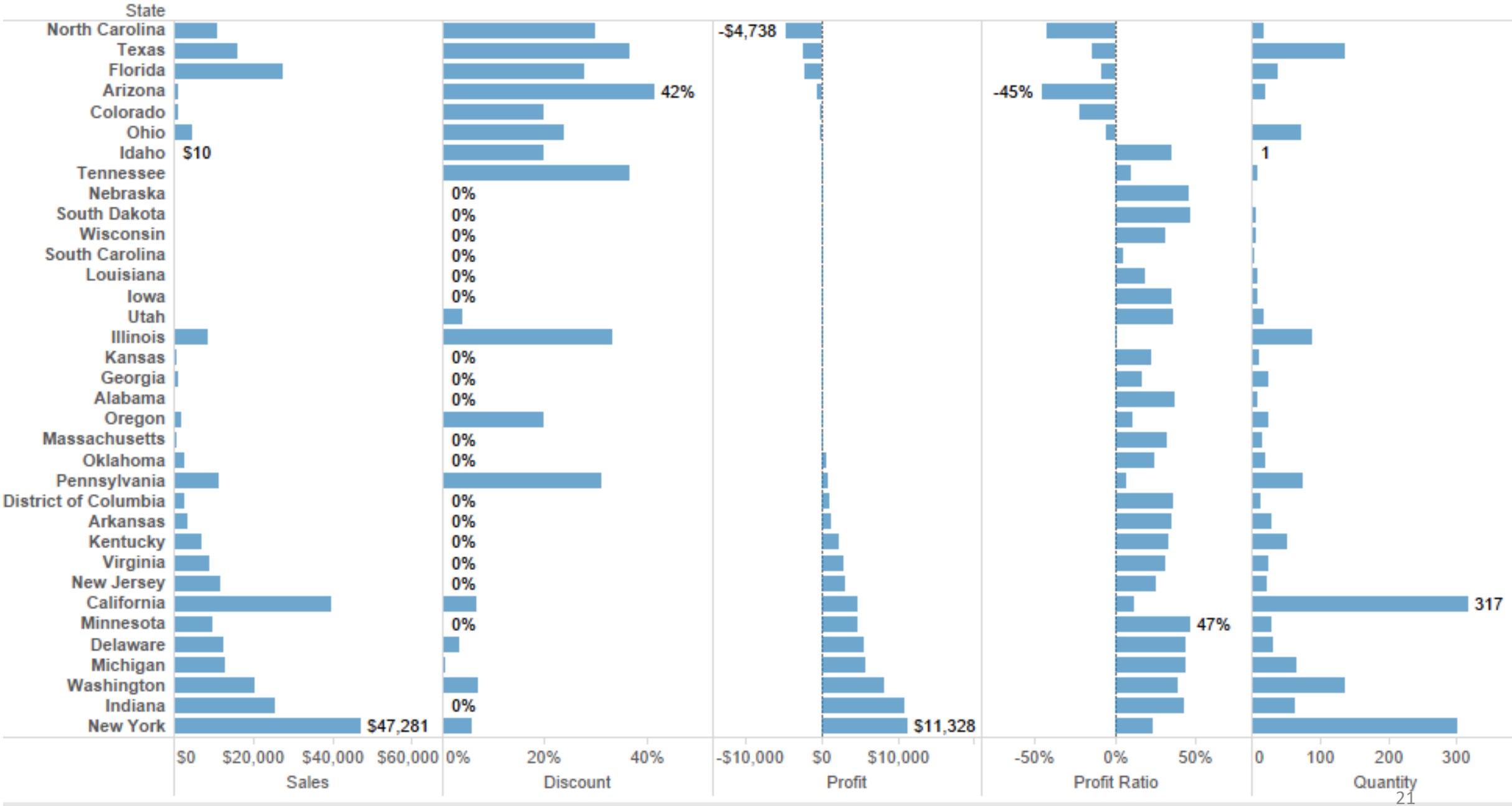
Source: http://thedailyviz.com/2012/08/07/charting-u-s-gun-manufacturing/

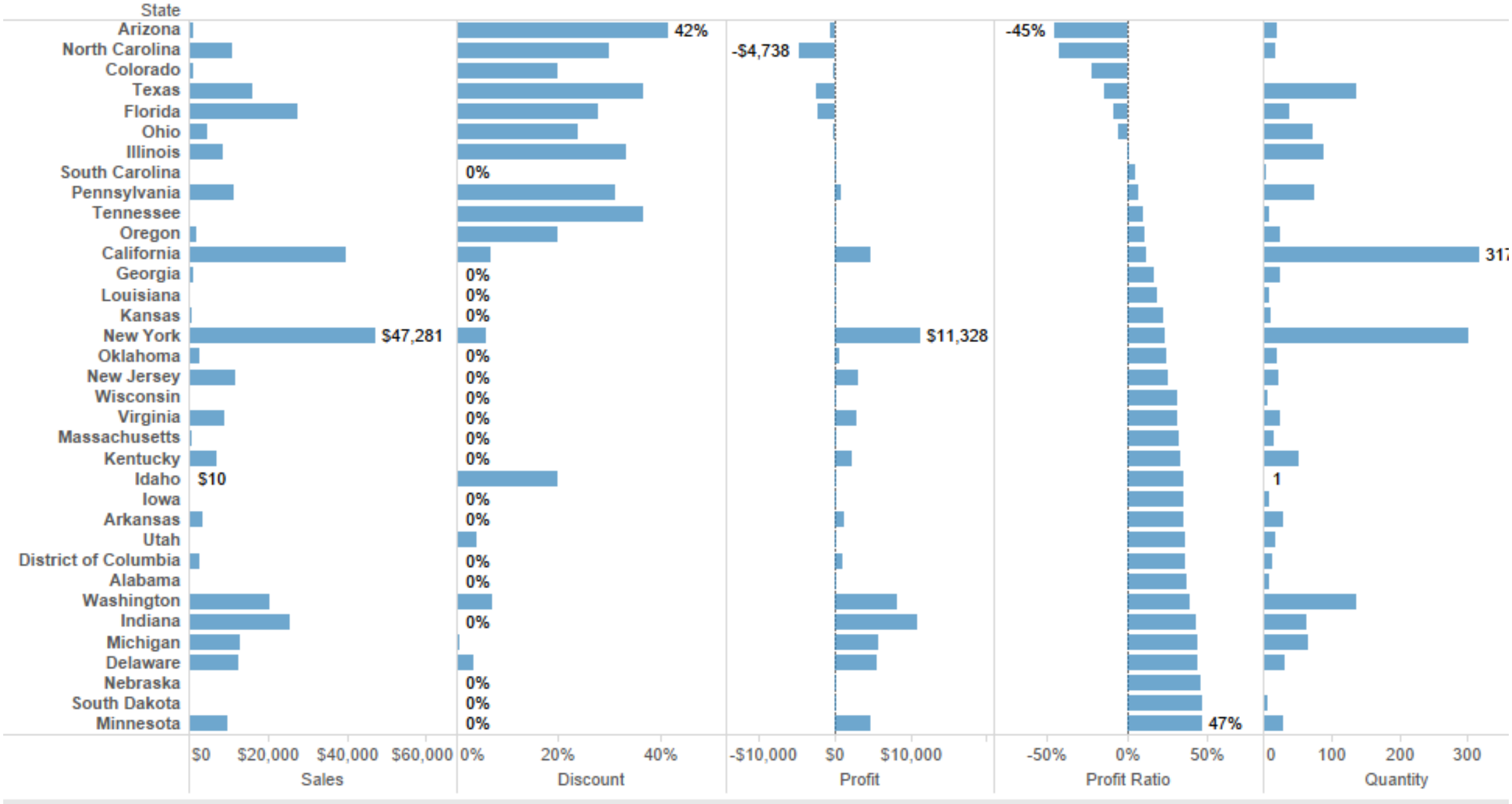

Q1 2003 Planned vs. Actual Sales by Region
$100,000
$80,000
$60,000
$40,000
$20,000
$0
North
East
South
West


6,000
5,000
4,000
3,000
2,000
1,000
0
Quantity
5,974
5,178
3,563
3,289
3,158
3,000
2,976
22%
41%
54%
66%
78%
89%
100%
Ryan
Mark
Ram
Navin
Karthik
Bob
Sam


State
New York
California
Florida
Indiana
Washington
Texas
Michigan
Delaware
New Jersey
Pennsylvania
North Carolina
Minnesota
Virginia
Illinois
Kentucky
Ohio
Arkansas
District of Columbia
Oklahoma
Oregon
Colorado
Arizona
Georgia
Kansas
Massachusetts
Alabama
South Carolina
Utah
Louisiana
Iowa
Tennessee
Wisconsin
South Dakota
Nebraska
Idaho
$47,281
$10
$0
$20,000
$40,000
$60,000
Sales


State
New York
California
Florida
Indiana
Washington
Texas
Michigan
Delaware
New Jersey
Pennsylvania
North Carolina
Minnesota
Virginia
Illinois
Kentucky
Ohio
Arkansas
District of Columbia
Oklahoma
Oregon
Colorado
Arizona
Georgia
Kansas
Massachusetts
Alabama
South Carolina
Utah
Louisiana
Iowa
Tennessee
Wisconsin
South Dakota
Nebraska
Idaho
$47,281
$10
0%
42%
$11,328
-$4,738
47%
-45%
317
1
$0
$20,000
$40,000
$60,000
Sales
0%
20%
40%
Discount
-$10,000
$0
$10,000
Profit
-50%
0%
50%
Profit Ratio
0
100
200
300
Quantity

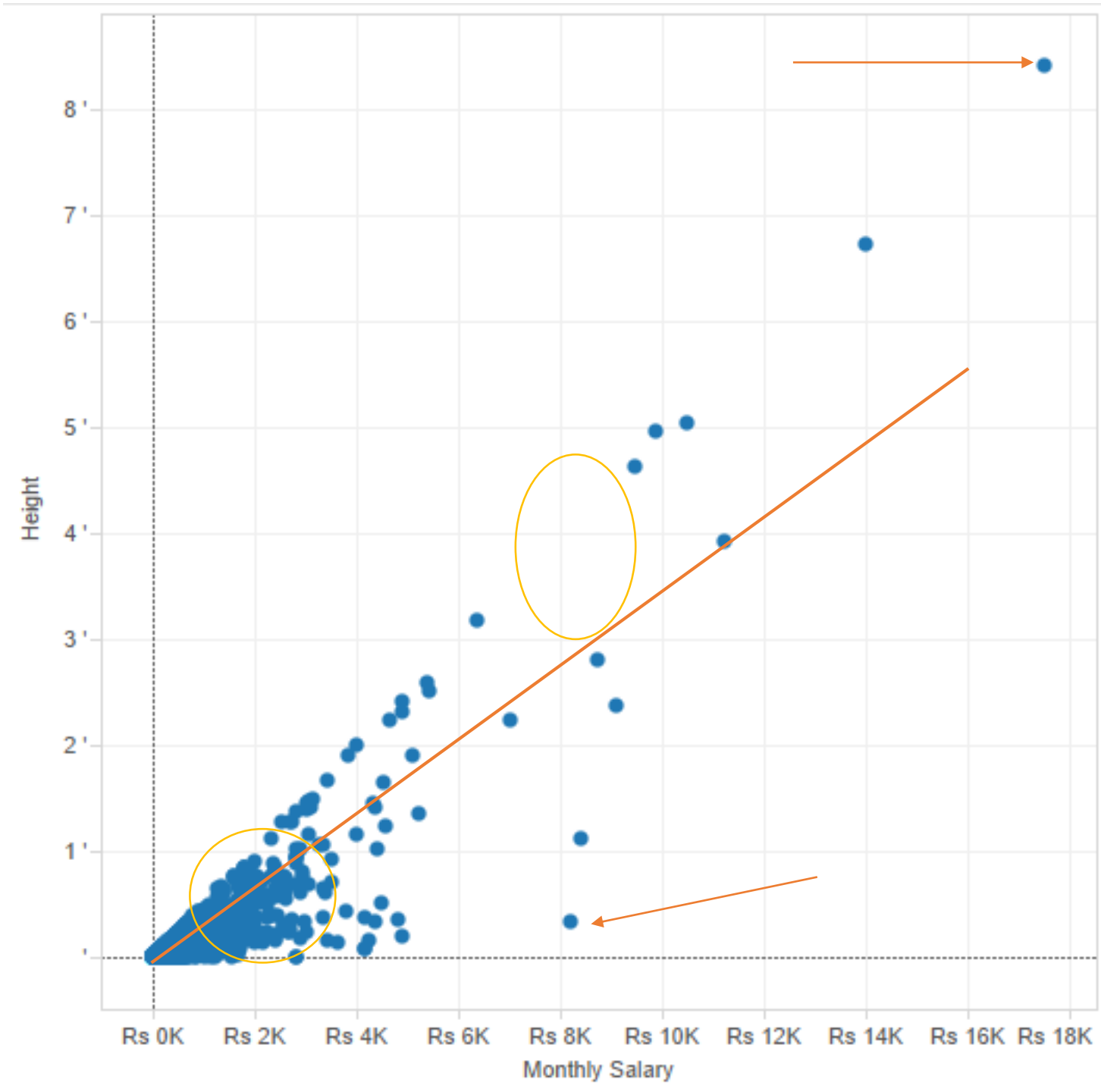

State
North Carolina
Texas
Florida
Arizona
Colorado
Ohio
Idaho
Tennessee
Nebraska
South Dakota
Wisconsin
South Carolina
Louisiana
Iowa
Utah
Illinois
Kansas
Georgia
Alabama
Oregon
Massachusetts
Oklahoma
Pennsylvania
District of Columbia
Arkansas
Kentucky
Virginia
New Jersey
California
Minnesota
Delaware
Michigan
Washington
Indiana
New York
$10
$47,281
42%
0%
-$4,738
$11,328
-45%
47%
1
317
$0
$20,000
$40,000
$60,000
Sales
0%
20%
40%
Discount
-$10,000
$0
$10,000
Profit
-50%
0%
50%
Profit Ratio
0
100
200
300
Quantity

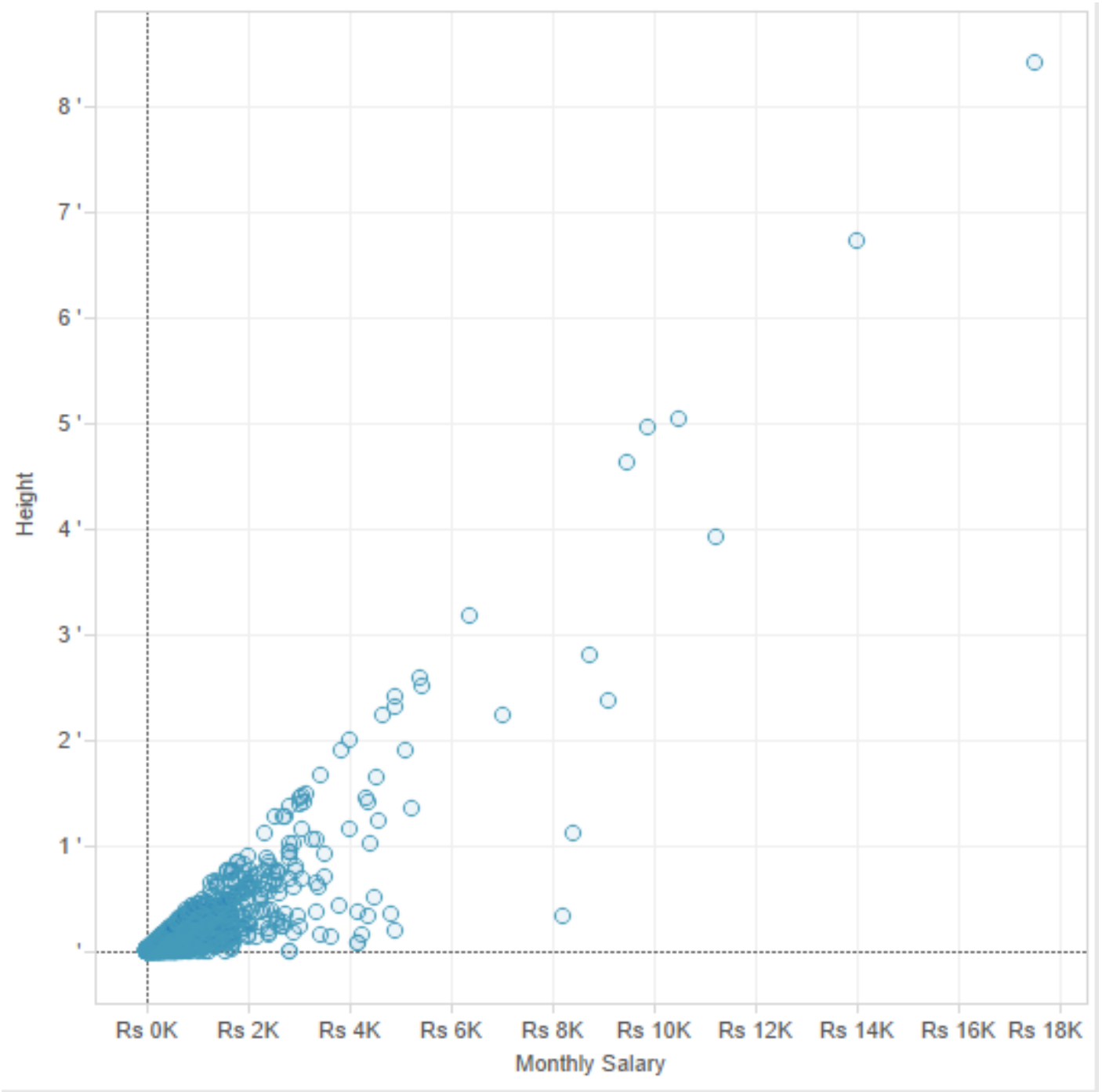

State
Arizona
North Carolina
Colorado
Texas
Florida
Ohio
Illinois
South Carolina
Pennsylvania
Tennessee
Oregon
California
Georgia
Louisiana
Kansas
New York
Oklahoma
New Jersey
Wisconsin
Virginia
Massachusetts
Kentucky
Idaho
Iowa
Arkansas
Utah
District of Columbia
Alabama
Washington
Indiana
Michigan
Delaware
Nebraska
South Dakota
Minnesota
$47,281
$10
42%
0%
-$4,738
$11,328
-45%
47%
317
1
$0
$20,000
$40,000
$60,000
Sales
0%
20%
40%
Discount
-$10,000
$0
$10,000
Profit
-50%
0%
50%
Profit Ratio
0
100
200
300
Quantity

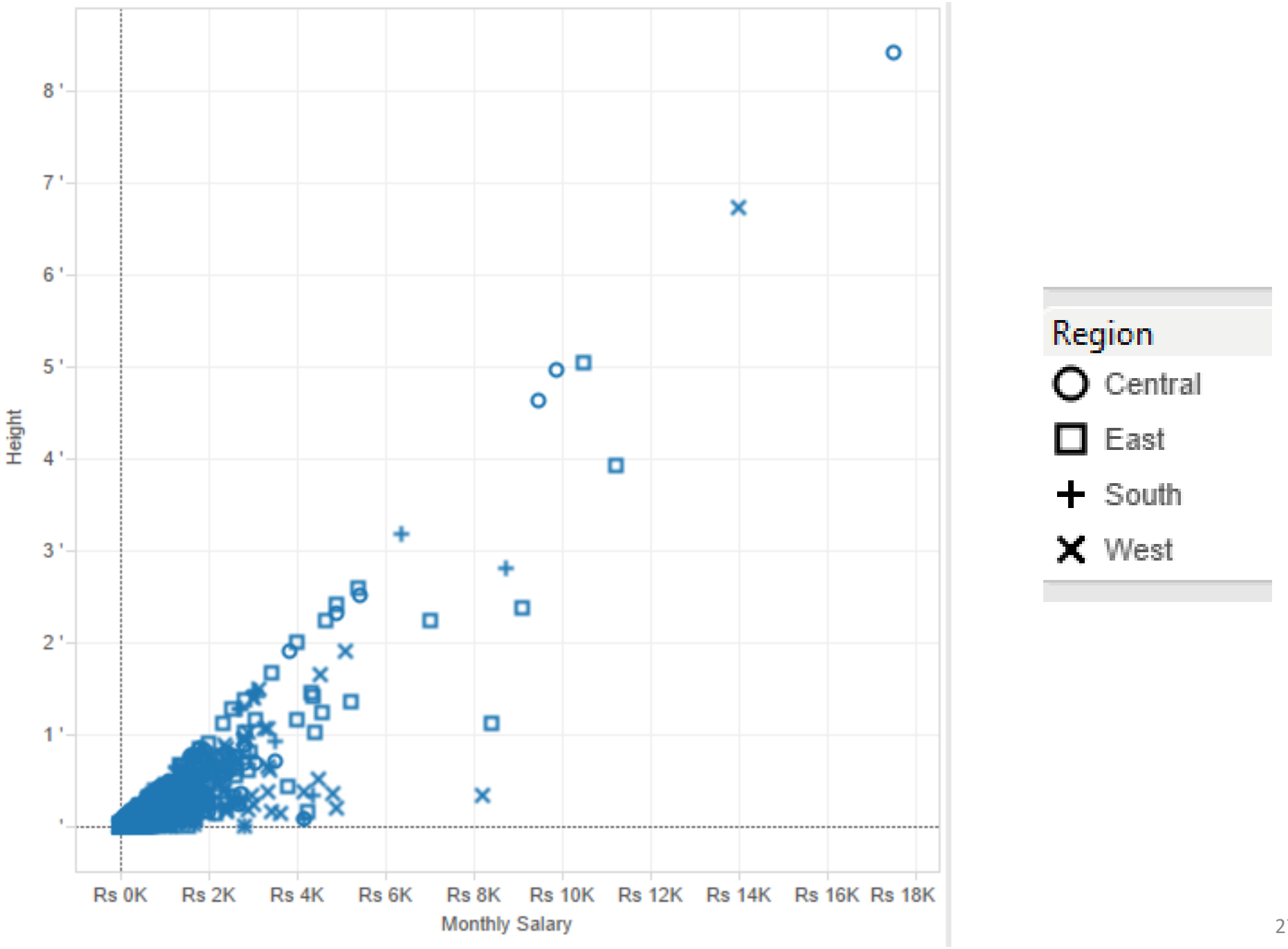
Bars

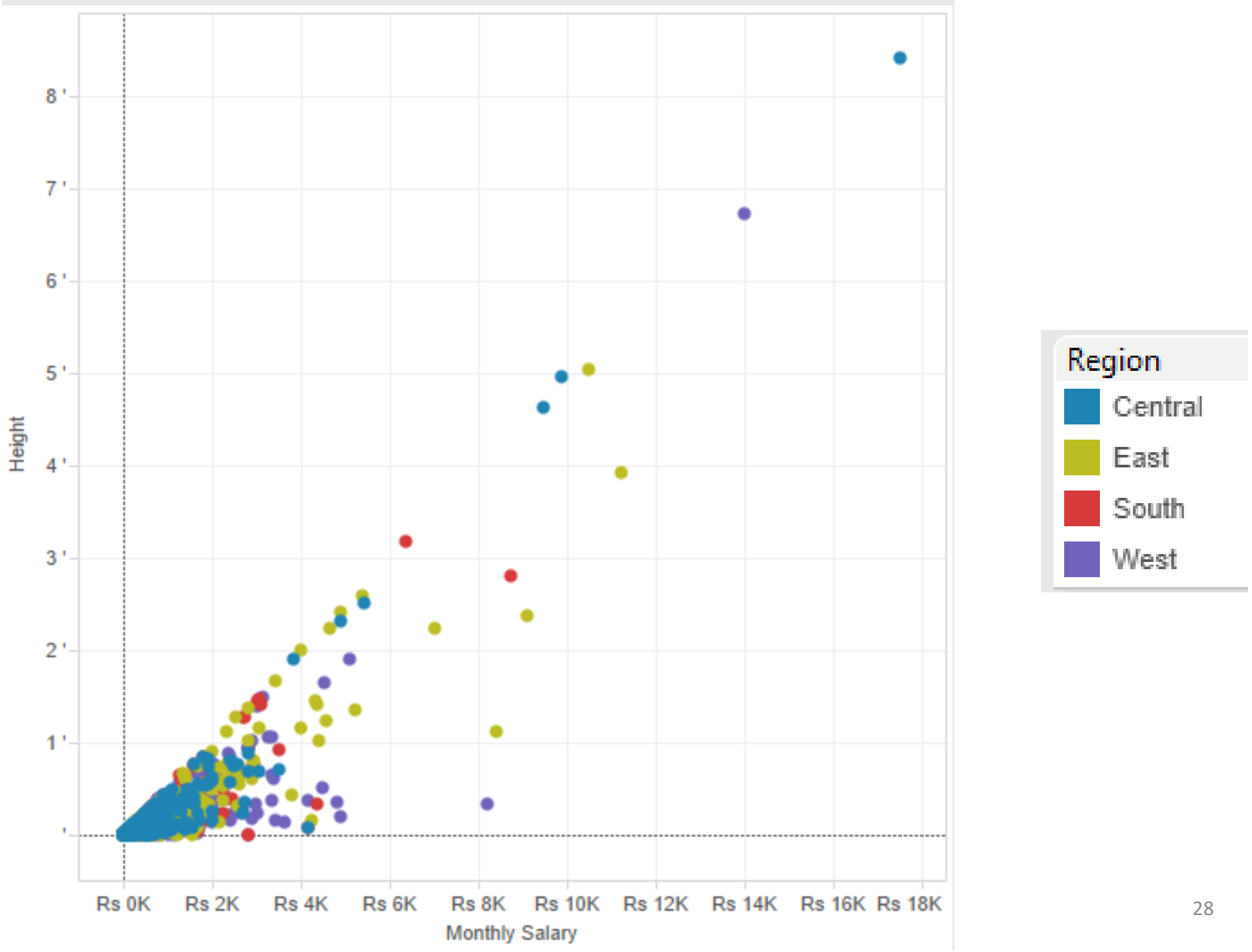
- Compare
- Category
- Rank
- High/Lows
- Correlation
- Part to Whole

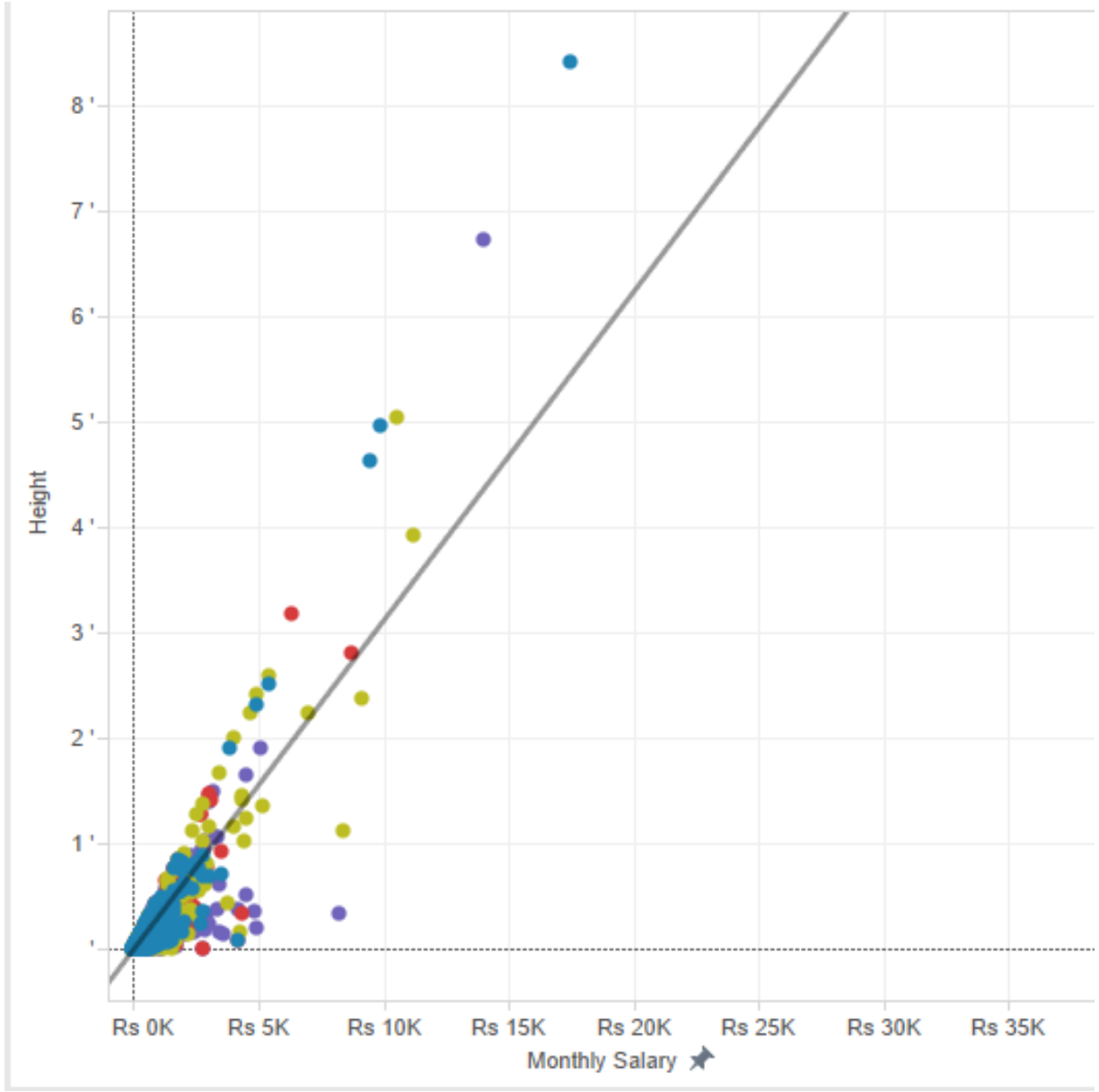
One Measure + One Measure

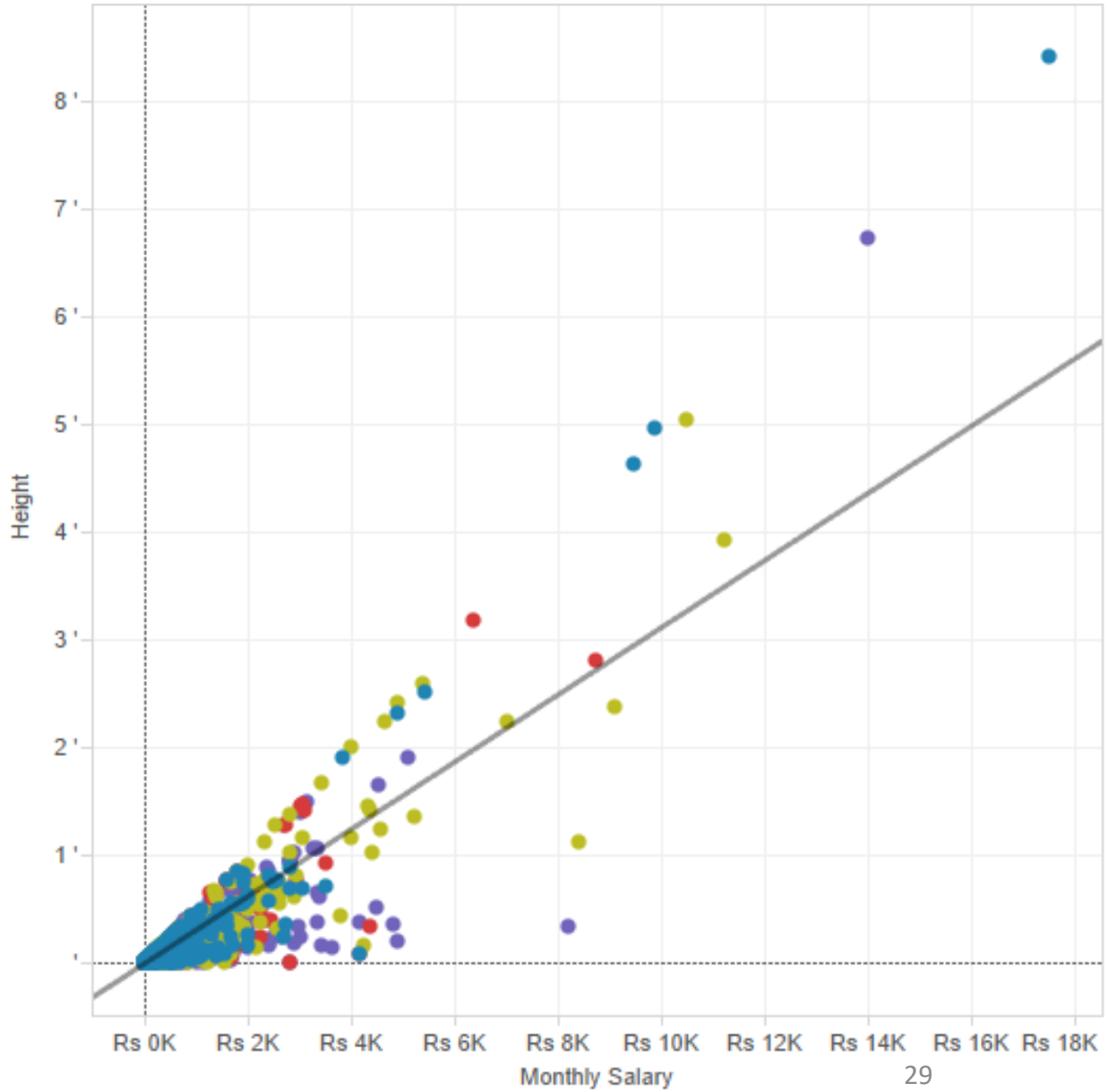

8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Height
Rs 0K
Rs 2K
Rs 4K
Rs 6K
Rs 8K
Rs 10K
Rs 12K
Rs 14K
Rs 16K
Rs 18K
Monthly Salary


8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Height
Rs 0K
Rs 2K
Rs 4K
Rs 6K
Rs 8K
Rs 10K
Rs 12K
Rs 14K
Rs 16K
Rs 18K
Monthly Salary


8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Height
Rs 0K
Rs 2K
Rs 4K
Rs 6K
Rs 8K
Rs 10K
Rs 12K
Rs 14K
Rs 16K
Rs 18K
Monthly Salary
Region
Central
East
South
West

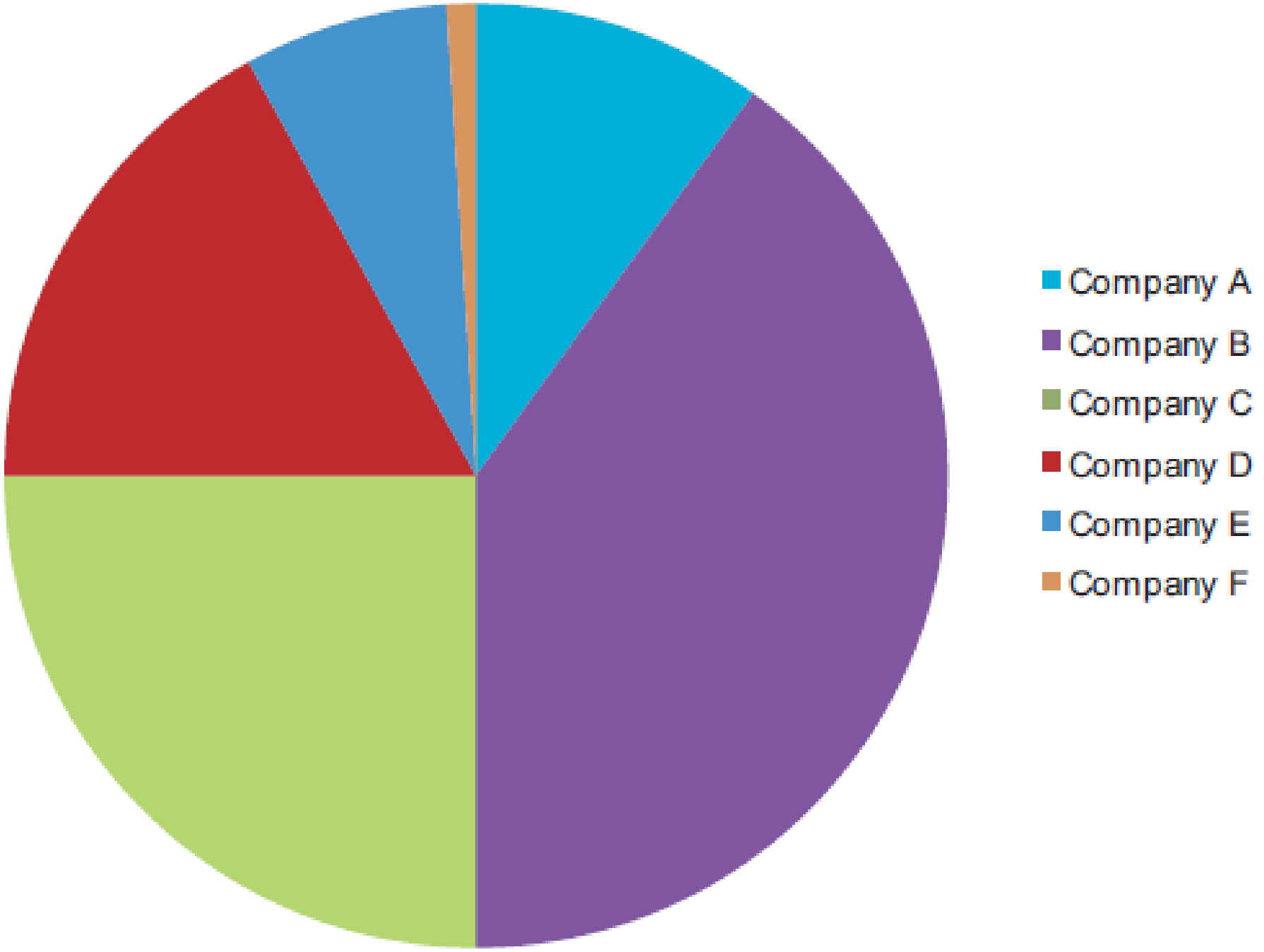

Height
8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Rs 0K
Rs 2K
Rs 4K
Rs 6K
Rs 8K
Rs 10K
Rs 12K
Rs 14K
Rs 16K
Rs 18K
Monthly Salary
Region
Central
East
South
West

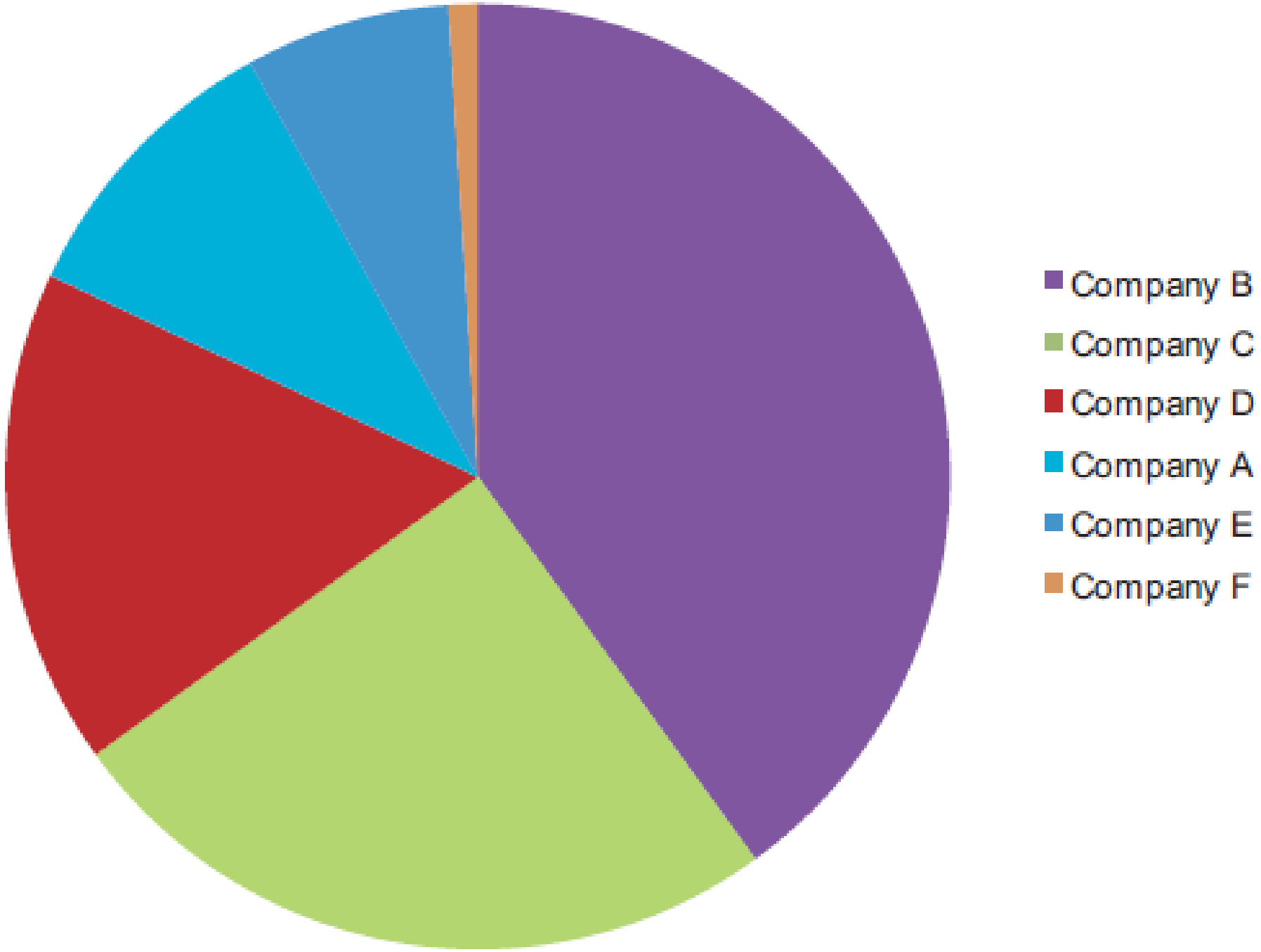

8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Height
Rs 0K
Rs 5K
Rs 10K
Rs 15K
Rs 20K
Rs 25K
Rs 30K
Rs 35K
Monthly Salary

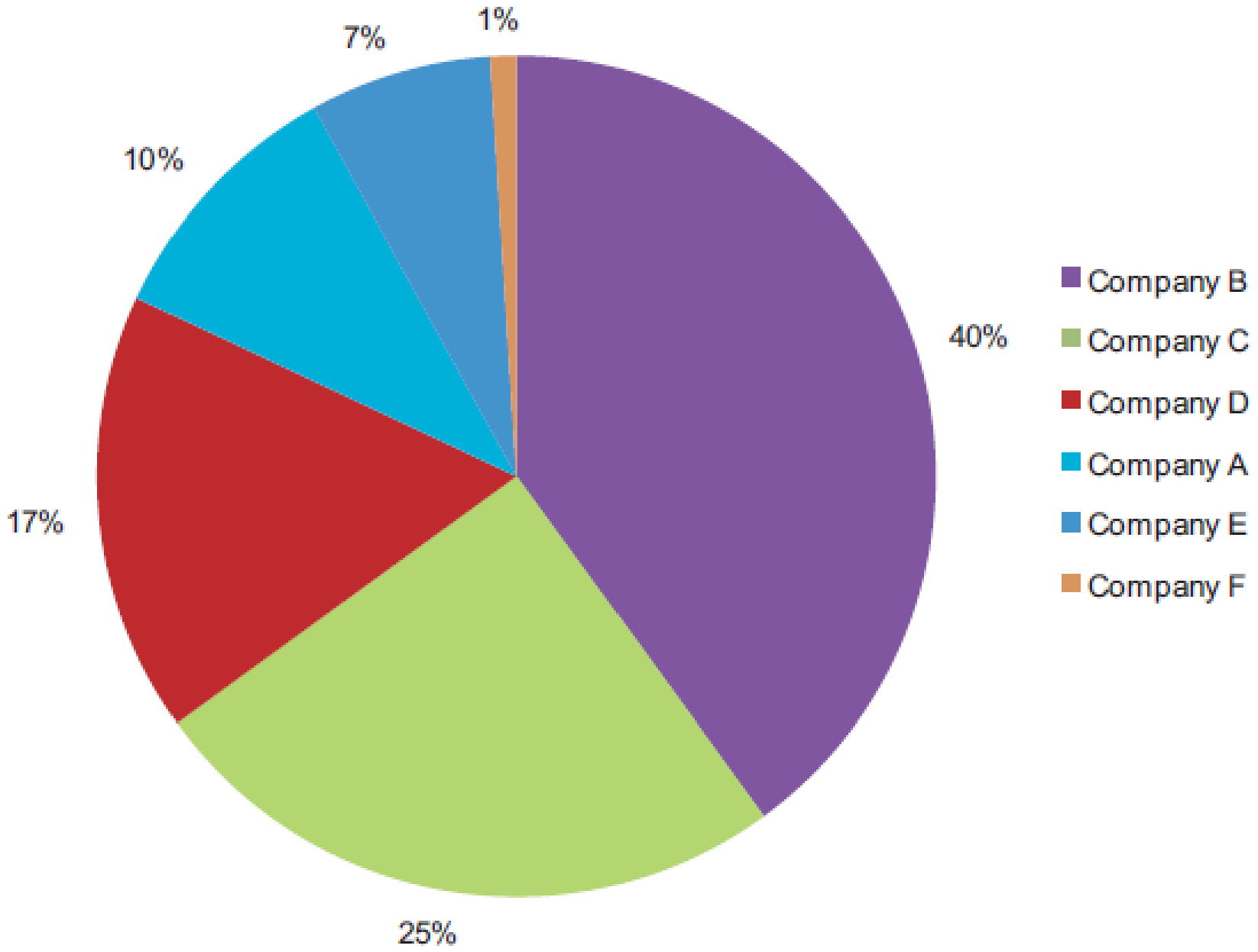

8 '
7 '
6 '
5 '
4 '
3 '
2 '
1 '
'
Height
Rs 0K
Rs 2K
Rs 4K
Rs 6K
Rs 8K
Rs 10K
Rs 12K
Rs 14K
Rs 16K
Rs 18K
Monthly Salary

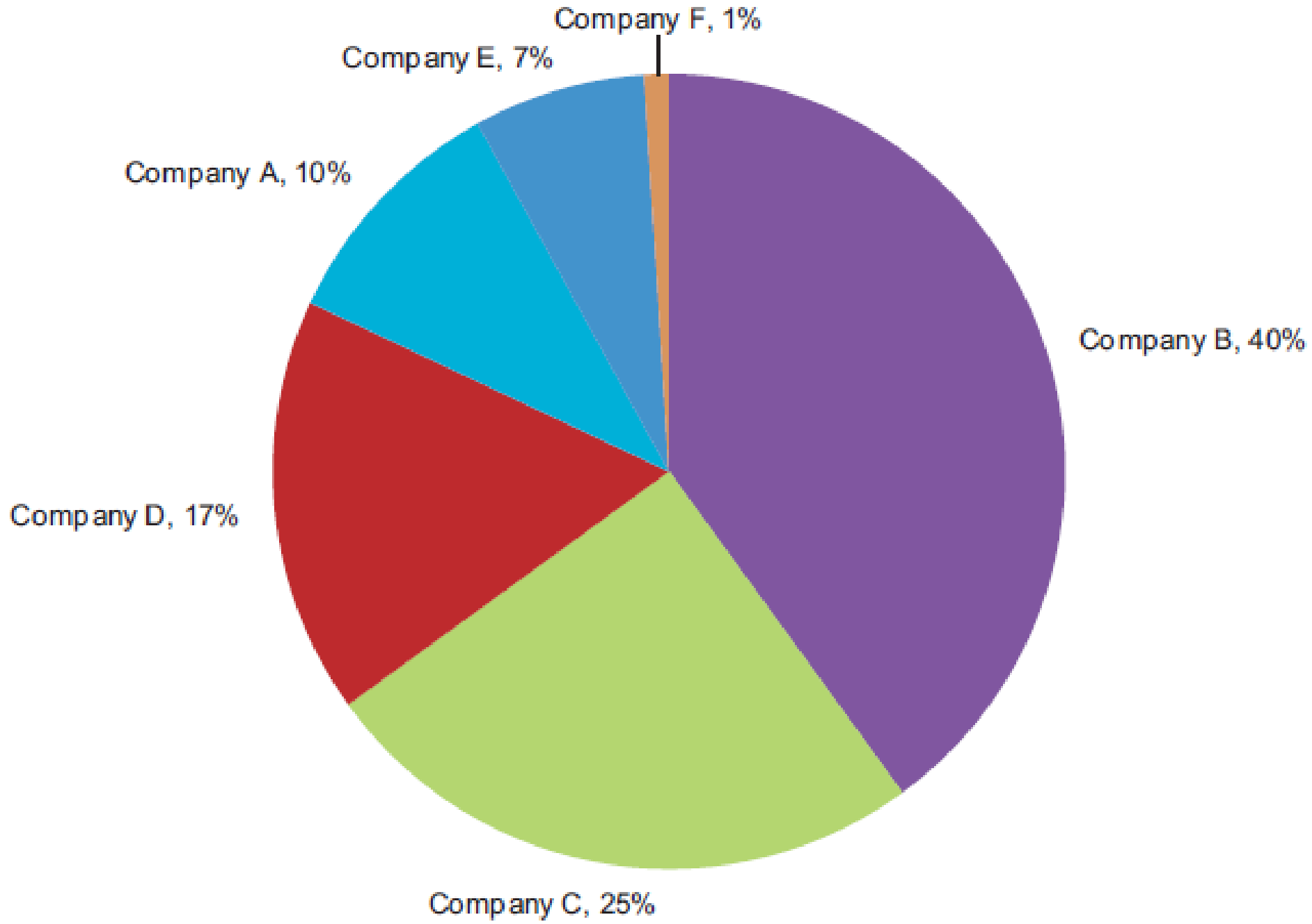
ScatterPlot

- Trend
- Concentrations
- Gaps
- Outliers
- Groups/Clusters
- Relationship

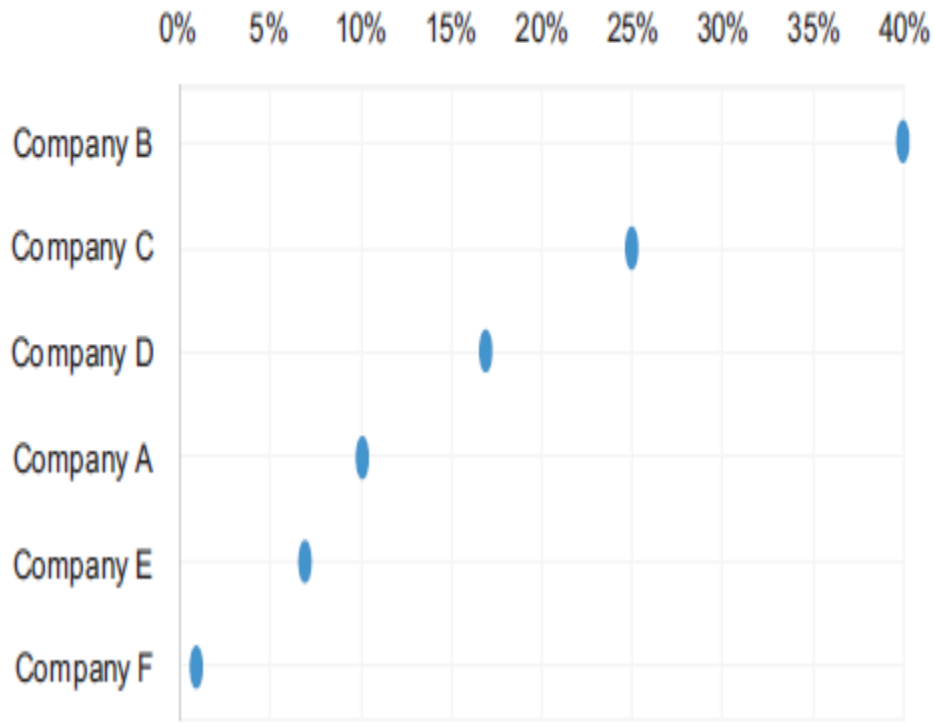

Company A
Company B
Company C
Company D
Company E
Company F

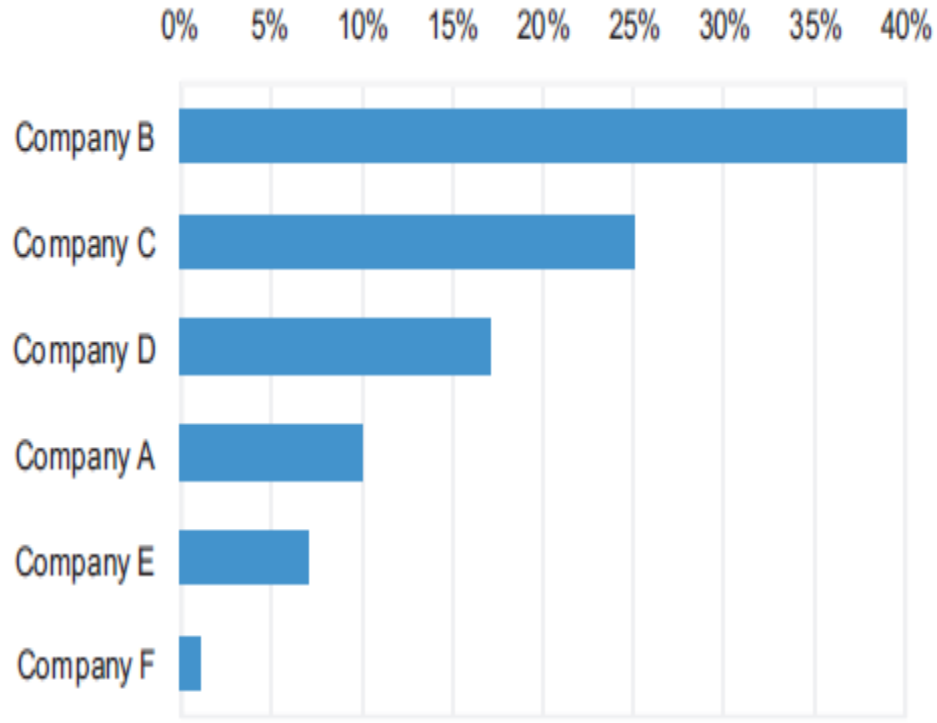

Company B
Company C
Company D
Company A
Company E
Company F


1%
7%
10%
40%
17%
25%
Company B
Company C
Company D
Company A
Company E
Company F

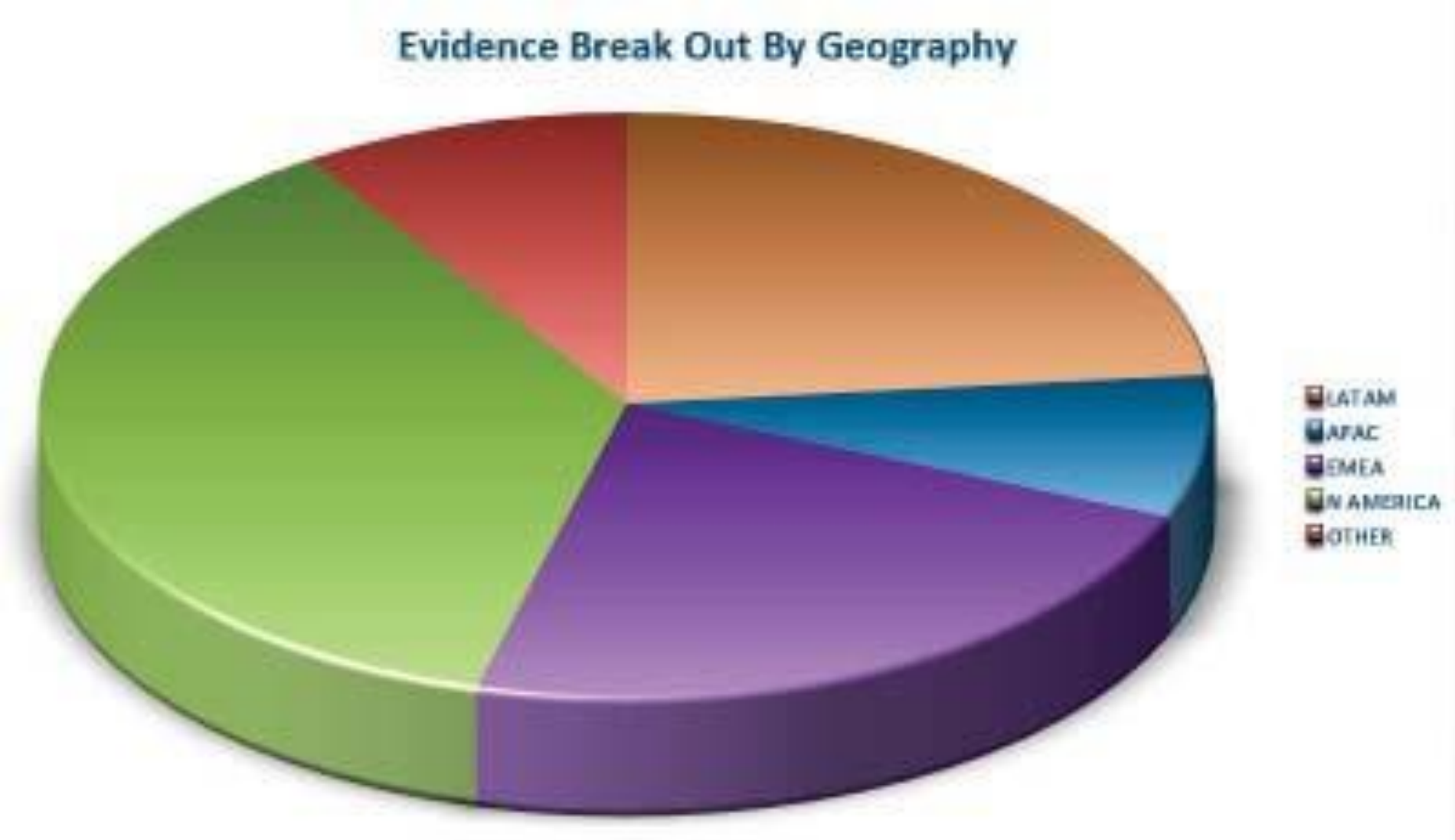

Company F, 1%
Company E, 7%
Company A, 10%
Company B, 40%
Company D, 17%
Company C, 25%

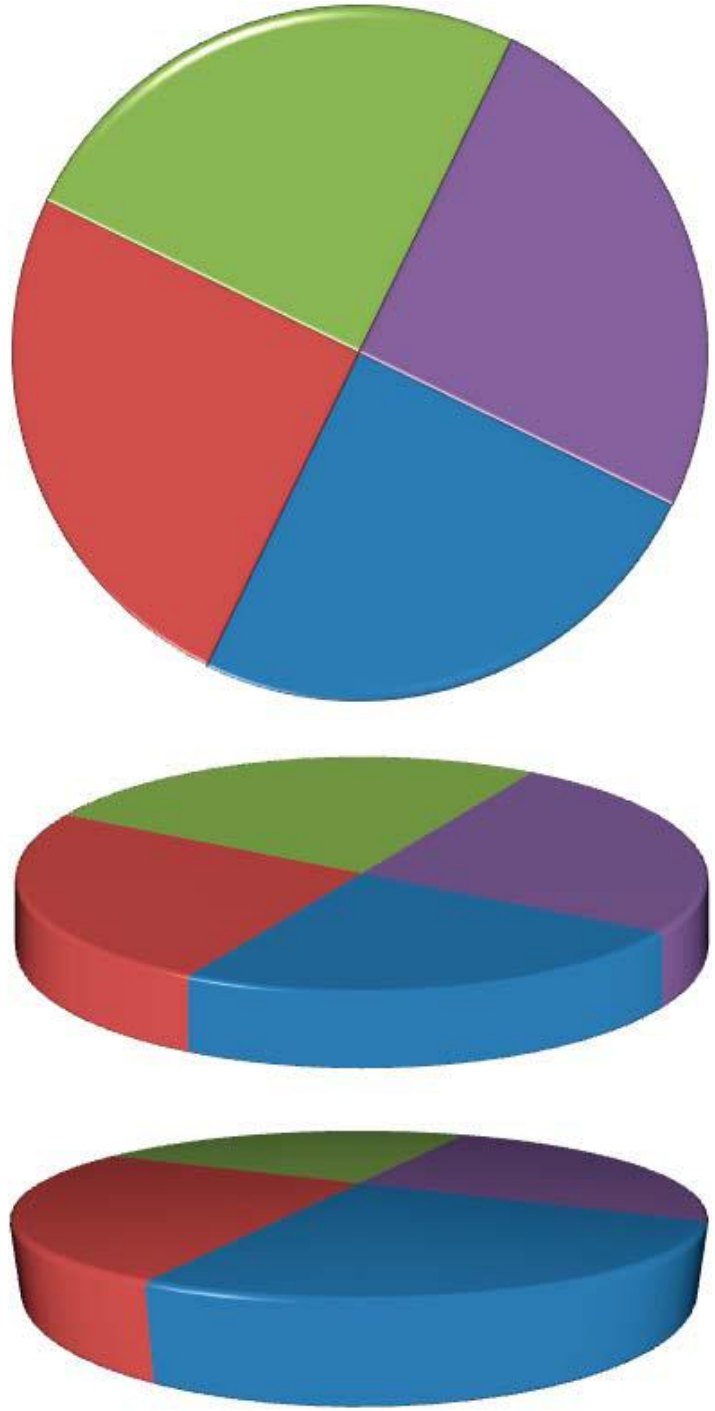
Companies	Percentage
Company B	40%
Company C	25%
Company D	17%
Company A	10%
Company E	7%
Company F	1%
Total	100%

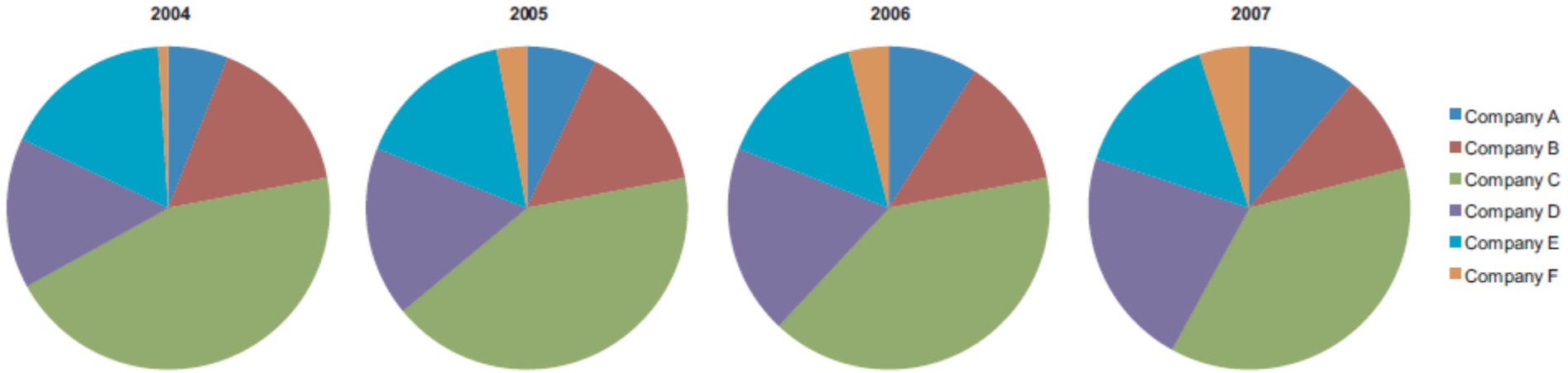

0%
5%
10%
15%
20%
25%
30%
35%
40%
Company B
Company C
Company D
Company A
Company E
Company F

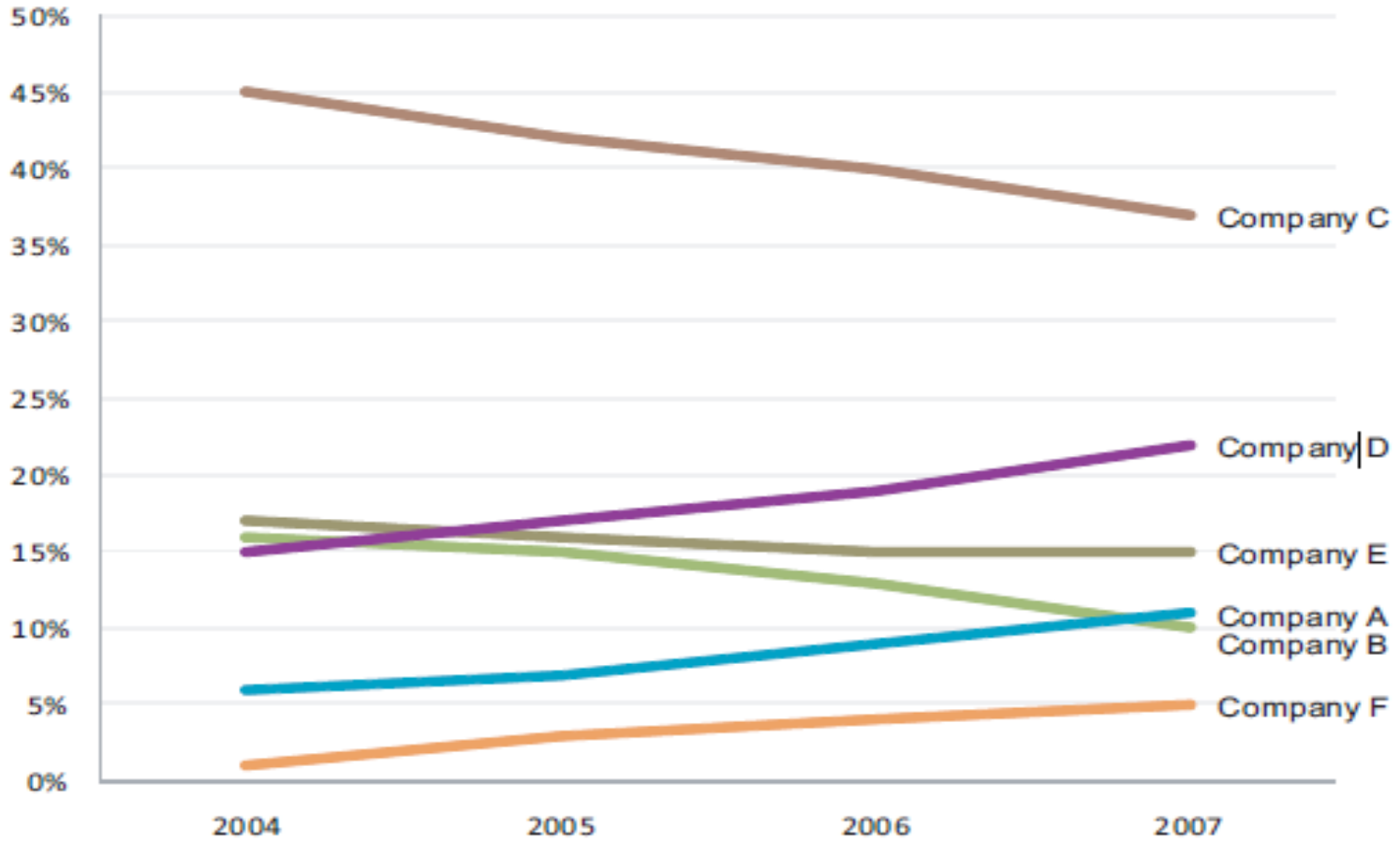

0%
5%
10%
15%
20%
25%
30%
35%
40%
Company B
Company C
Company D
Company A
Company E
Company F


?
1

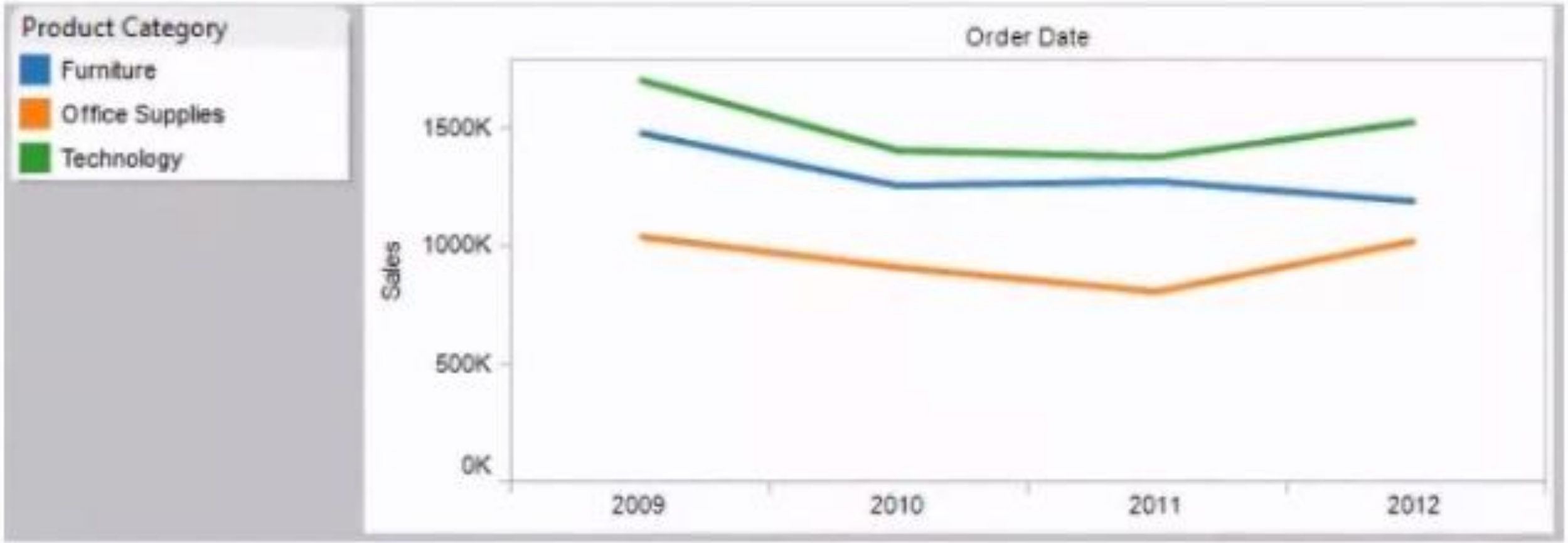

Evidence Break Out By Geography
LATAM
APAC
EMEA
N AMERICA
OTHER

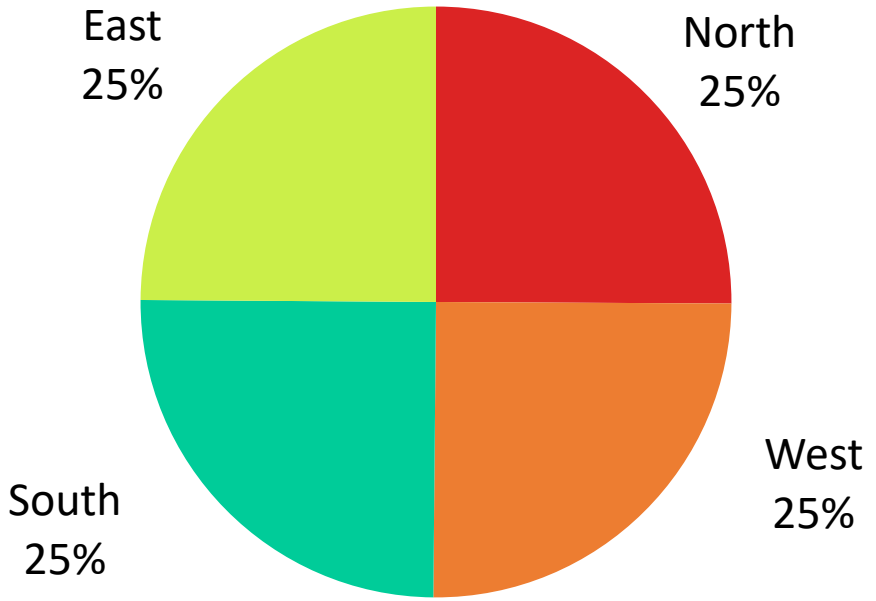


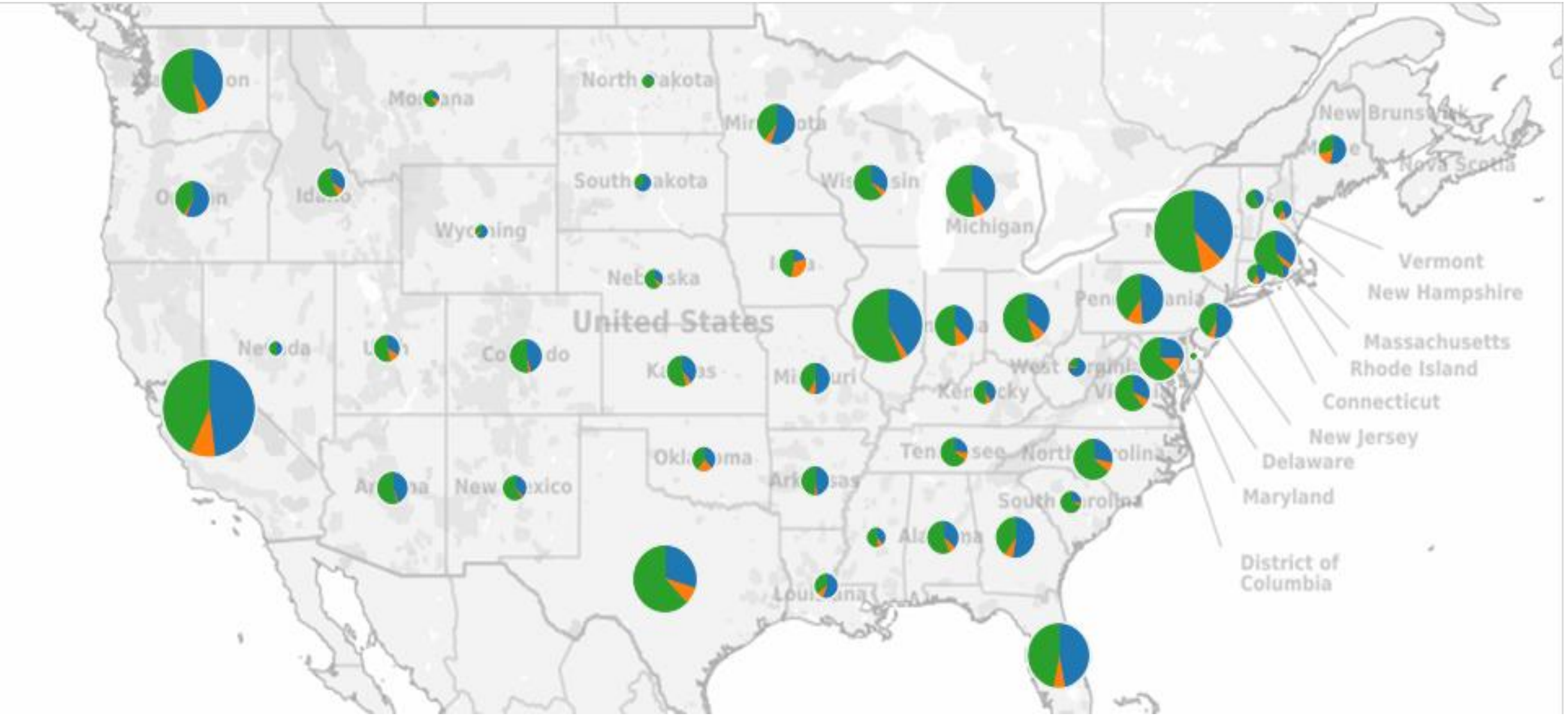

2004
2005
2006
2007
Company A
Company B
Company C
Company D
Company E
Company F

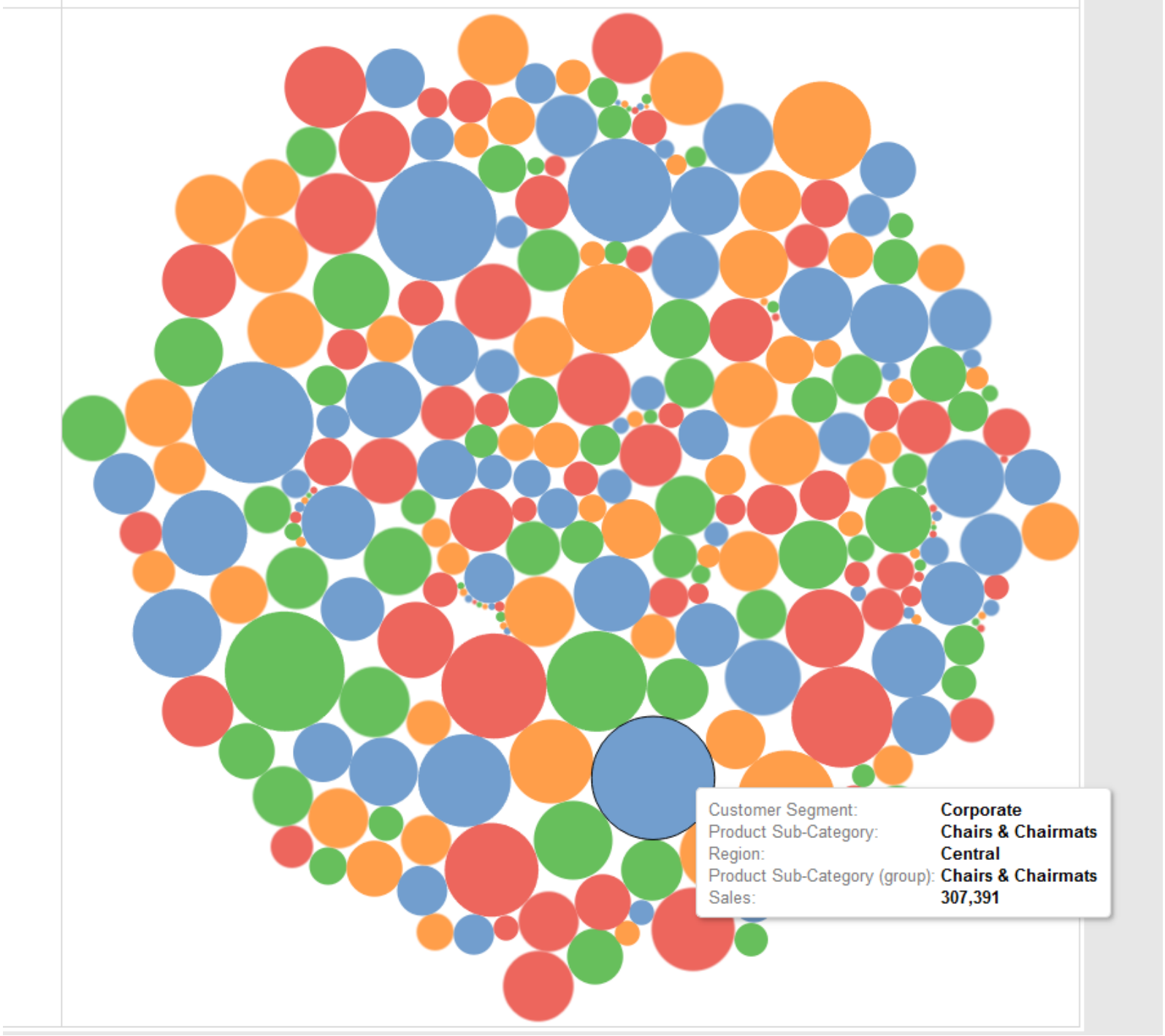

50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
2004
2005
2006
2007
Company C
Company D
Company E
Company A
Company B
Company F


Product Category
Furniture
Office Supplies
Technology
Order Date
2009
2010
2011
2012
Drop field here


Product Category
Furniture
Office Supplies
Technology
Order Date
Sales
1500K
1000K
500K
0K
2009
2010
2011
2012


East
25%
North
25%
South
25%
West
25%

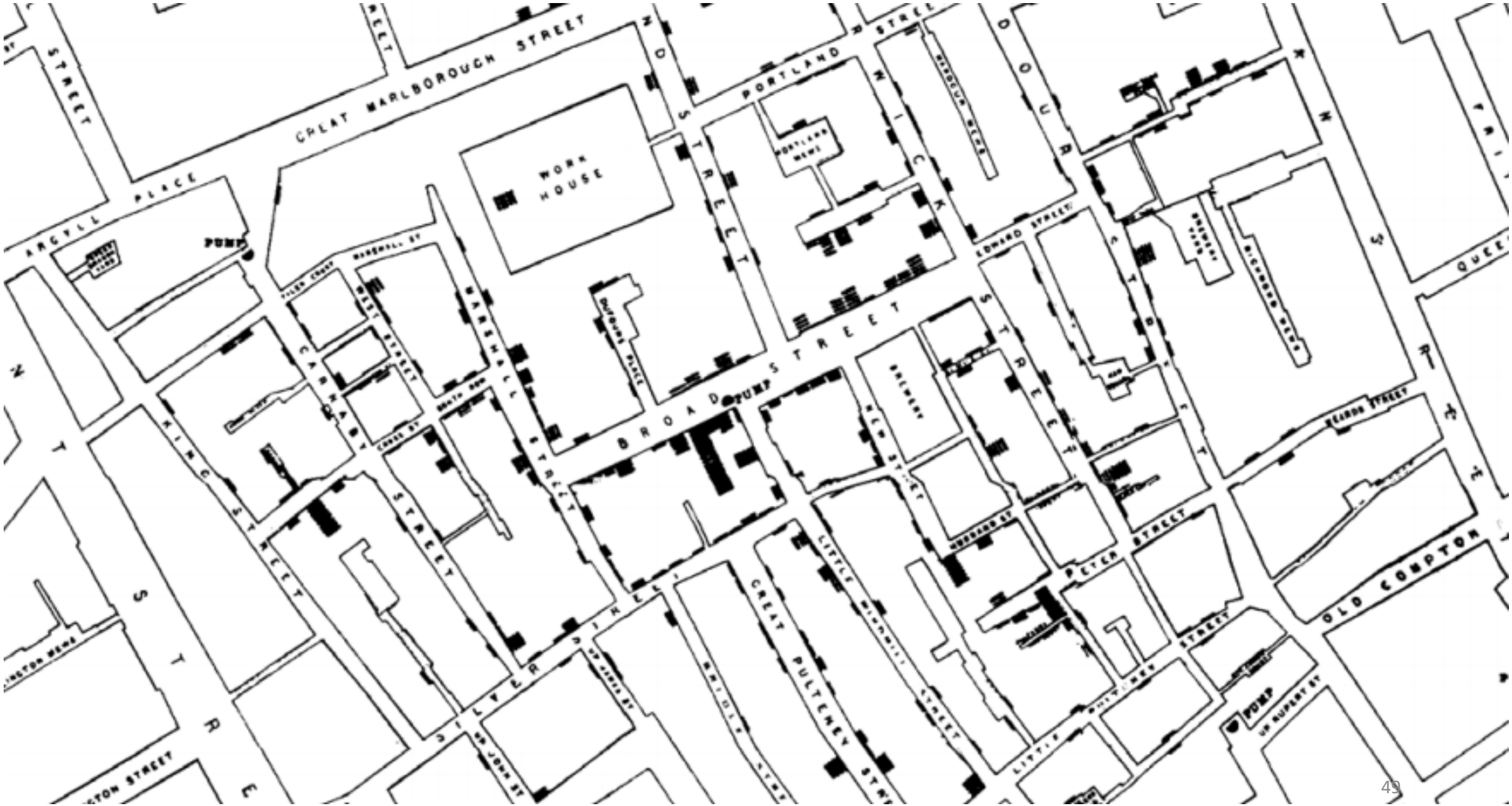

United States
Michigan
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New Jersey
Delaware
Maryland
District of Columbia

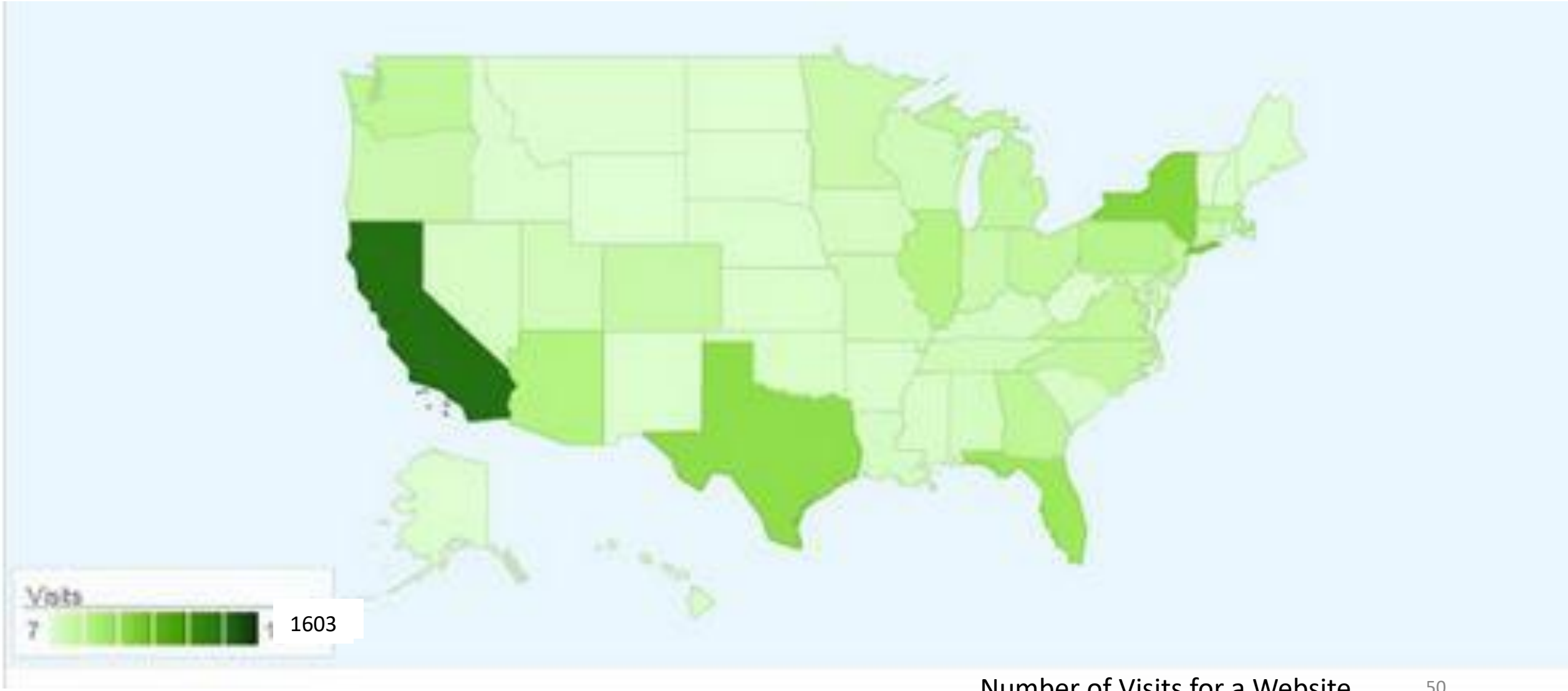

Region
Central
East
South
West
SUM(Sales)
270
100,000
200,000
307,391
Customer Segment: Corporate
Product Sub-Category: Chairs & Chairmats
Region: Central
Product Sub-Category (group): Chairs & Chairmats
Sales: 307,391

Pie

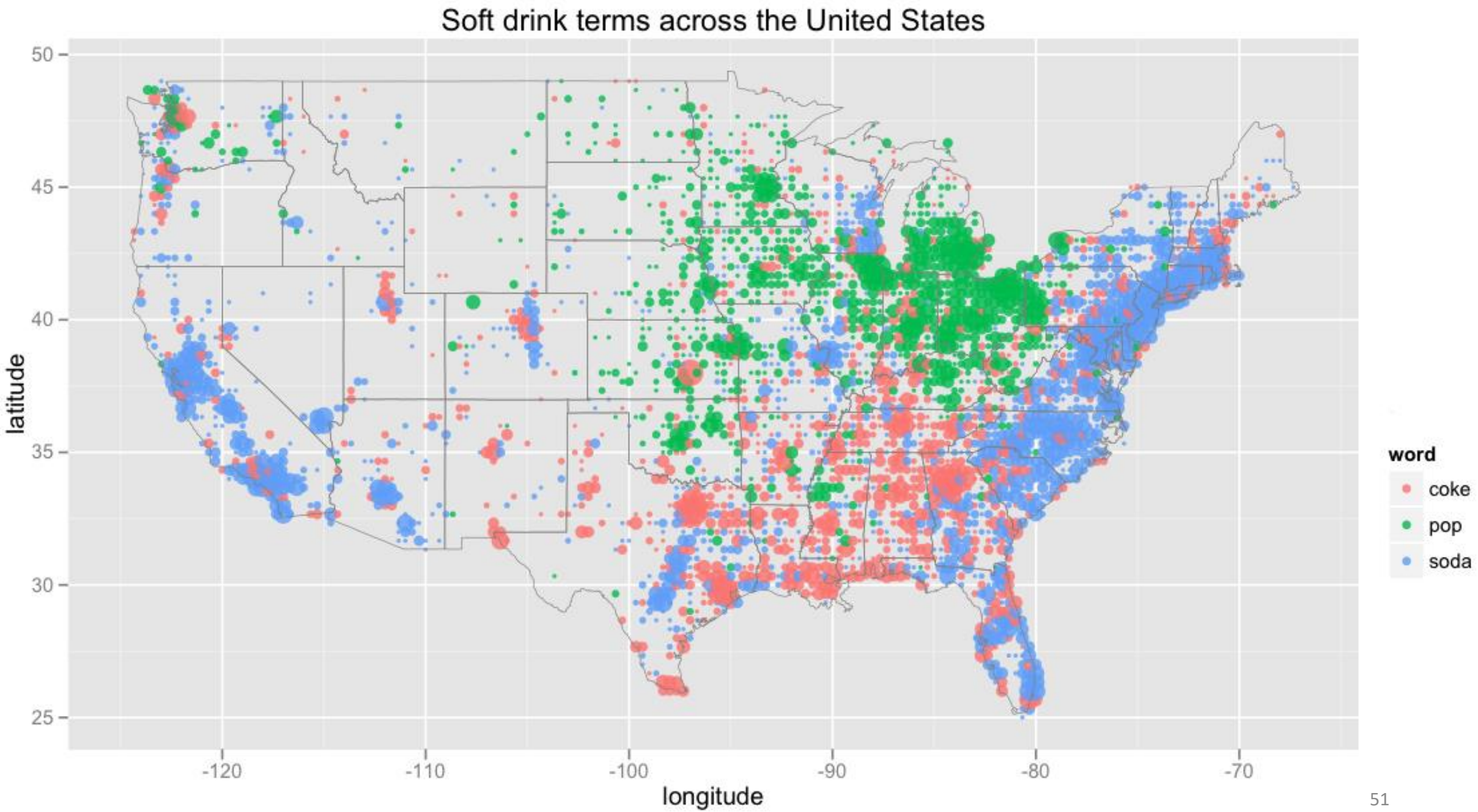
- Part to Whole – Intuitive
- Angles not difficult to interpret
- Constrained for Space – Geospatial
- Large volume of data - Bubble

Geo Spatial

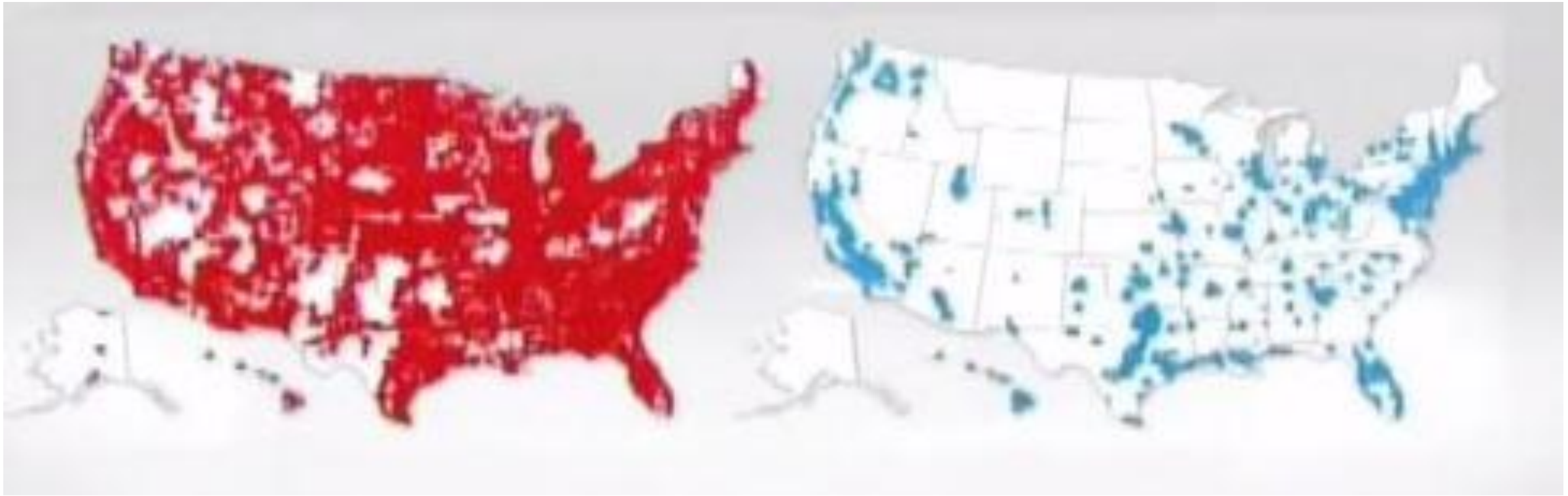

GREAT MARLBOROUGH STREET
ARGYLL PLACE
PUMP
WORK HOUSE
POLAND STREET
BROAD STREET
PUMP
BROWER
GREAT PULTENEY STREET
PETER STREET
OLD COMPTON
PUMP



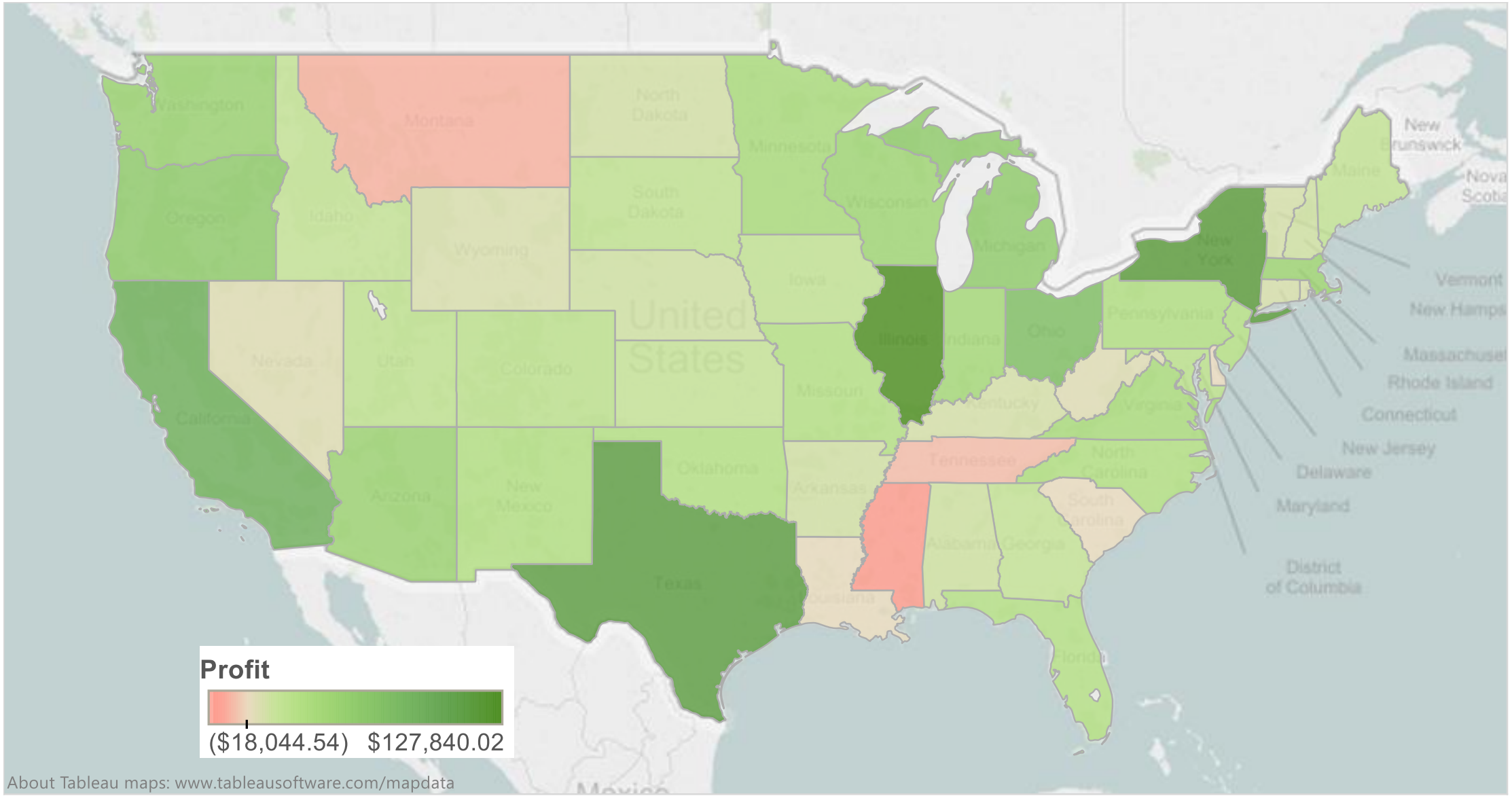
Number of Visits for a Website

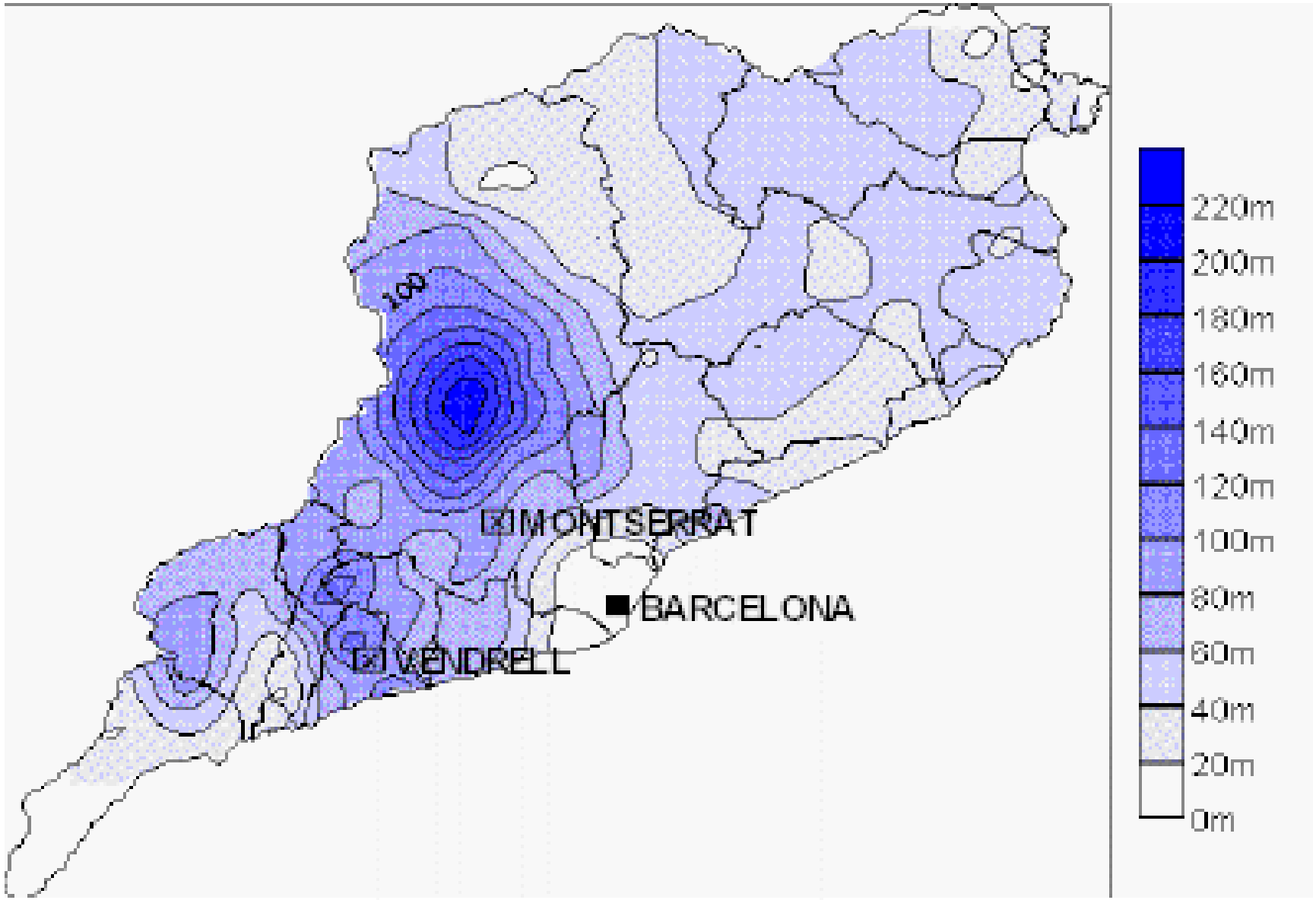

Soft drink terms across the United States
50
45
40
35
30
25
latitude
-120
-110
-100
-90
-80
-70
longitude
word
coke
pop
soda

Coverage of Telecom Service Providers



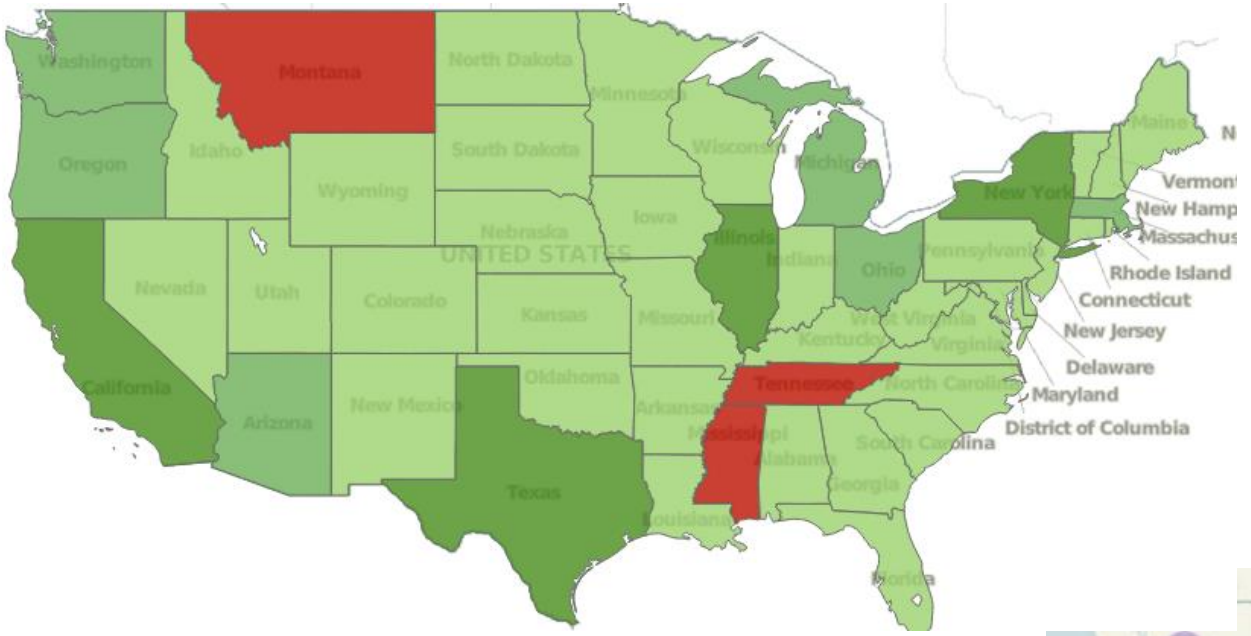
Routes of a European Airline

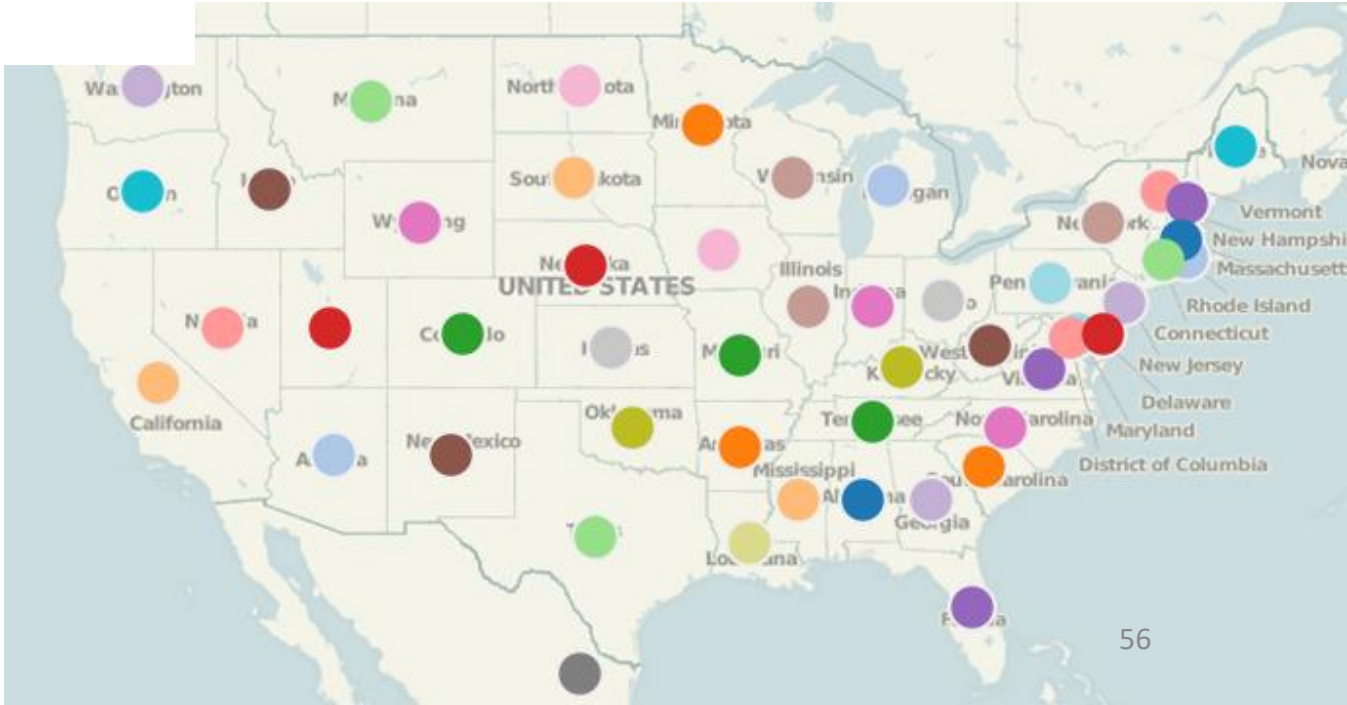

Profit
($18,044.54) $127,840.02
About Tableau maps: www.tableausoftware.com/mapdata

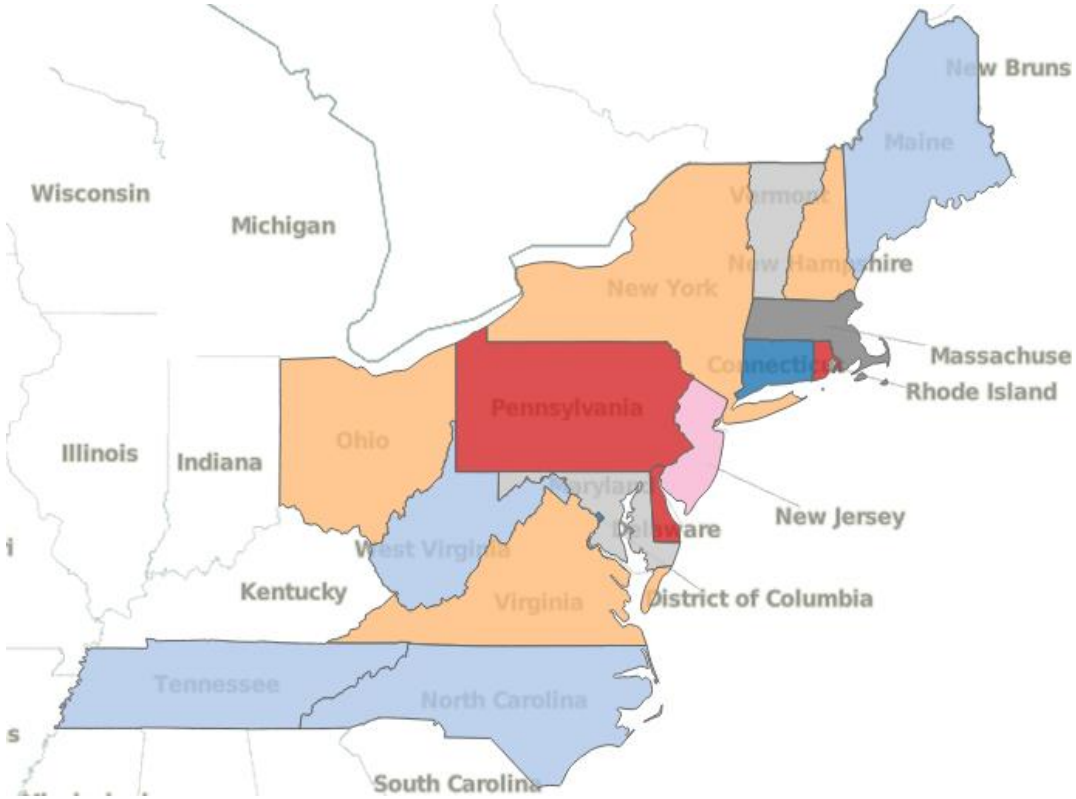


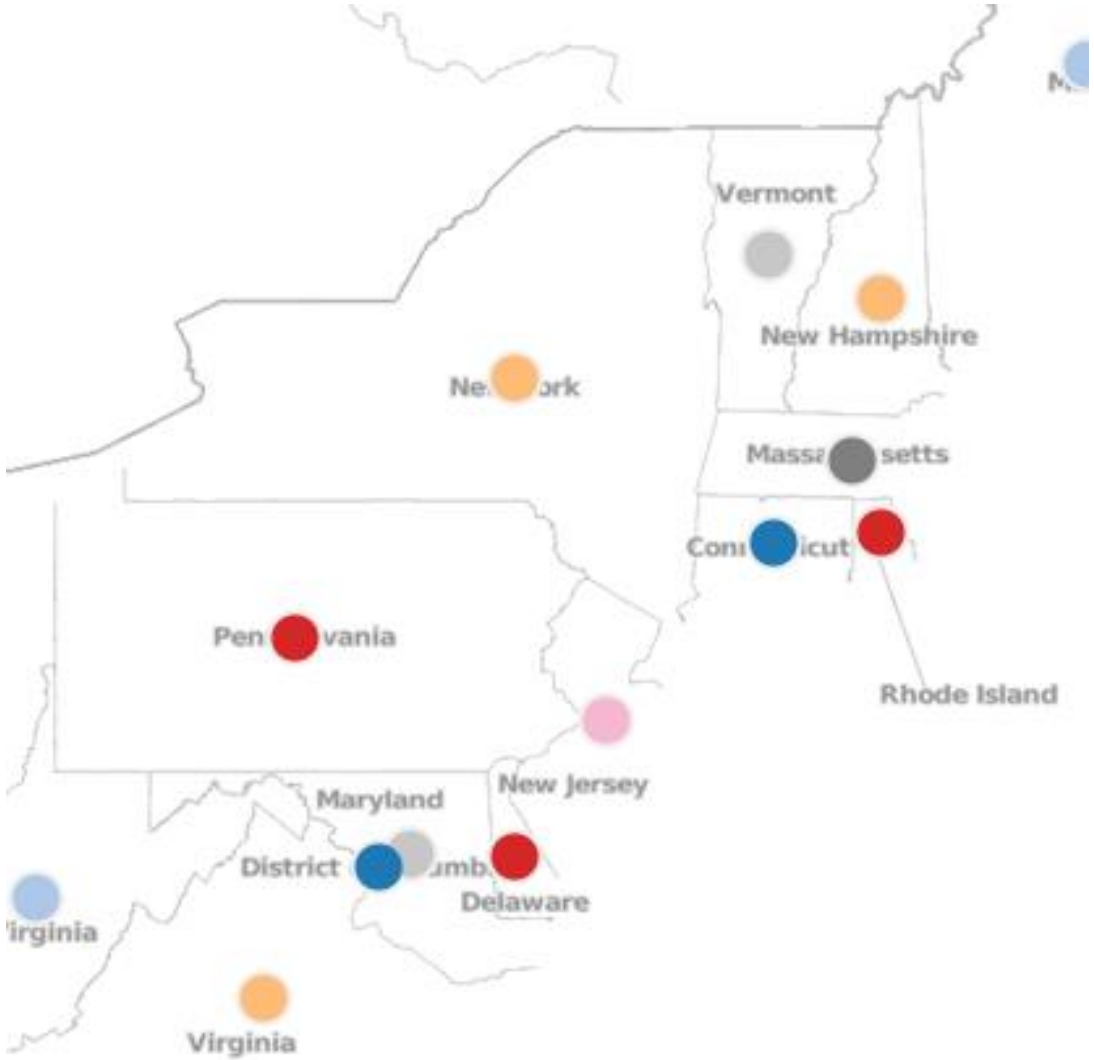
Source: http://geographyfieldwork.com/DataPresentationMappingTechniques.htm

Color Choice

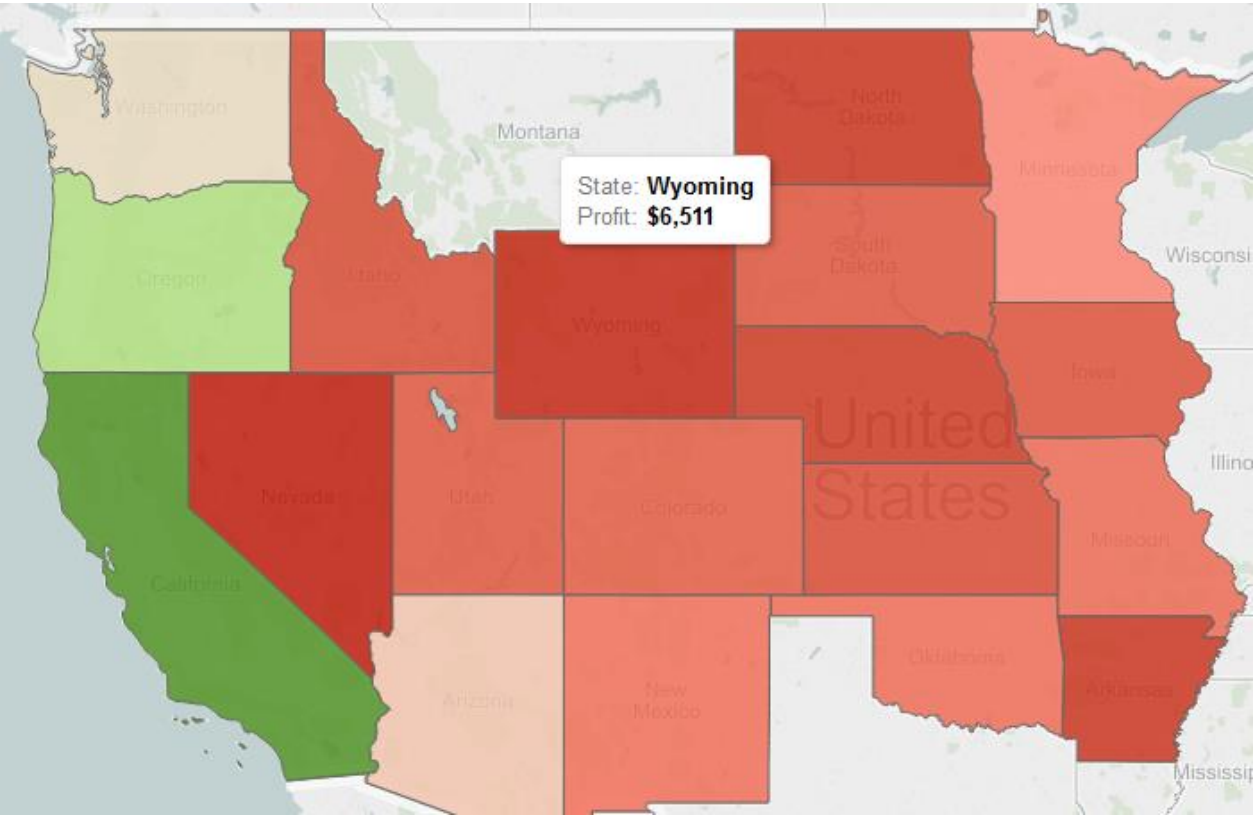


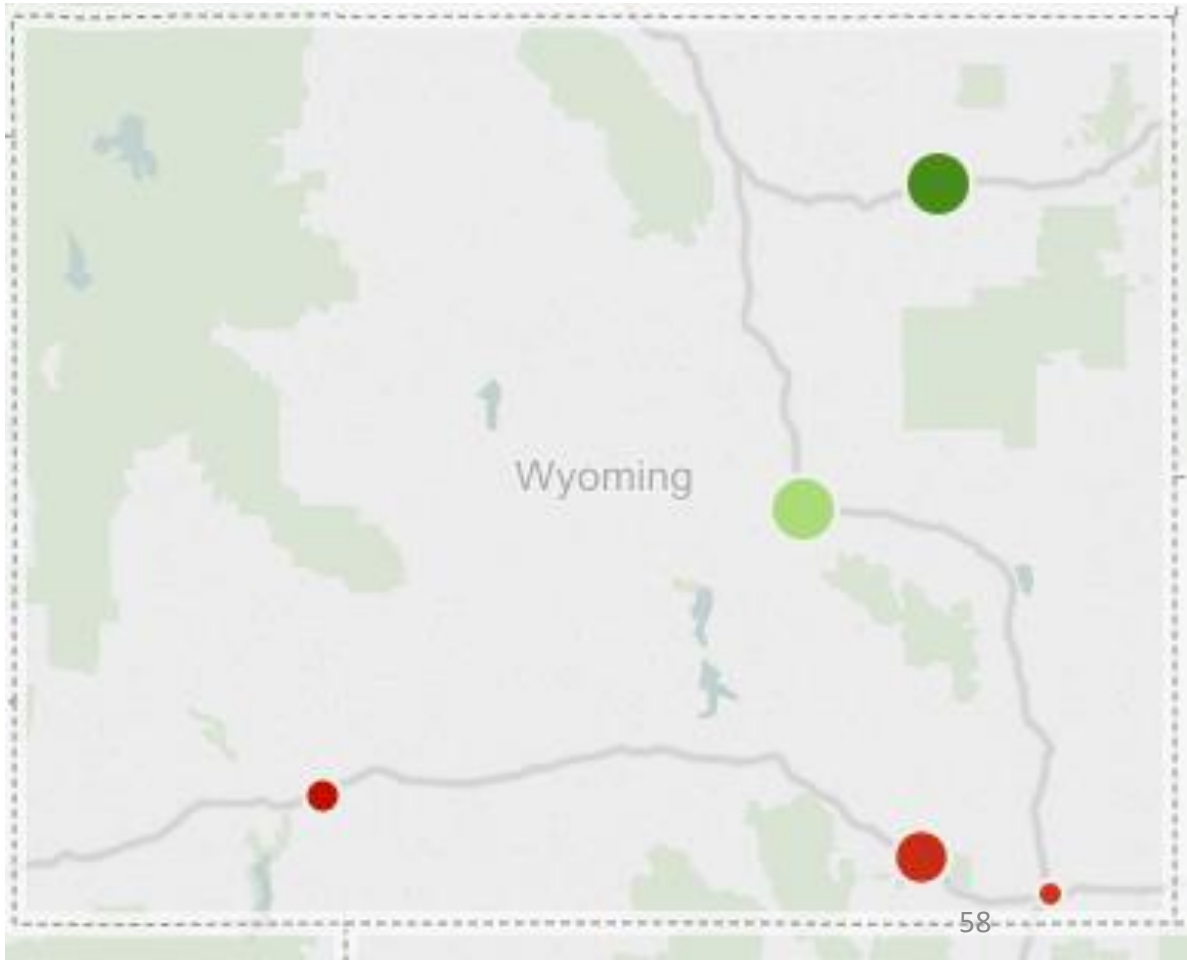


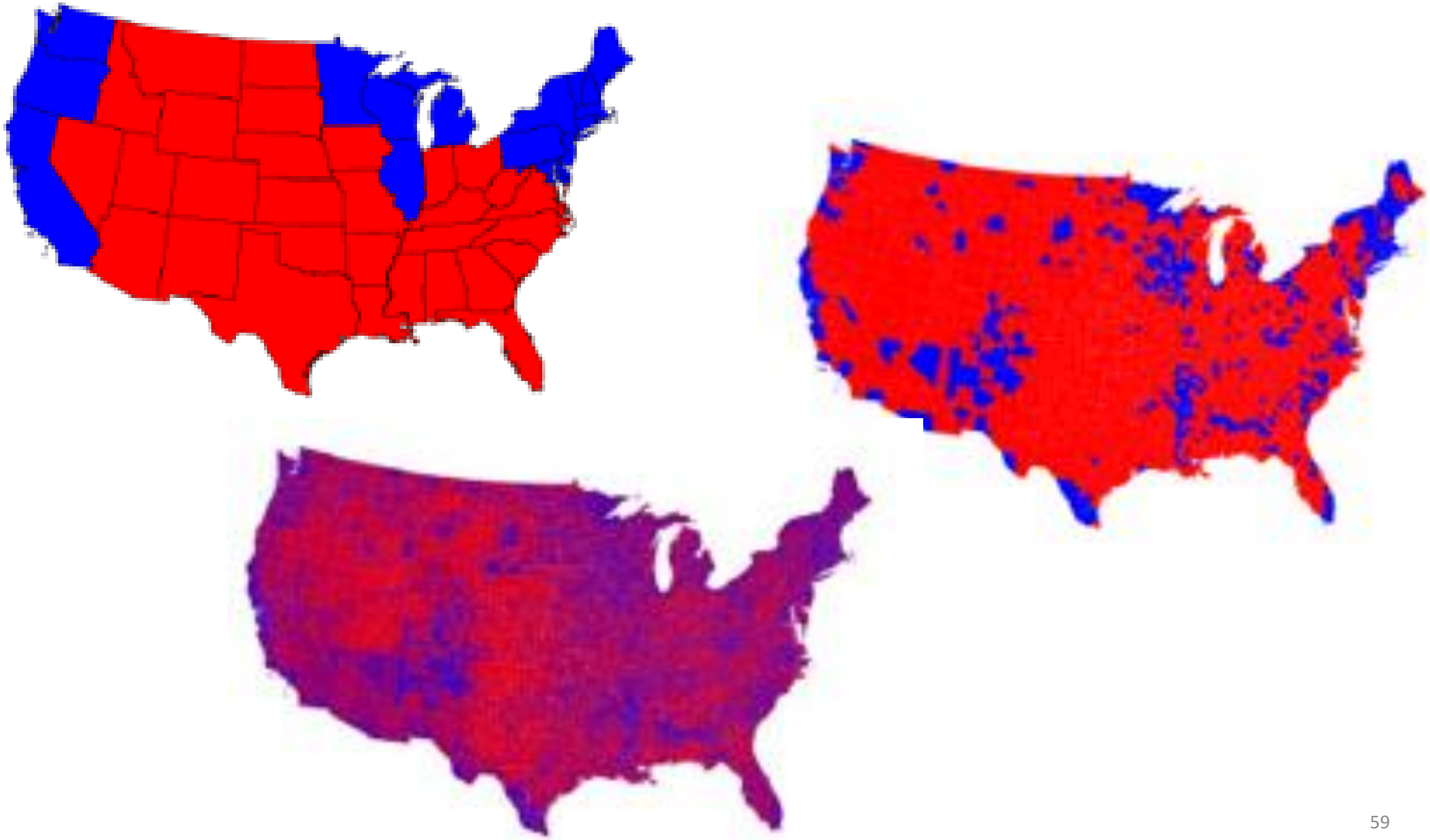

Wisconsin
Michigan
Illinois
Indiana
Ohio
Pennsylvania
New York
Maine
Massachuse
Rhode Island
New Jersey
Kentucky
Virginia
Tennessee
North Carolina
South Carolina


Vermont
New Hampshire
Rhode Island
Maryland
New Jersey
Delaware
Virginia

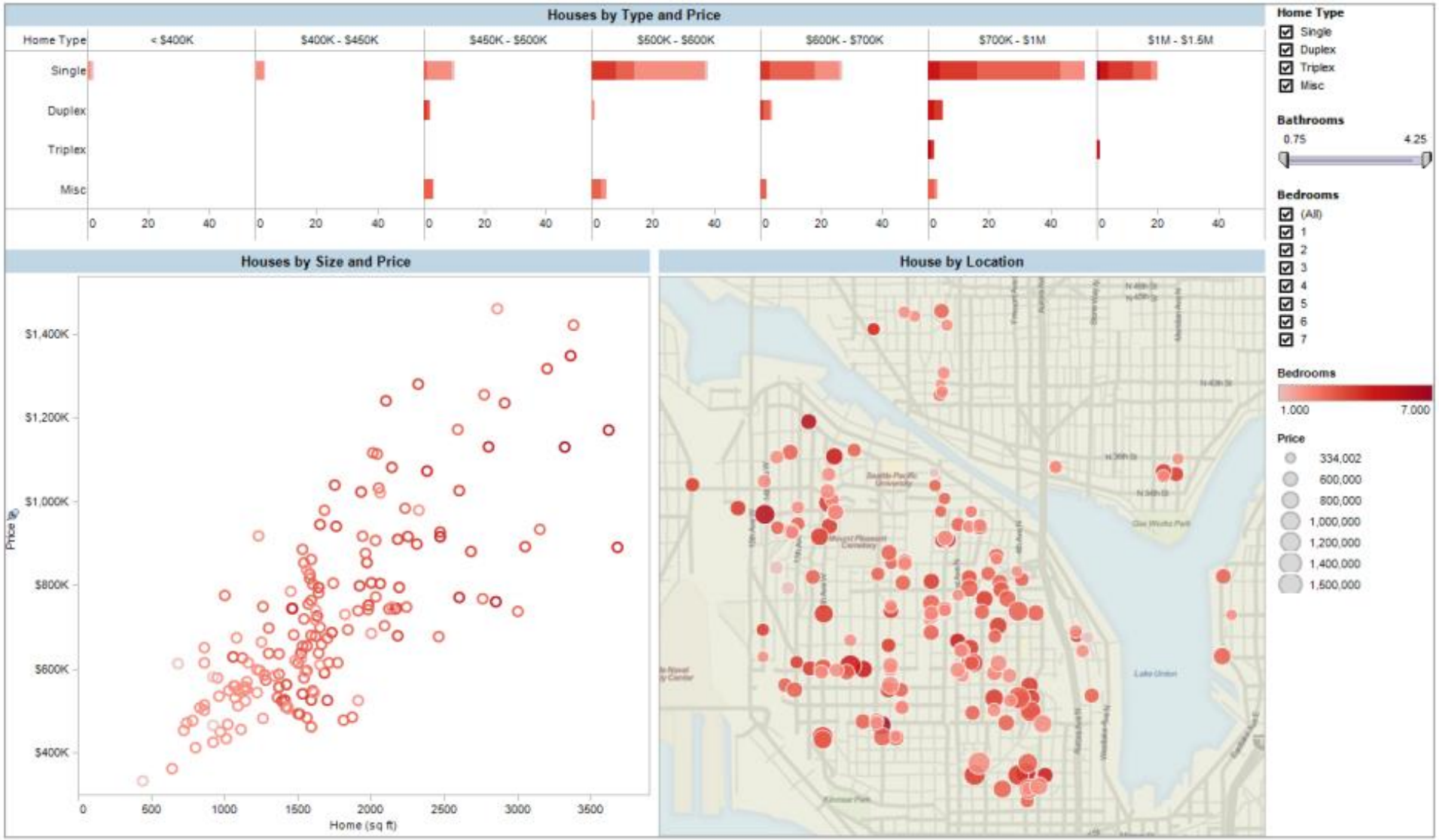
From high level to localization



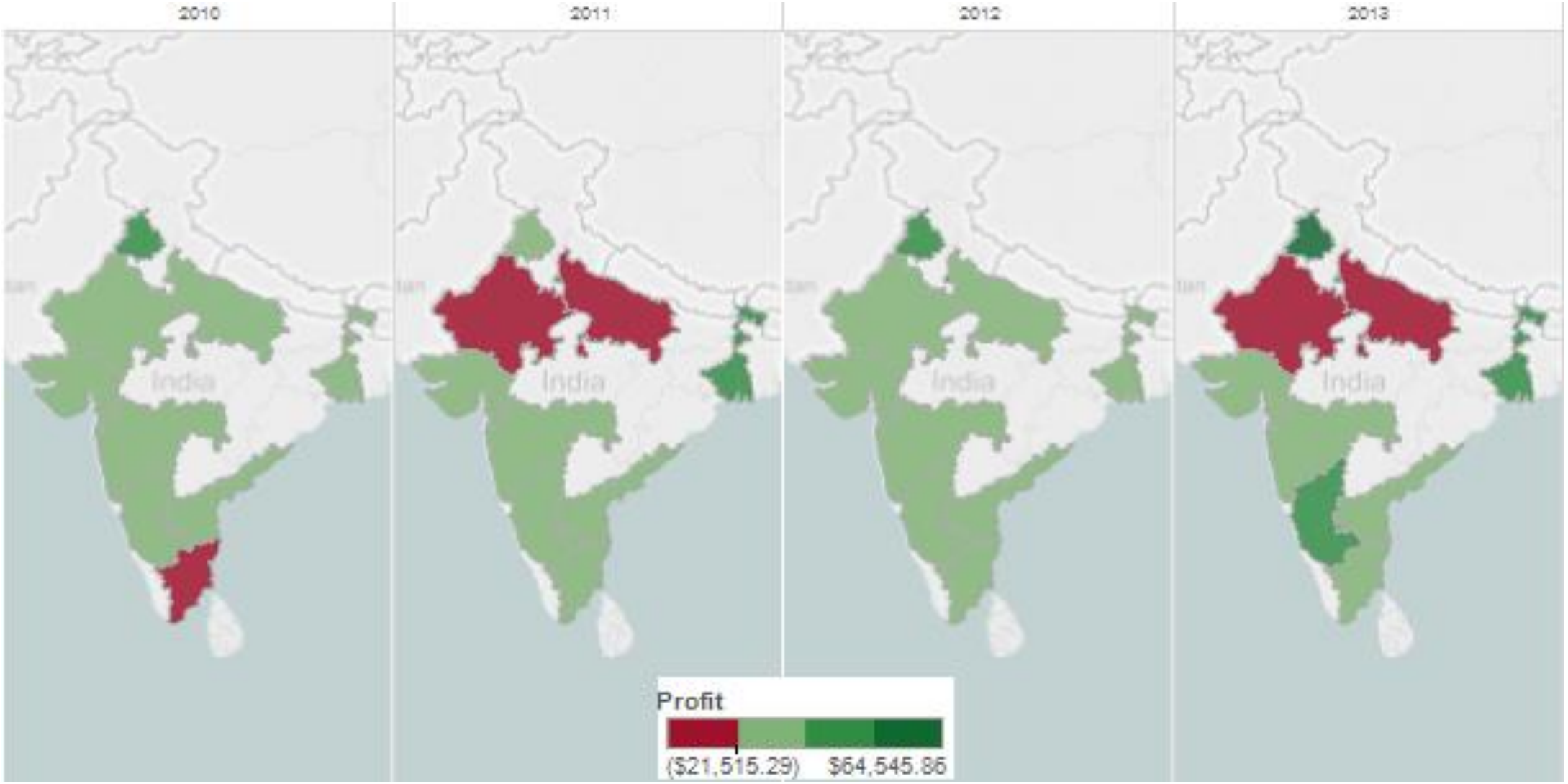




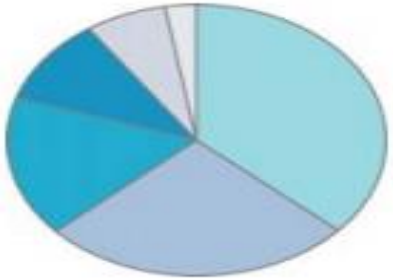
Utilize Multiple Displays

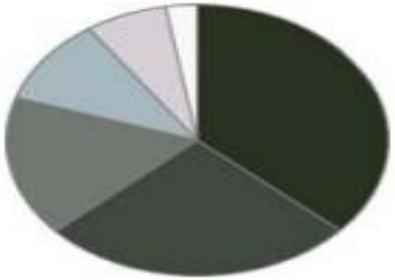


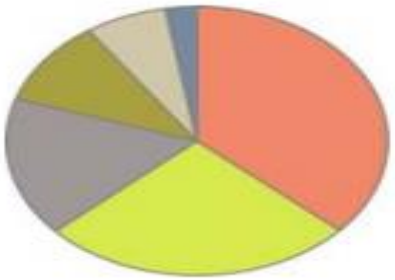
Integrate Geo-spatial Analysis with Time Series



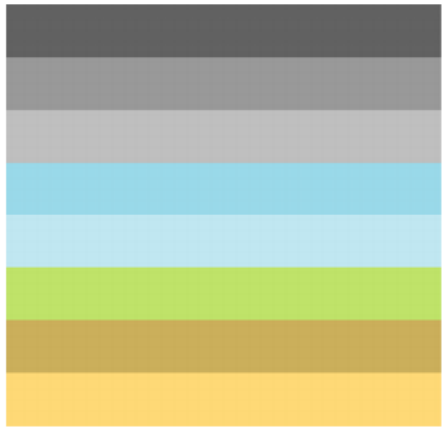
Nature’s Colors



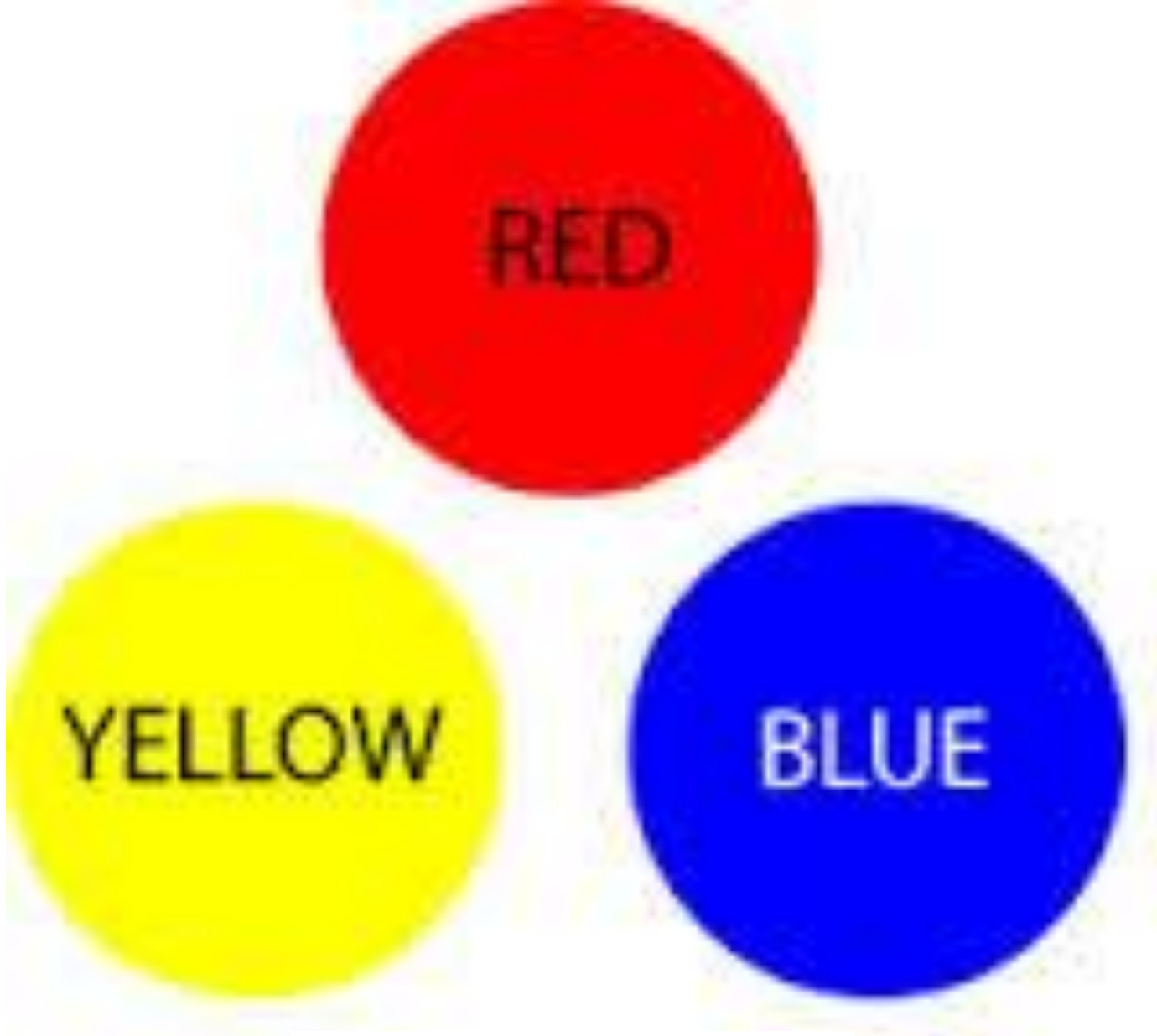


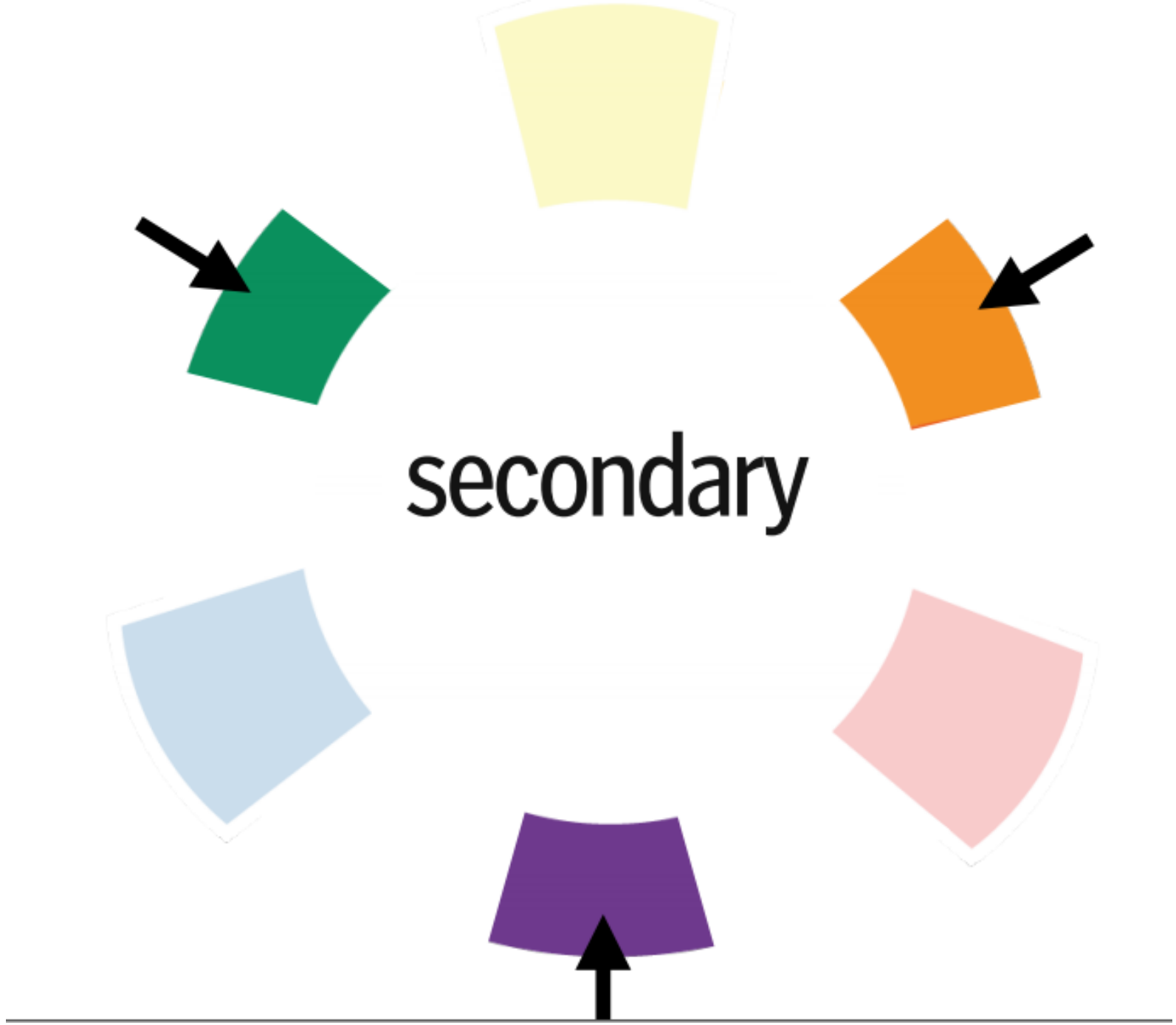


Nature’s Colors

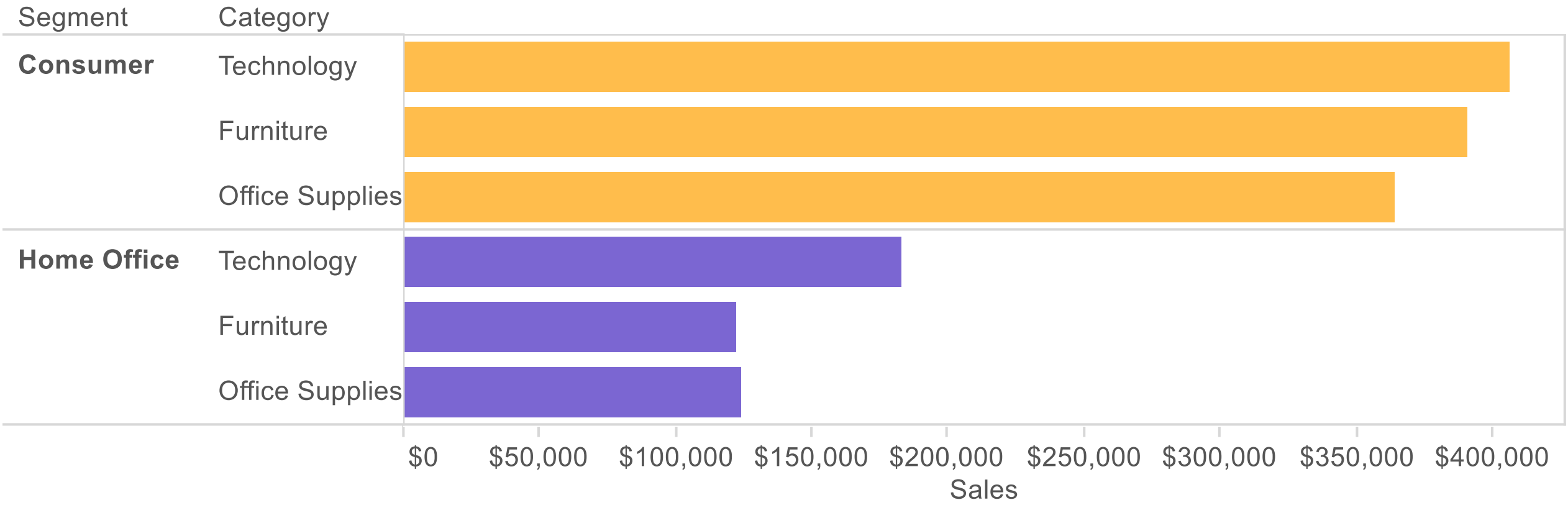


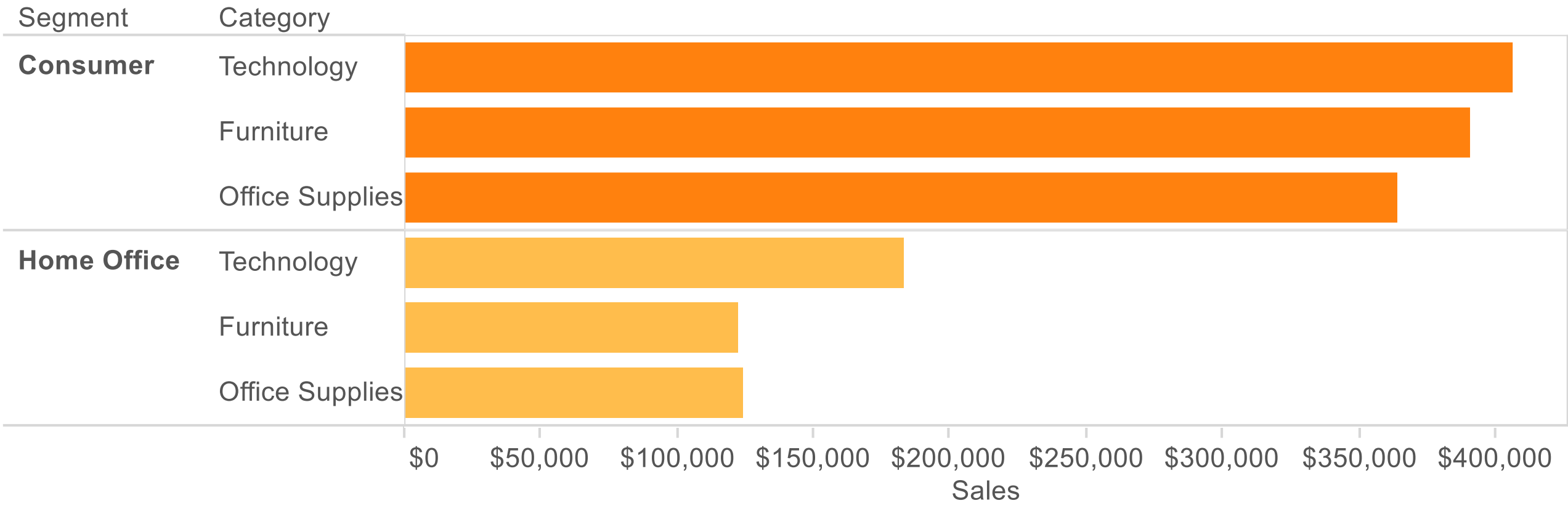
Saturated Colors


RED
YELLOW
BLUE


secondary


tertiary

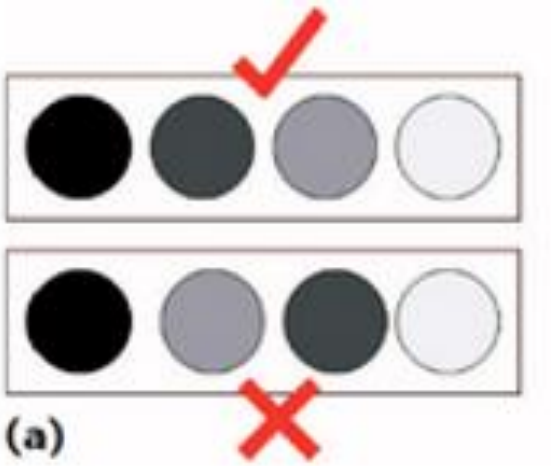

Segment
Category
Consumer
Technology
Furniture
Office Supplies
Home Office
Technology
Furniture
Office Supplies
$0
$50,000
$100,000
$150,000
$200,000
$250,000
$300,000
$350,000
$400,000
Sales

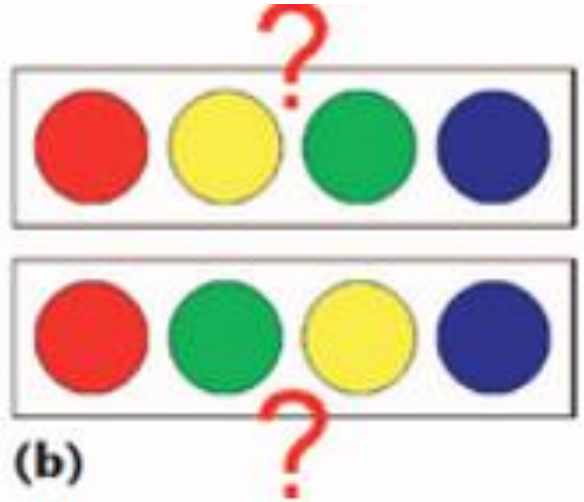

Segment
Category
Consumer
Technology
Furniture
Office Supplies
Home Office
Technology
Furniture
Office Supplies
$0
$50,000
$100,000
$150,000
$200,000
$250,000
$300,000
$350,000
$400,000
Sales


complementary

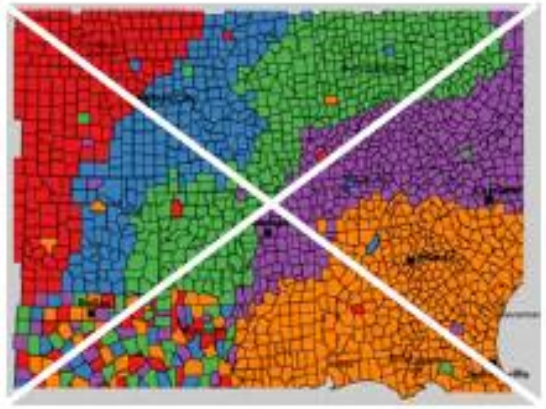

analogous

Color Choices





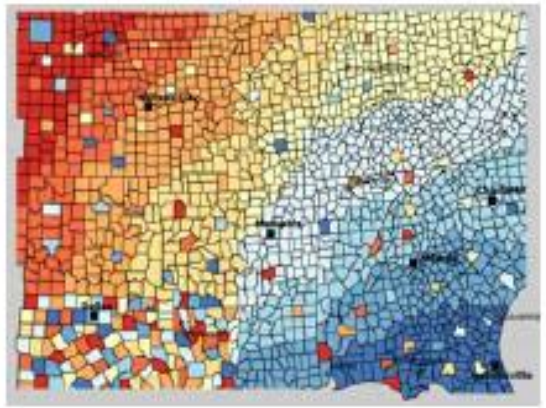
Use of sequential colors for Quantitative scales



We do not perceive hues sequentially.

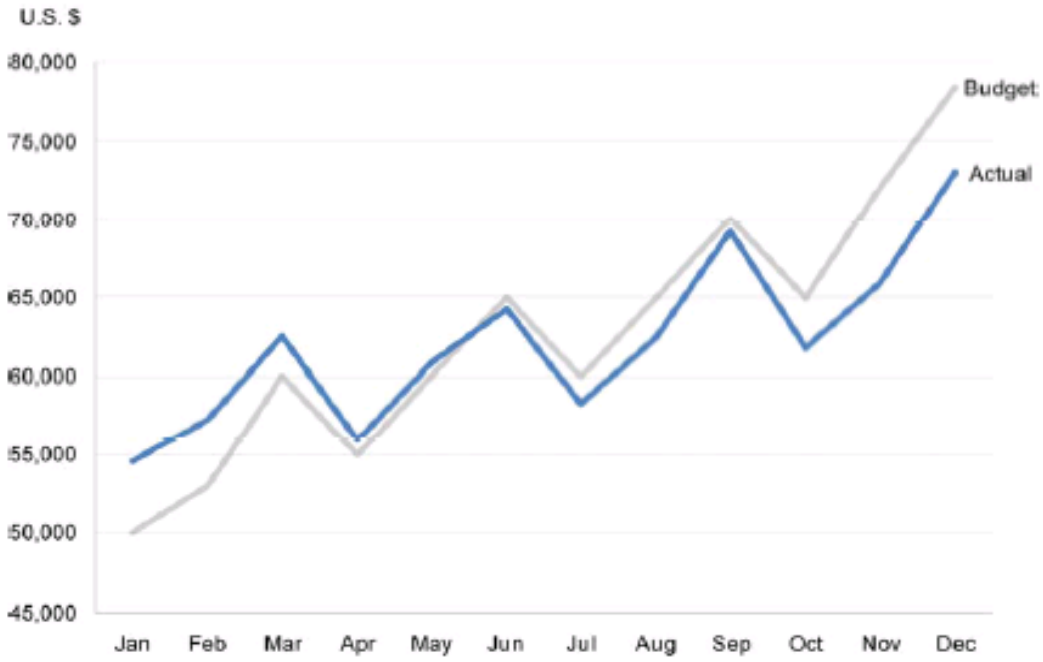
But we do perceive color intensities sequentially.

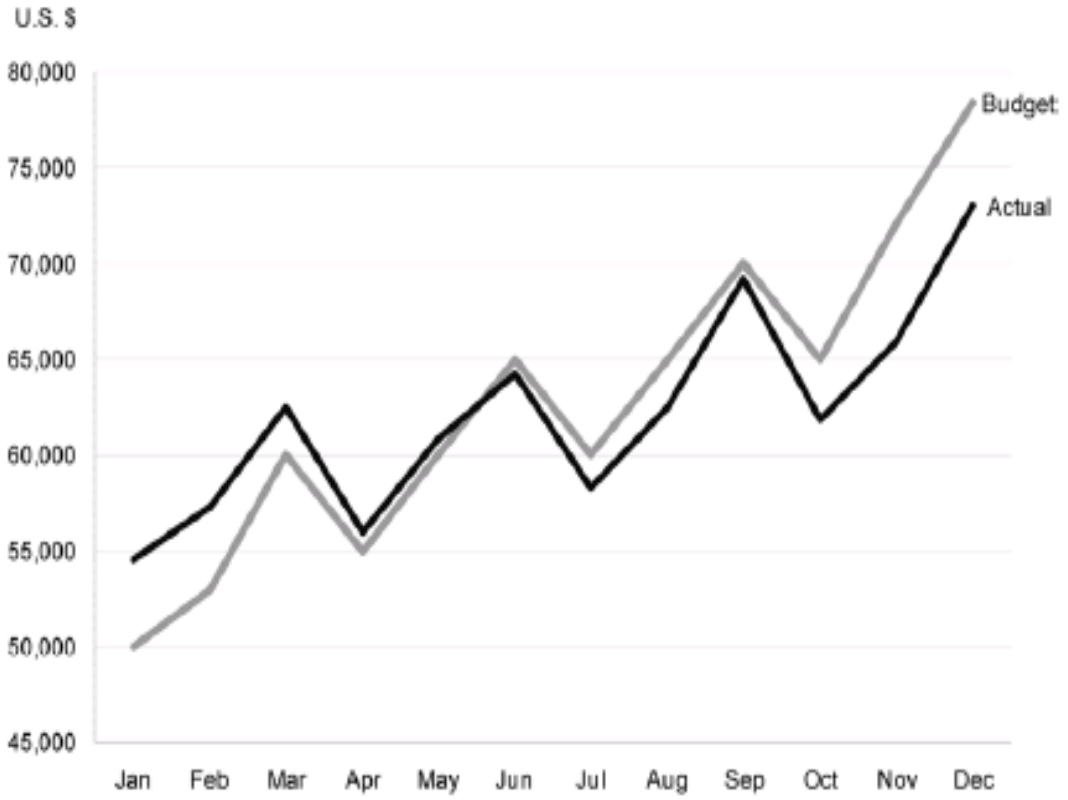
Single sequence scale



Diverging sequential scale

Color Choices





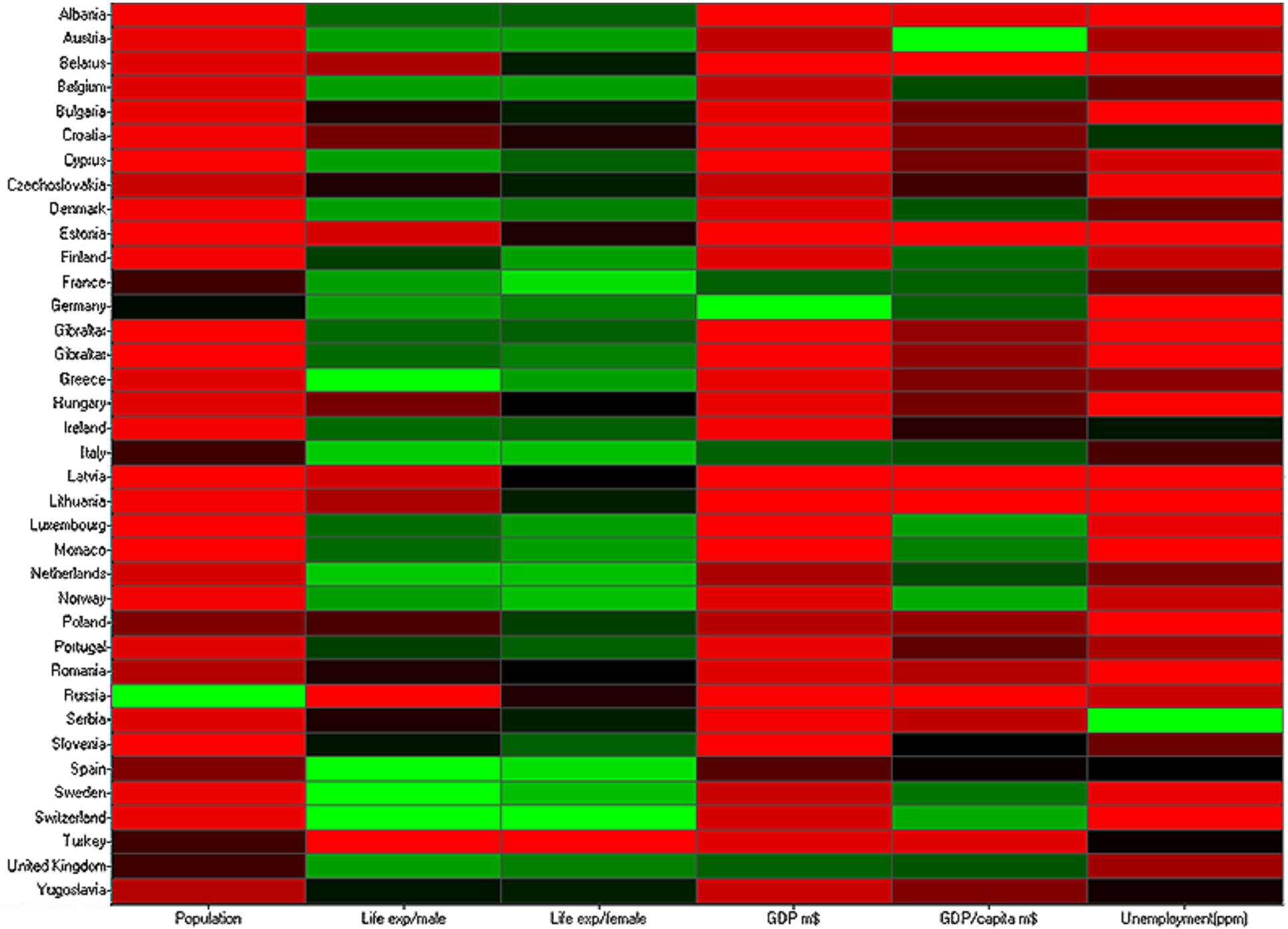
Color Choices

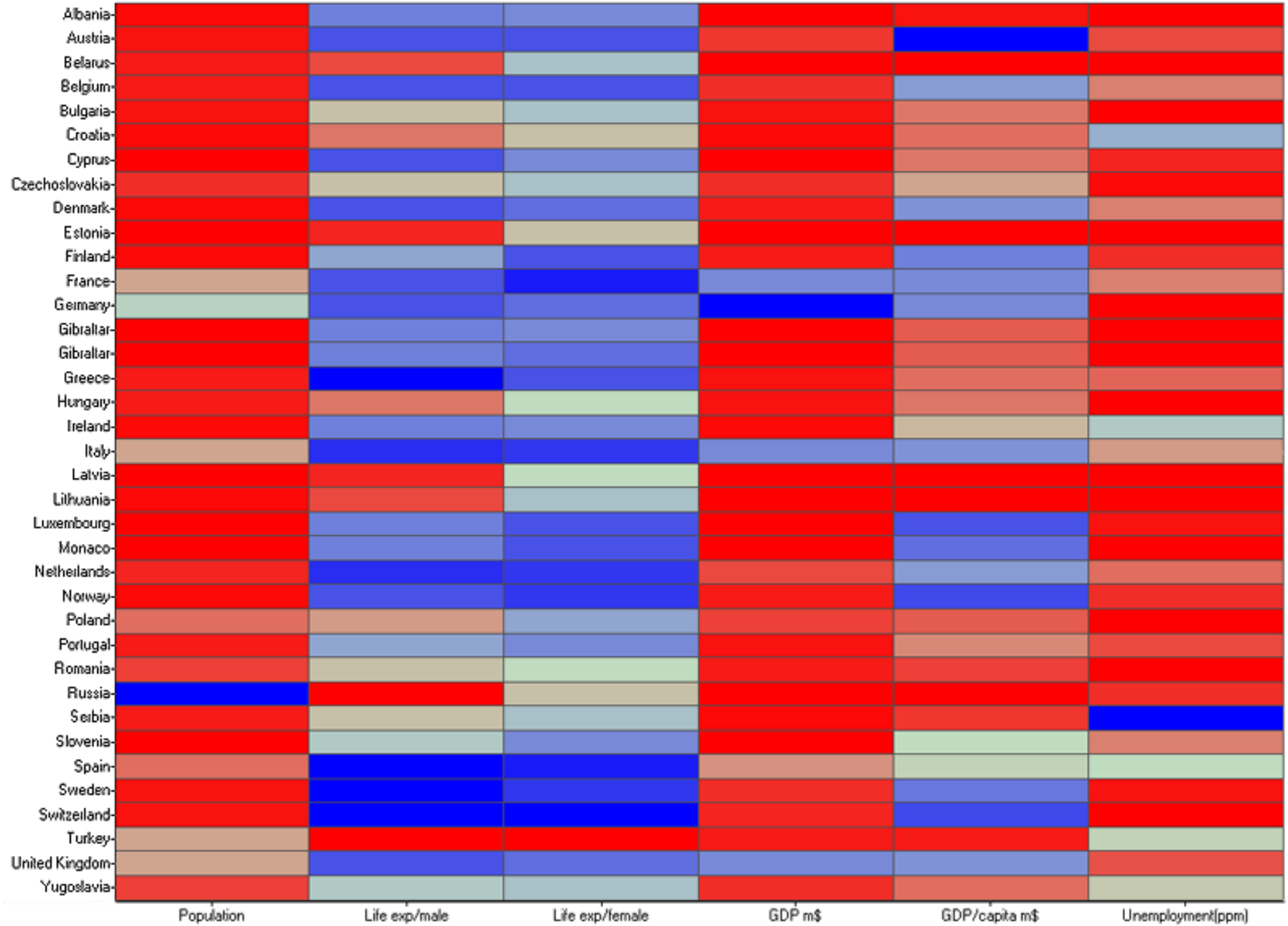
GEO SPATIAL

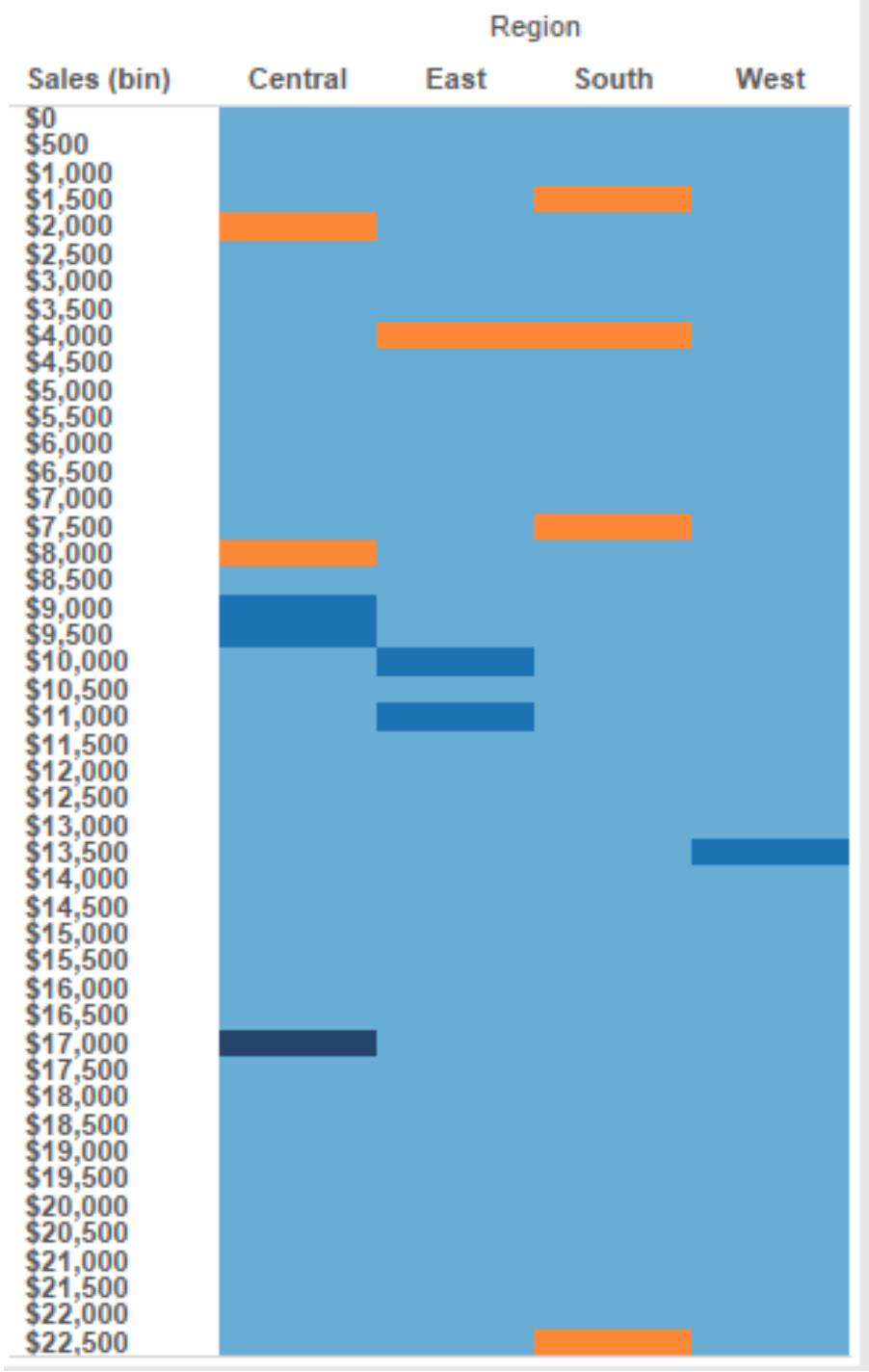
- GPS, Country,State,City
- Locations
- Branches/Plants/Offices
- High level Overview
- As filters
- Concentrations
- Penetration

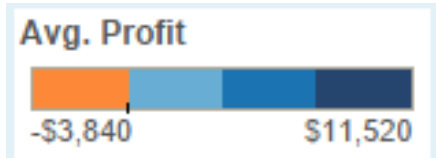
Distribution – 1 Measure + 1 Dimension

Heat Map


Albania
Austria
Belarus
Belgium
Bulgaria
Croatia
Cyprus
Czechoslovakia
Denmark
Estonia
Finland
France
Germany
Gibraltar
Gibraltar
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Monaco
Netherlands
Norway
Poland
Portugal
Romania
Russia
Serbia
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom
Yugoslavia
Population
Life exp/male
Life exp/female
GDP m$
GDP/capita m$
Unemployment(ppm)


Albania
Austria
Belarus
Belgium
Bulgaria
Croatia
Cyprus
Czechoslovakia
Denmark
Estonia
Finland
France
Germany
Gibraltar
Gibraltar
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Monaco
Netherlands
Norway
Poland
Portugal
Romania
Russia
Serbia
Slovenia
Spain
Sweden
Switzerland
Turkey
United Kingdom
Yugoslavia
Population
Life exp/male
Life exp/female
GDP m$
GDP/capita m$
Unemployment(ppm)

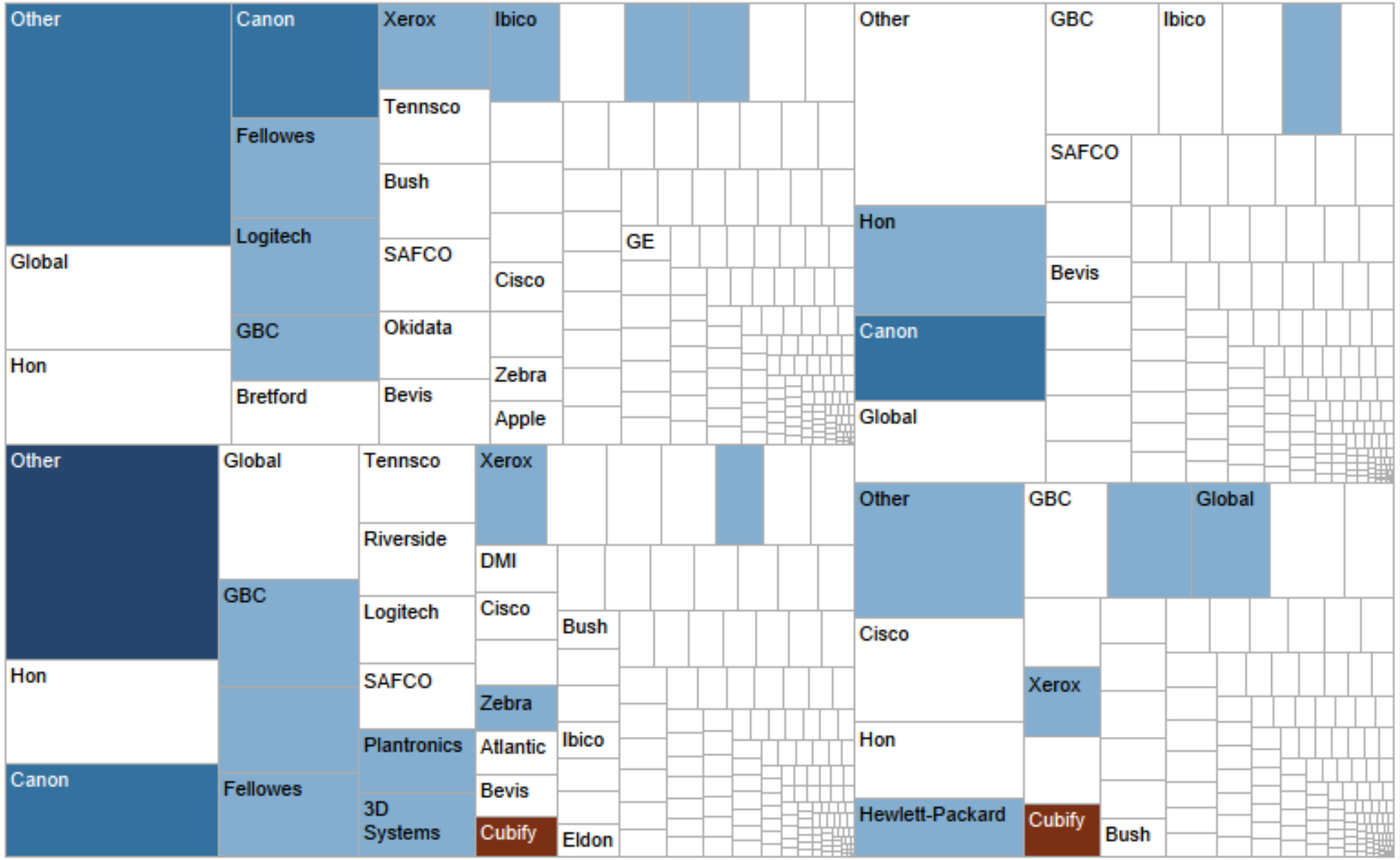

Region
Sales (bin)
Central
East
South
West
$0
$500
$1,000
$1,500
$2,000
$2,500
$3,000
$3,500
$4,000
$4,500
$5,000
$5,500
$6,000
$6,500
$7,000
$7,500
$8,000
$8,500
$9,000
$9,500
$10,000
$10,500
$11,000
$11,500
$12,000
$12,500
$13,000
$13,500
$14,000
$14,500
$15,000
$15,500
$16,000
$16,500
$17,000
$17,500
$18,000
$18,500
$19,000
$19,500
$20,000
$20,500
$21,000
$21,500
$22,000
$22,500

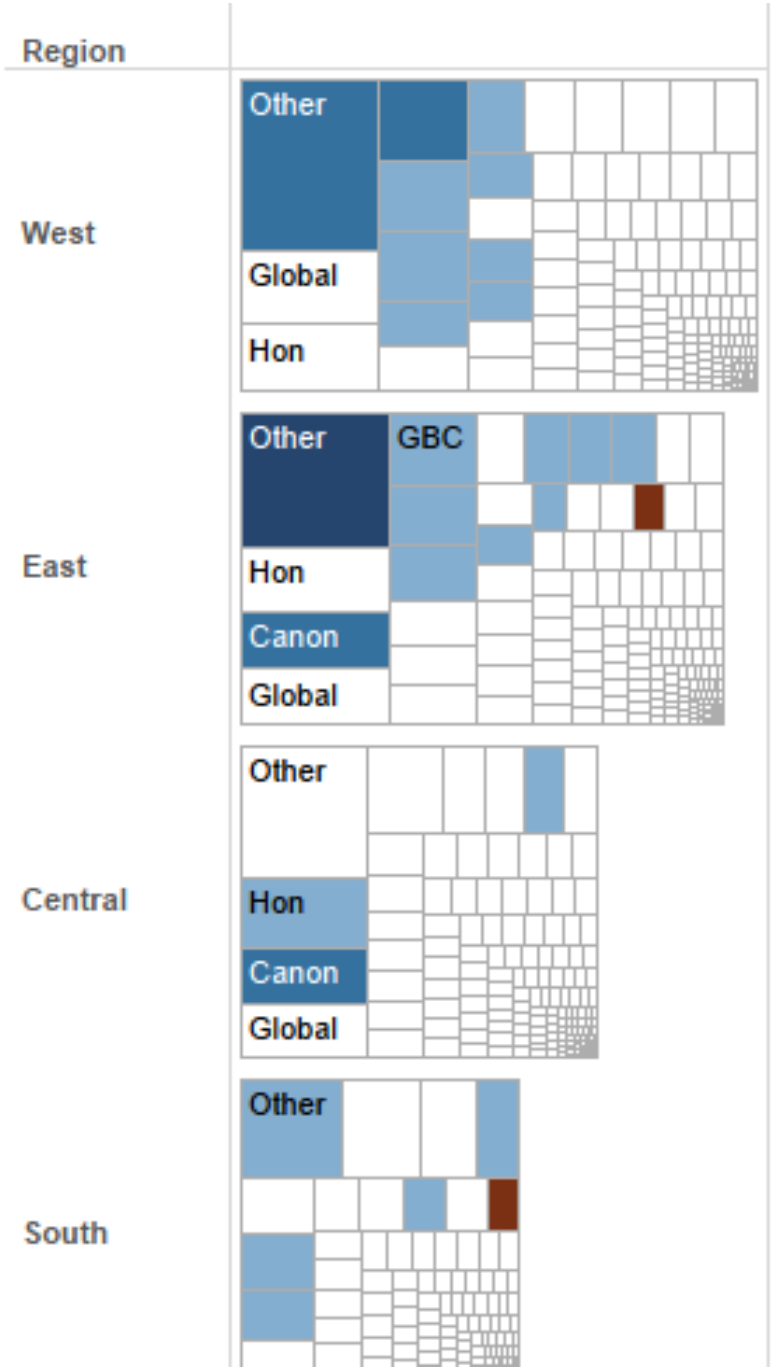

Avg. Profit
-$3,840
$11,520

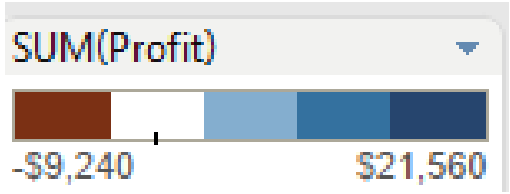
Heat Map or Highlight Table

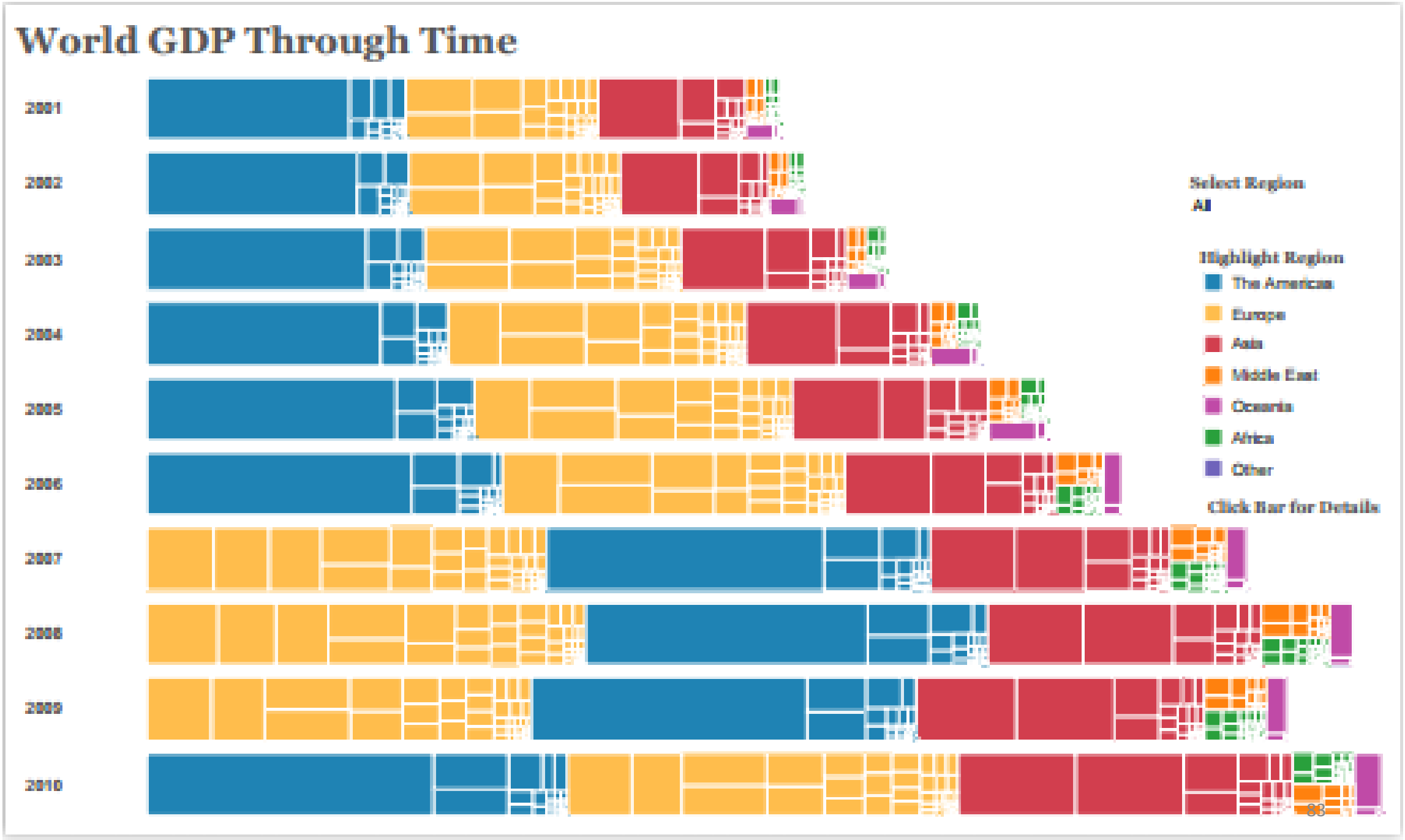
- Overview
- Large Volume
- Where to begin
- Relationship
- Outliers

Distribution – 2 Measures + 1 Dimension (Part to Whole)


Other
Canon
Xerox
Ibico
Tennsco
Fellowes
Bush
Logitech
SAFCO
Global
Cisco
GBC
Okidata
Hon
Zebra
Bretford
Bevis
Apple
GE
Other
GBC
Ibico
SAFCO
Hon
Bevis
Canon
Global
Other
Global
Tennsco
Xerox
Riverside
DMI
GBC
Cisco
Bush
Logitech
Zebra
SAFCO
Ibico
Plantronics
Atlantic
Hon
Bevis
3D Systems
Cubify
Eldon
Canon
Fellowes
Other
GBC
Global
Cisco
Xerox
Hon
Hewlett-Packard
Cubify
Bush
SUM(Profit)
-$9,240
$21,560


Region
West
Other
Global
Hon
East
Other
GBC
Hon
Canon
Global
Central
Other
Hon
Canon
Global
South
Other


SUM(Profit)
-$9,240
$21,560


World GDP Through Time
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Select Region
All
Highlight Region
The Americas
Europe
Asia
Middle East
Oceania
Africa
Other
Click Bar for Details

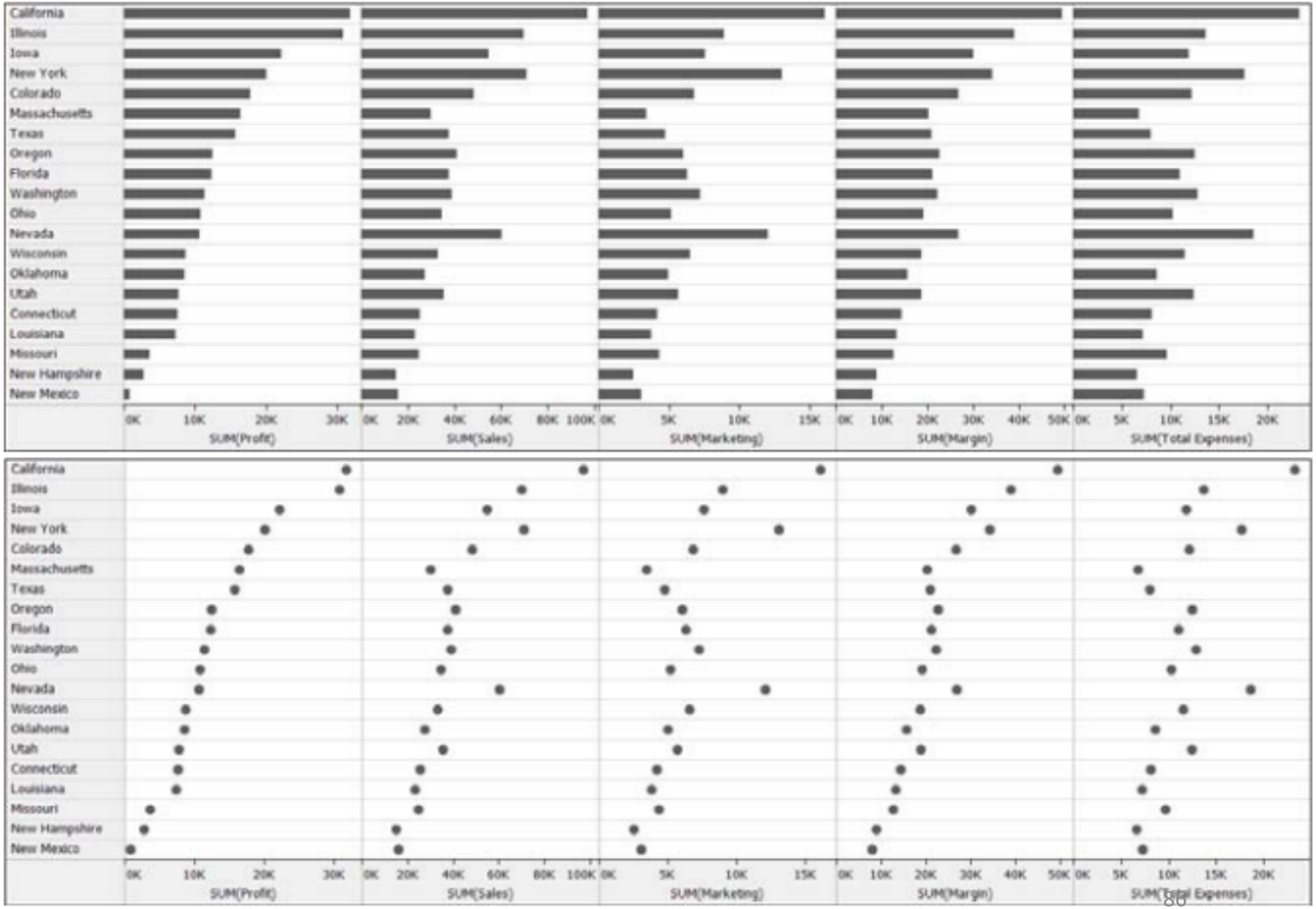
Tree Map

- At a glance
- Volume
- Hierarchy
- Part to Whole - Lot

Multivariate

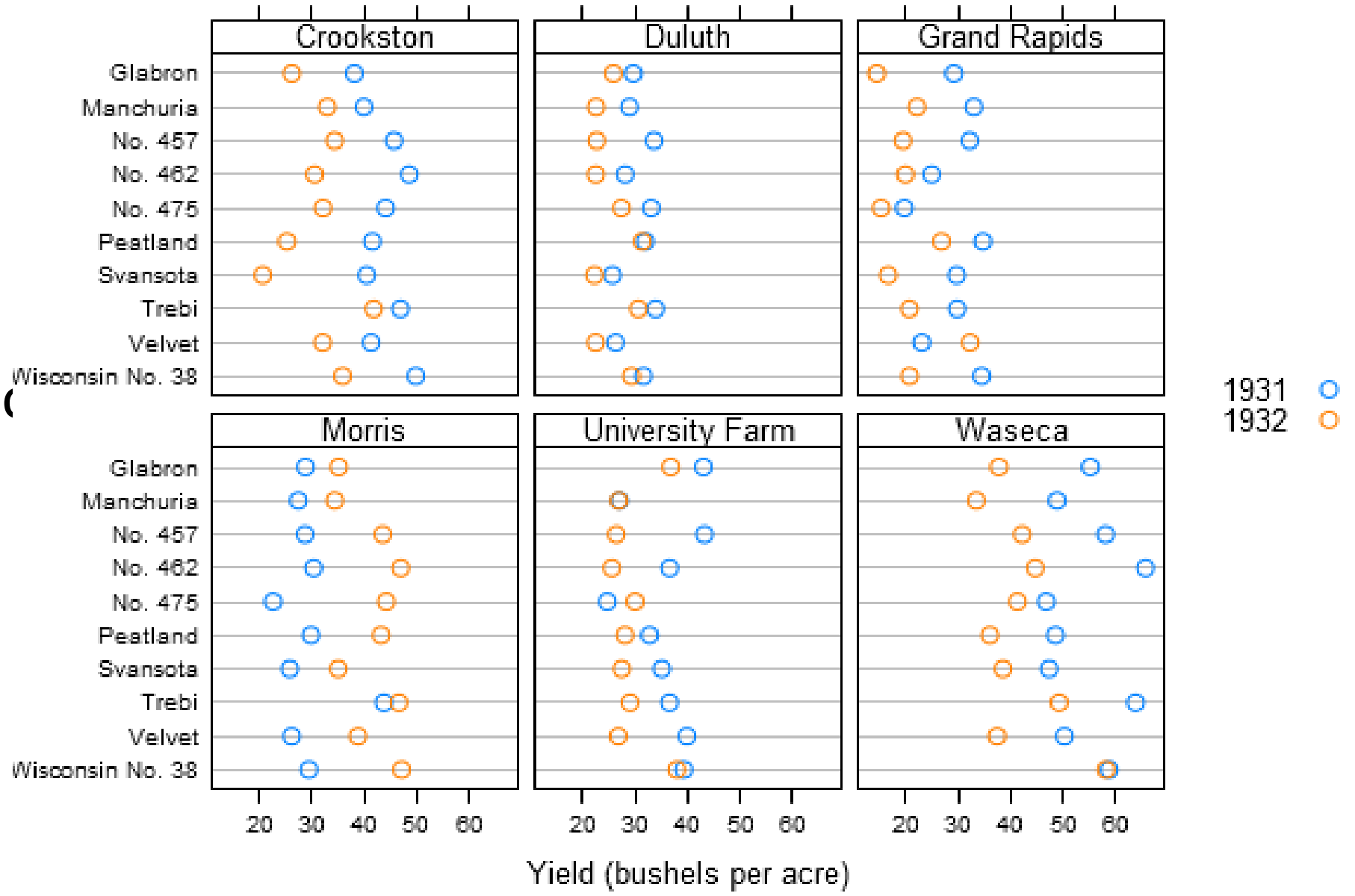
Table Lens

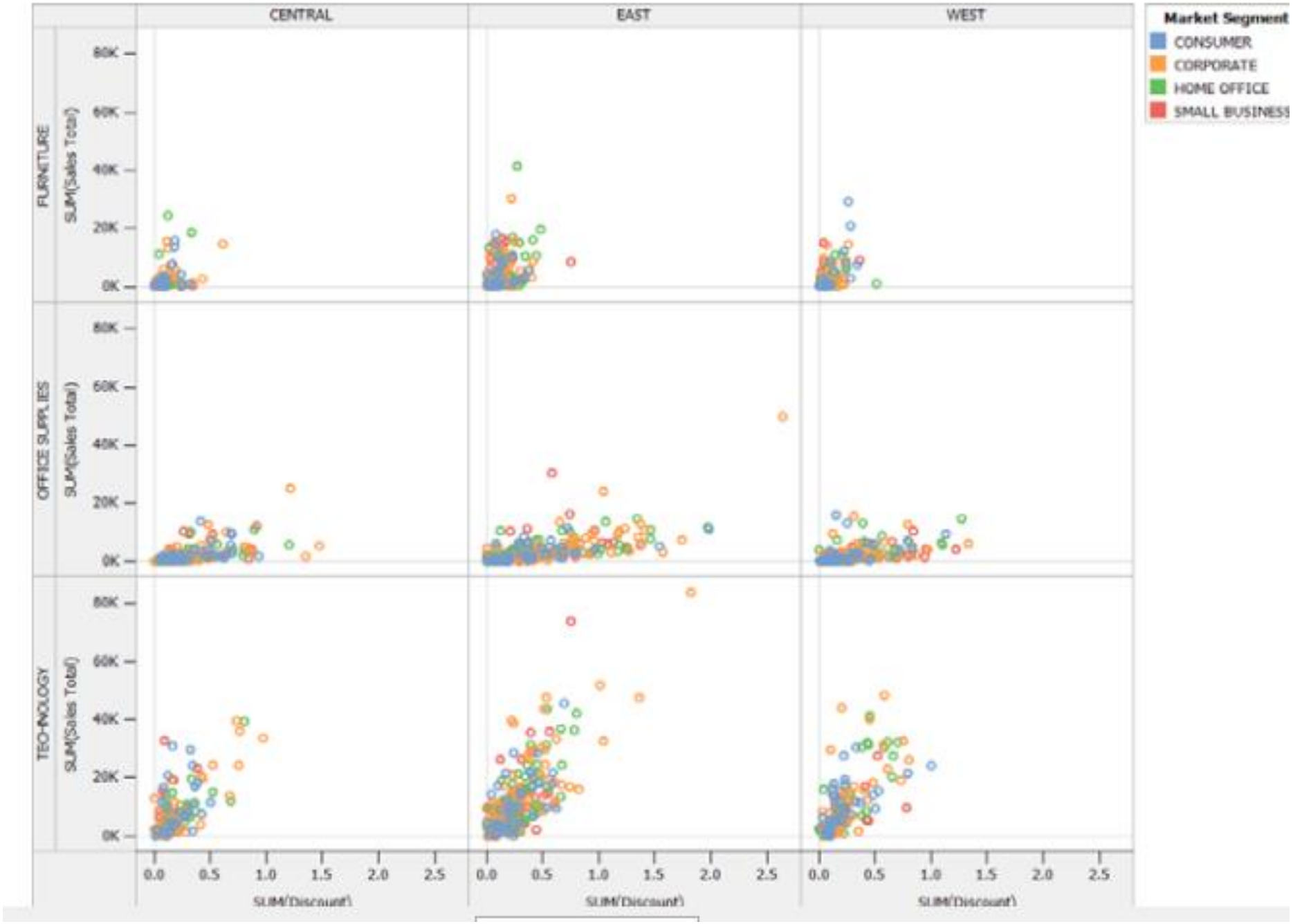
- Multi Variate
- Tabular structure
- Compare
- Correlation
- Large Data sets

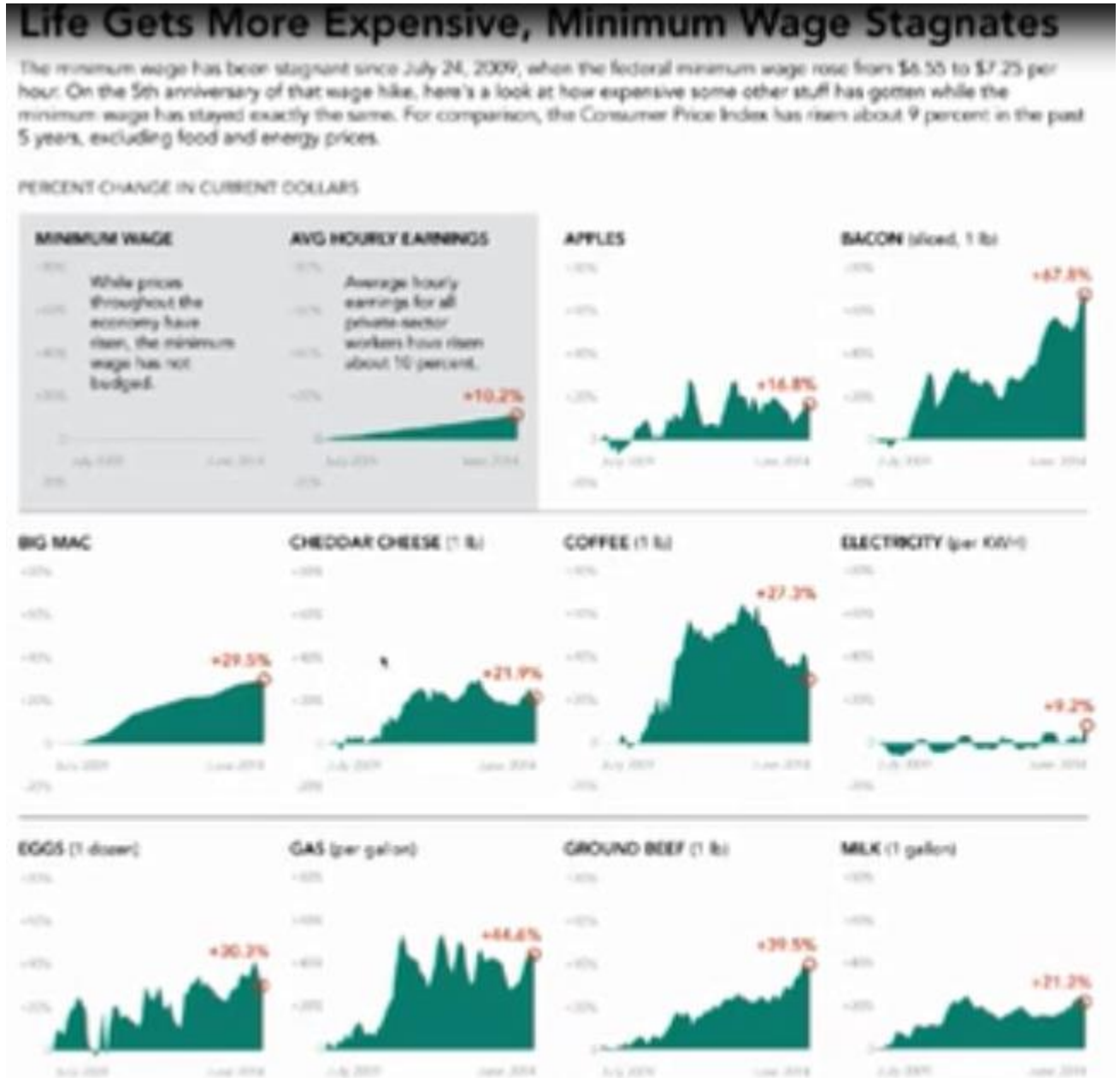


Small Multiples

- Single variation c
  one condition
- Dependency
- Detect Patterns
- Large Volume




CENTRAL
EAST
WEST
Market Segment
CONSUMER
CORPORATE
HOME OFFICE
SMALL BUSINESS
FURNITURE
OFFICE SUPPLIES
TECHNOLOGY
SUM(Sales Total)
80K
60K
40K
20K
0K
0.0
0.5
1.0
1.5
2.0
2.5
SUM(Discount)

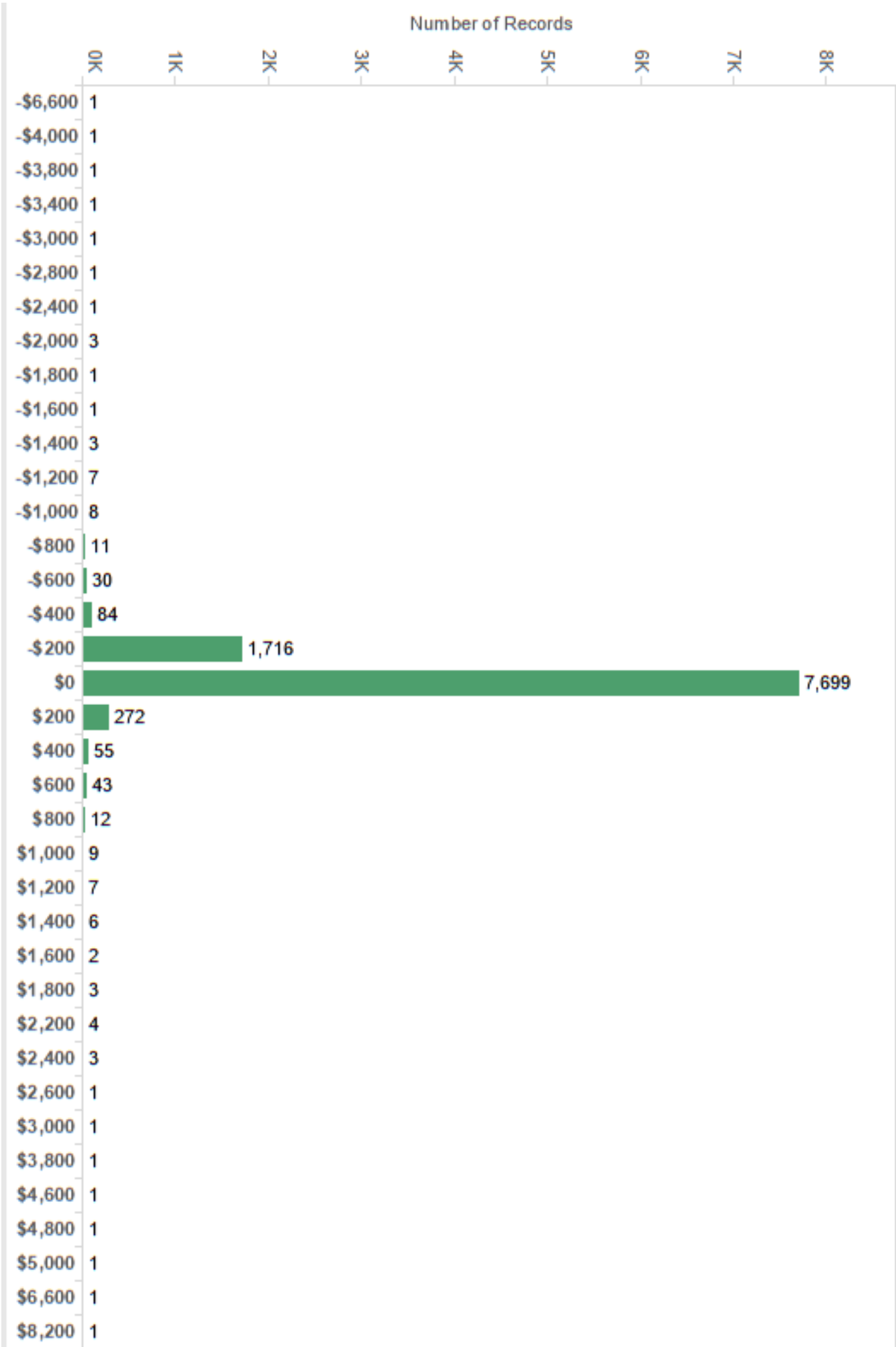

Life Gets More Expensive, Minimum Wage Stagnates
The minimum wage has been stagnant since July 24, 2009, when the federal minimum wage rose from $6.55 to $7.25 per hour. On the 5th anniversary of that wage hike, here's a look at how expensive some other stuff has gotten while the minimum wage has stayed exactly the same. For comparison, the Consumer Price Index has risen about 9 percent in the past 5 years, excluding food and energy prices.
PERCENT CHANGE IN CURRENT DOLLARS
MINIMUM WAGE
While prices throughout the economy have risen, the minimum wage has not budged.
AVG HOURLY EARNINGS
Average hourly earnings for all private-sector workers have risen about 10 percent.
+10.2%
APPLES
+16.8%
BACON (sliced, 1 lb)
+67.8%
BIG MAC
+29.5%
CHEDDAR CHEESE (1 lb)
+21.9%
COFFEE (1 lb)
+27.3%
ELECTRICITY (per KWH)
+9.2%
EGGS (1 dozen)
+30.2%
GAS (per gallon)
+44.6%
GROUND BEEF (1 lb)
+39.5%
MILK (1 gallon)
+21.2%

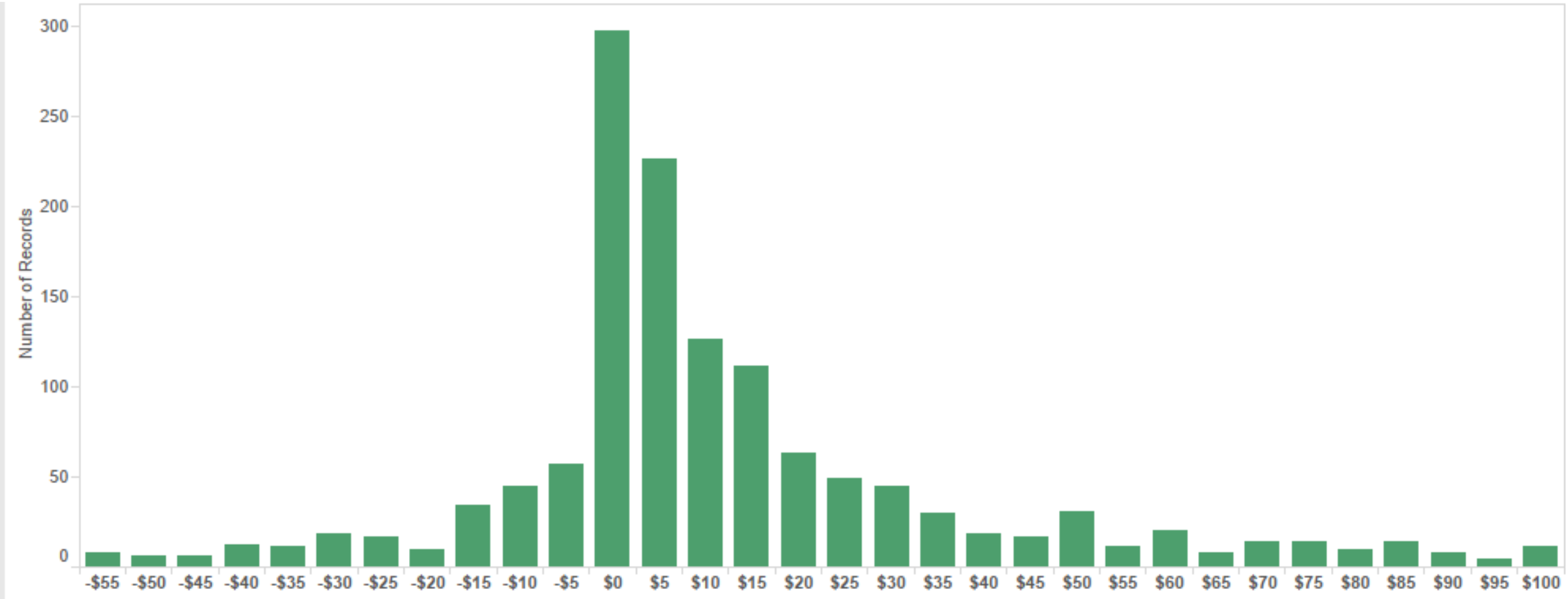

1990
1991
1992
1993
1994
1995
1996
1997
1998
1980
1981
1982
1983
1984
1985
1986
1987
1988
1970
1971
1972
1973
1974
1975
1976
1977
1978
1960
1961
1962
1963
1964
1965
1966
1967
1968

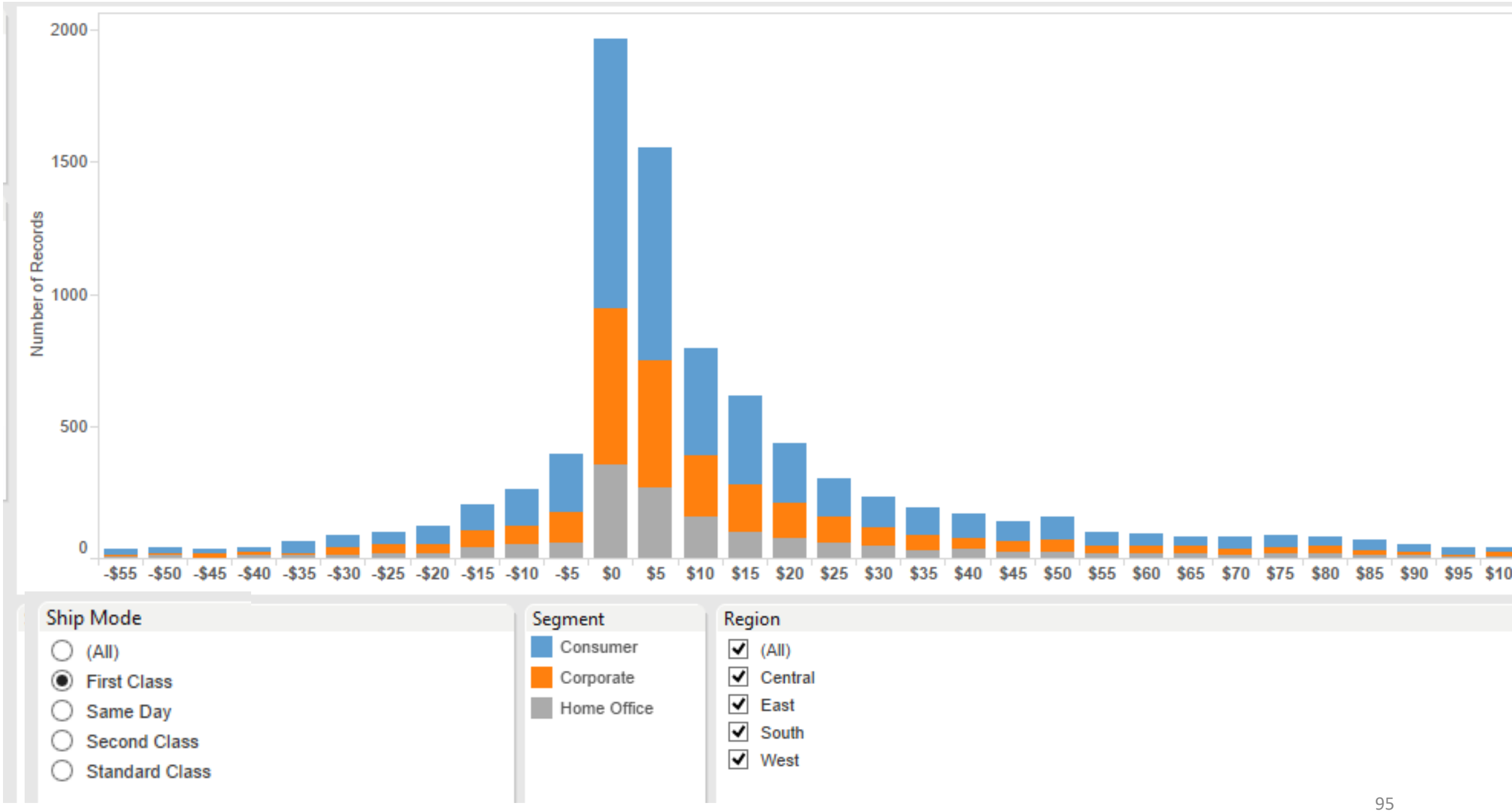
Multivariate

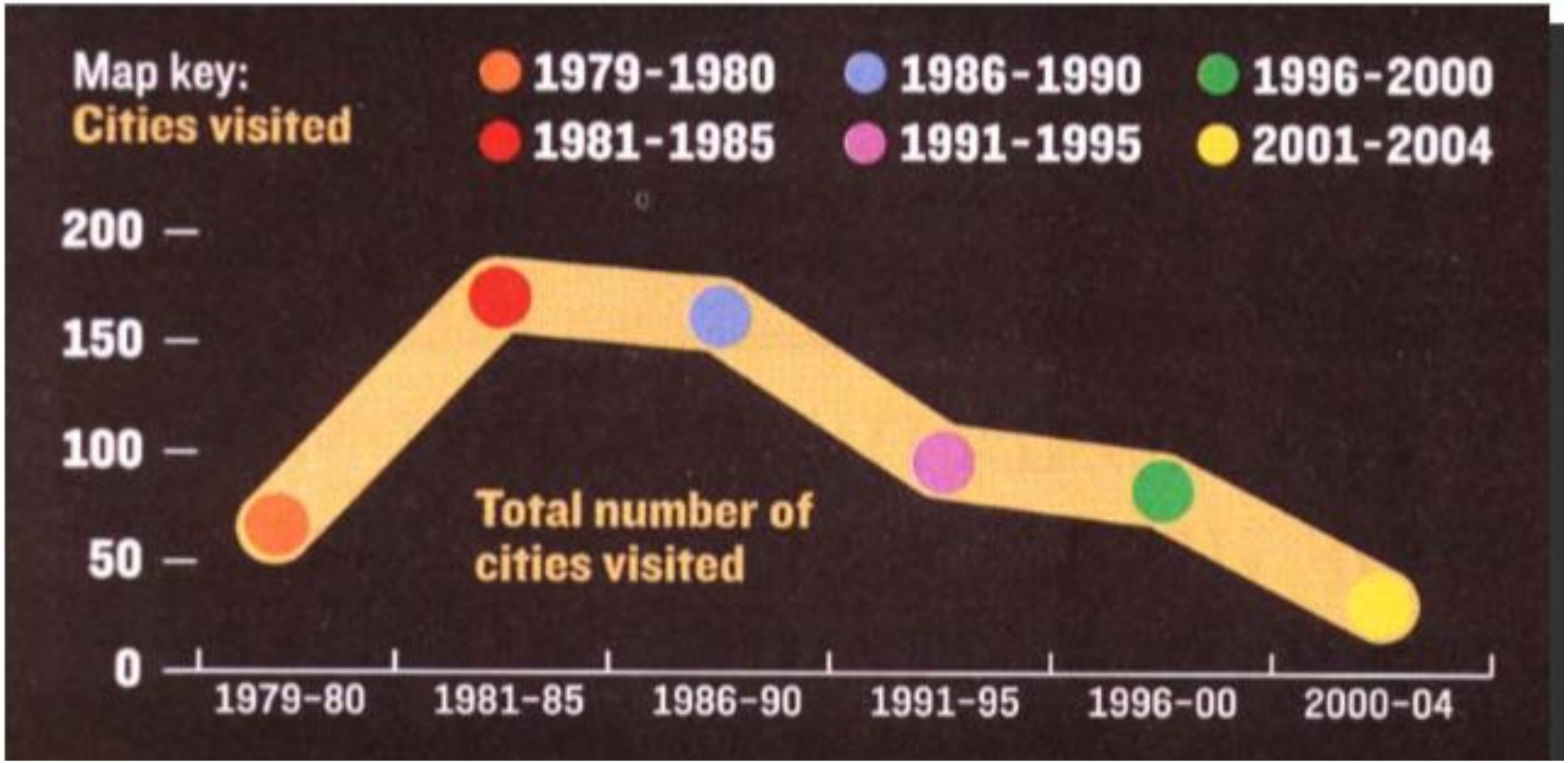
- At a glance
- Large Volume
- Bite Sized Info Views
- Vary one – keep everything else constant

One Measure


Number of Records
0K
1K
2K
3K
4K
5K
6K
7K
8K
-$6,600 1
-$4,000 1
-$3,800 1
-$3,400 1
-$3,000 1
-$2,800 1
-$2,400 1
-$2,000 3
-$1,800 1
-$1,600 1
-$1,400 3
-$1,200 7
-$1,000 8
-$800 11
-$600 30
-$400 84
-$200 1,716
$0 7,699
$200 272
$400 55
$600 43
$800 12
$1,000 9
$1,200 7
$1,400 6
$1,600 2
$1,800 3
$2,200 4
$2,400 3
$2,600 1
$3,000 1
$3,800 1
$4,600 1
$4,800 1
$5,000 1
$6,600 1
$8,200 1


Number of Records
300
250
200
150
100
50
0
-$55
-$50
-$45
-$40
-$35
-$30
-$25
-$20
-$15
-$10
-$5
$0
$5
$10
$15
$20
$25
$30
$35
$40
$45
$50
$55
$60
$65
$70
$75
$80
$85
$90
$95
$100


2000
1500
1000
500
0
Number of Records
-$55 -$50 -$45 -$40 -$35 -$30 -$25 -$20 -$15 -$10 -$5 $0 $5 $10 $15 $20 $25 $30 $35 $40 $45 $50 $55 $60 $65 $70 $75 $80 $85 $90 $95 $10
Ship Mode
(All)
First Class
Same Day
Second Class
Standard Class
Segment
Consumer
Corporate
Home Office
Region
(All)
Central
East
South
West

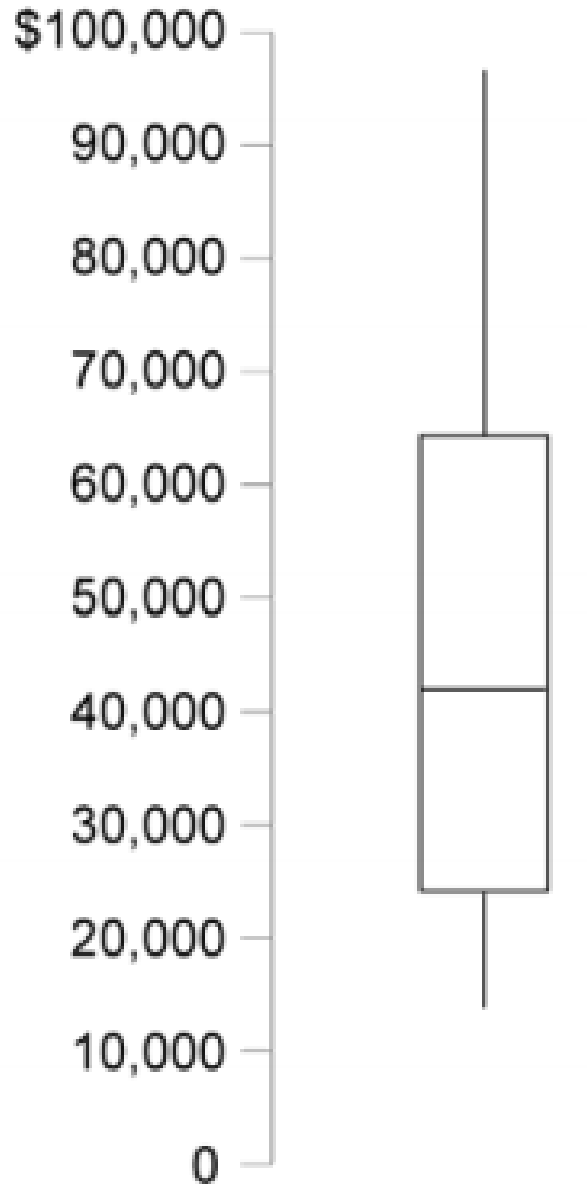

Map key:
Cities visited
1979-1980
1981-1985
1986-1990
1991-1995
1996-2000
2001-2004
200
150
100
50
0
Total number of cities visited
1979-80
1981-85
1986-90
1991-95
1996-00
2000-04

Histogram

- Distribution
- Intervals
- Grouping
- Outliers
- Categorize

Distribution – 1 Measure

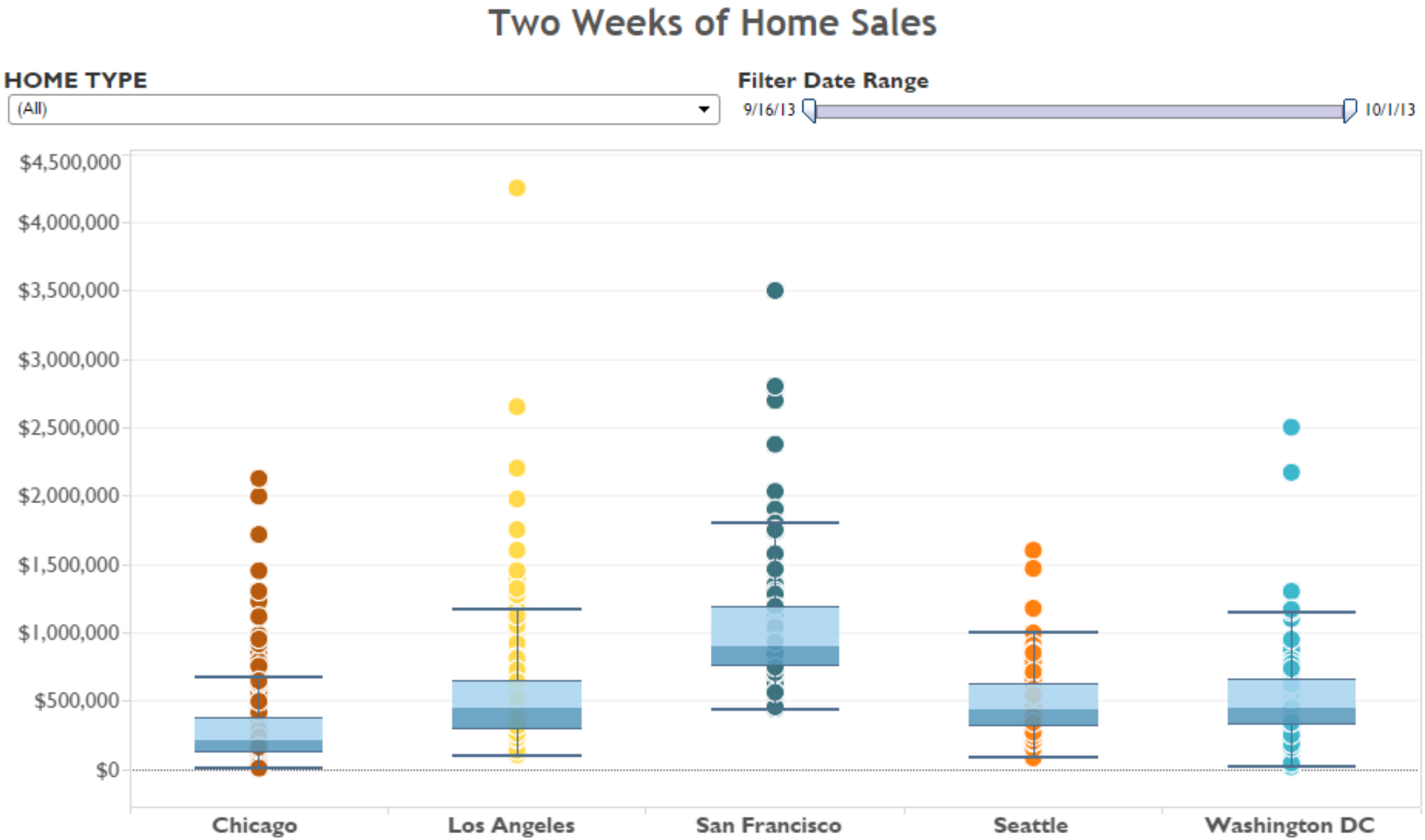
Box Plots


$100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0


Salaries
(U.S. $)
Female vs. Male Salary Distributions
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1
2
3
4
5
Pay Grades


Salaries
(U.S. $)
Male vs. Female Salary Distributions
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1
2
3
4
5
Pay Grades


Salaries
(U.S. $)
Male vs. Female Salary Distributions
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1
2
3
4
5
Pay Grades



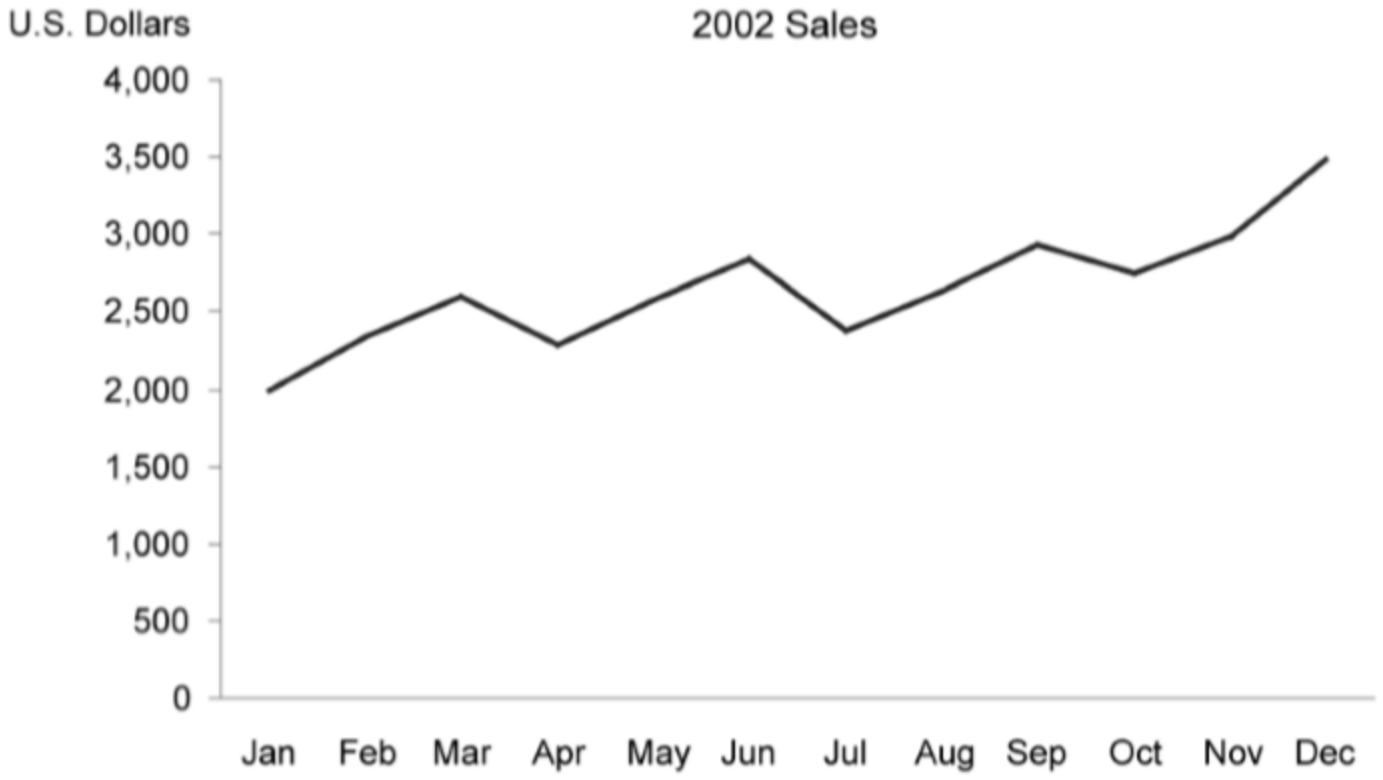
Source: http://www.tableau.com/learn/gallery?build=9000.15.0318.1720&edition=pro&lang=en-us&platform=windows&version=9.0

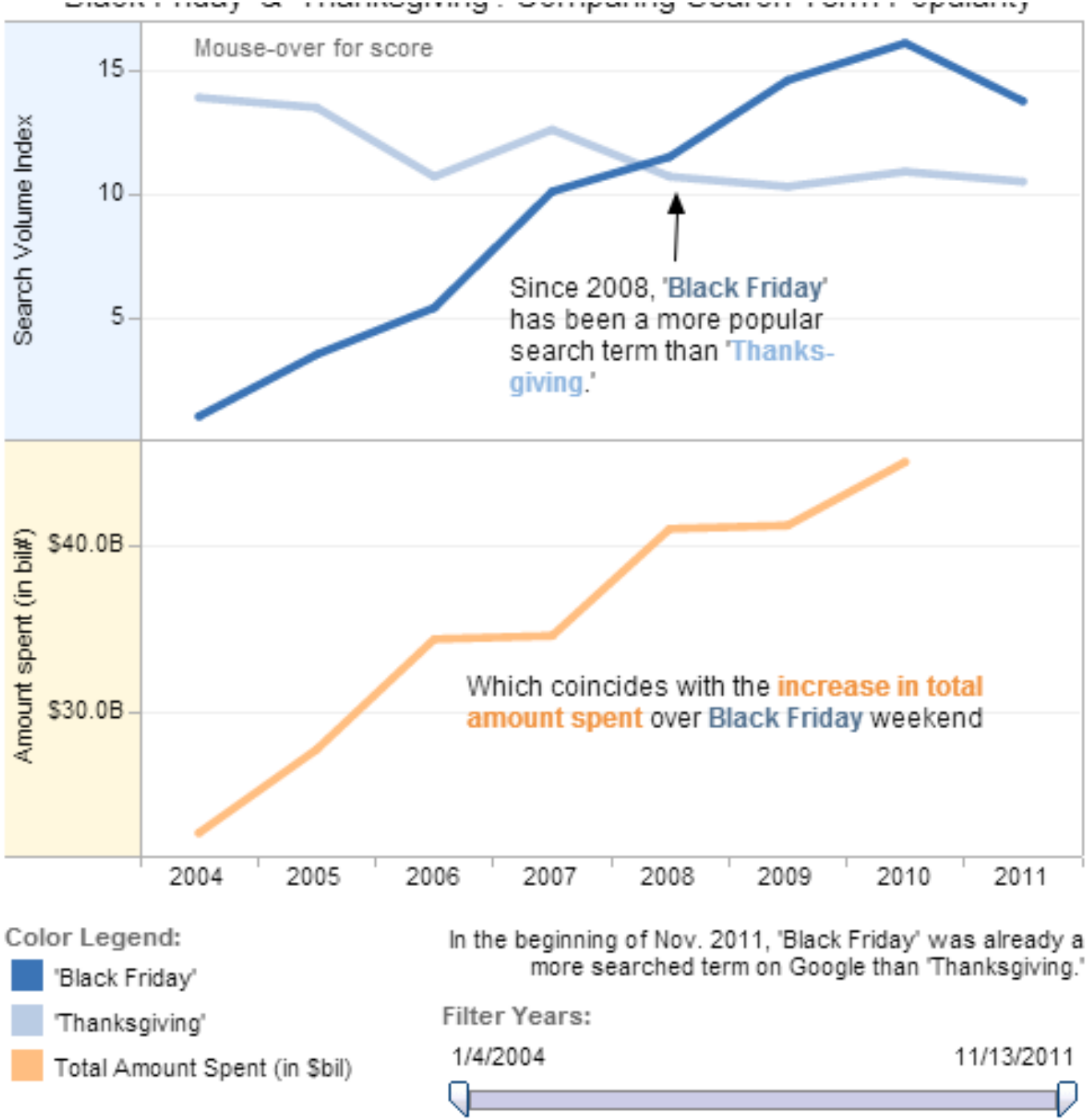
Box Plot

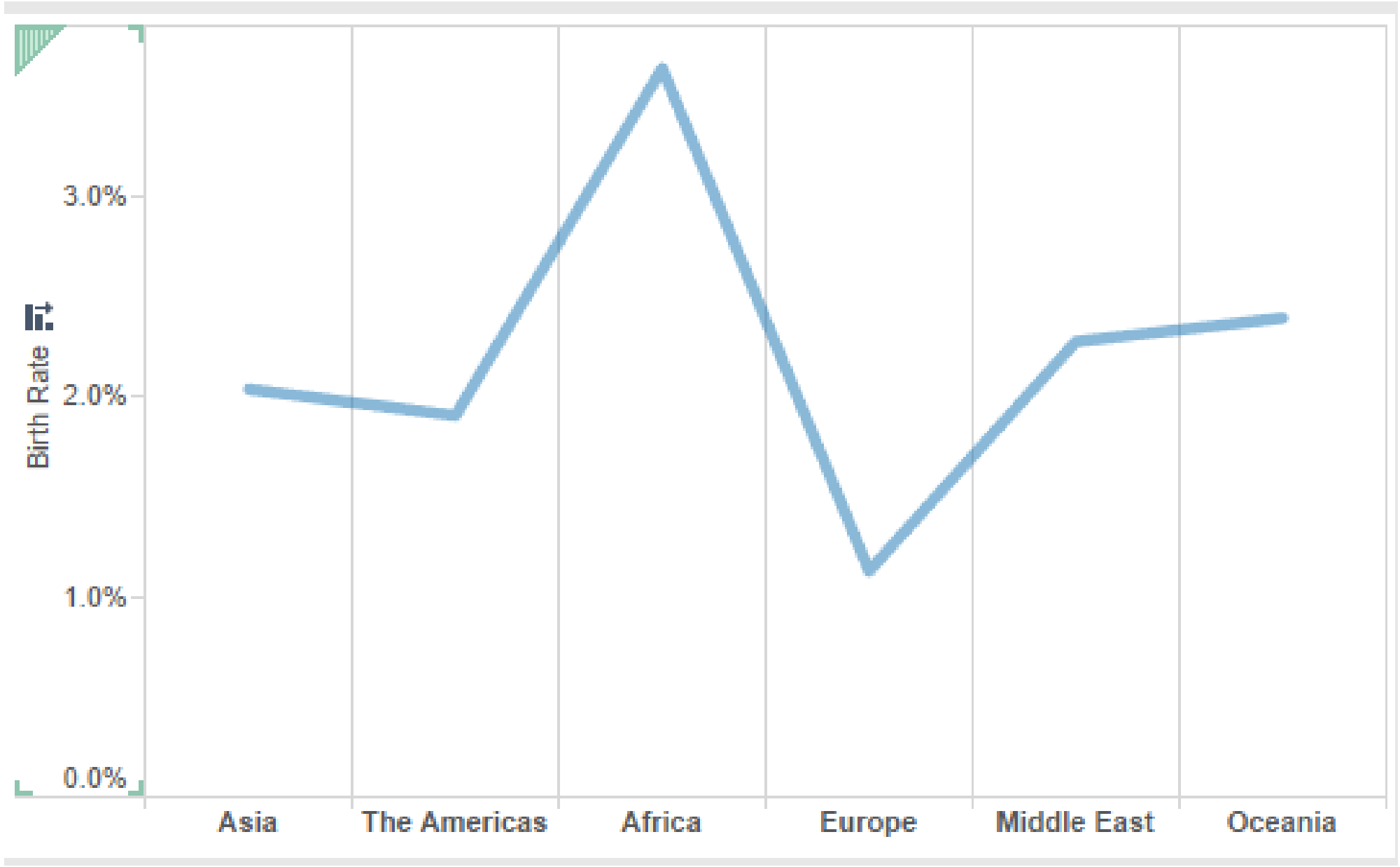
- Distribution
- Range
- Outlier
- Compare categories
- Performance Comparison
- Large volumes of data

Date + 1 Measure

Strength of Lines



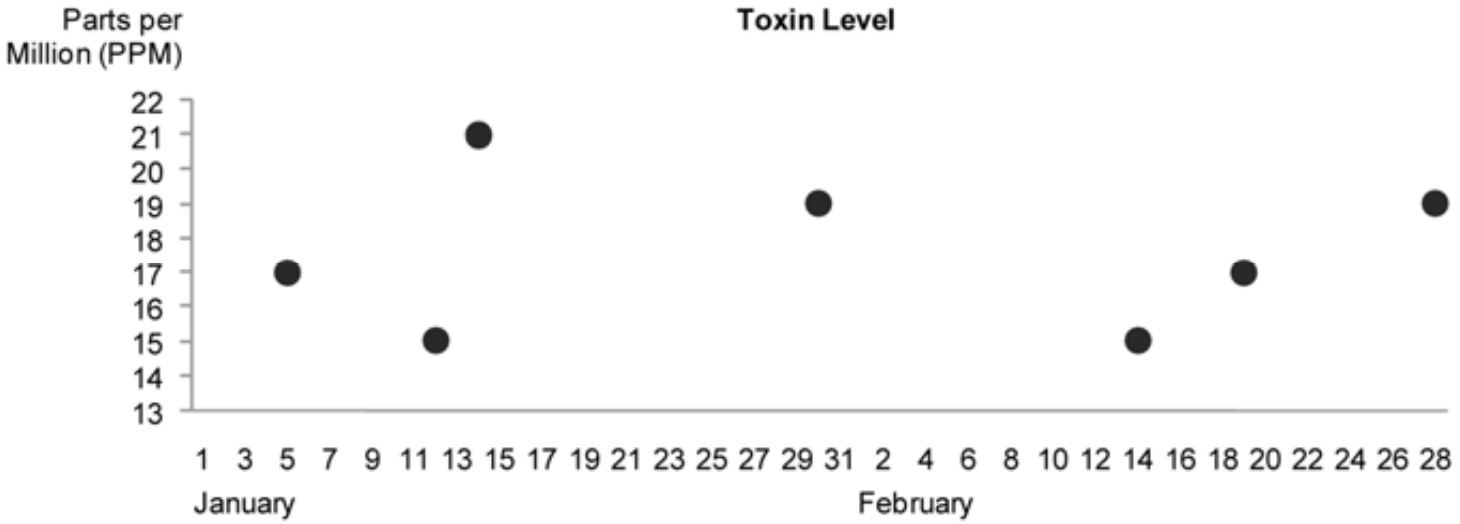

Mouse-over for score
Search Volume Index
15
10
5
Since 2008, 'Black Friday' has been a more popular search term than 'Thanks-giving.'
Amount spent (in bil#)
$40.0B
$30.0B
Which coincides with the increase in total amount spent over Black Friday weekend
2004
2005
2006
2007
2008
2009
2010
2011
Color Legend:
'Black Friday'
'Thanksgiving'
Total Amount Spent (in $bil)
In the beginning of Nov. 2011, 'Black Friday' was already a more searched term on Google than 'Thanksgiving.'
Filter Years:
1/4/2004
11/13/2011

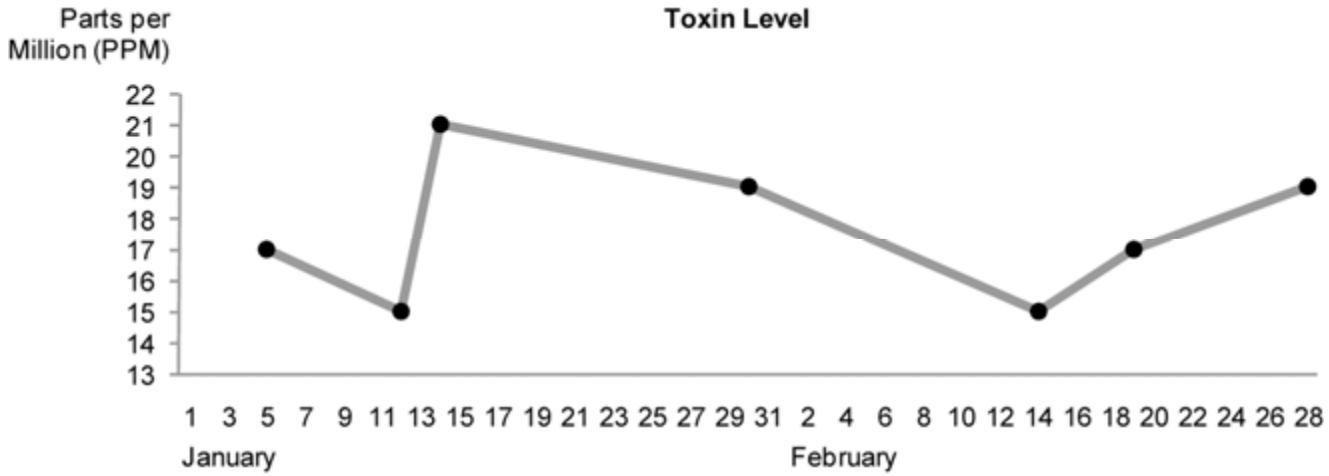

Birth Rate
3.0%
2.0%
1.0%
0.0%
Asia
The Americas
Africa
Europe
Middle East
Oceania

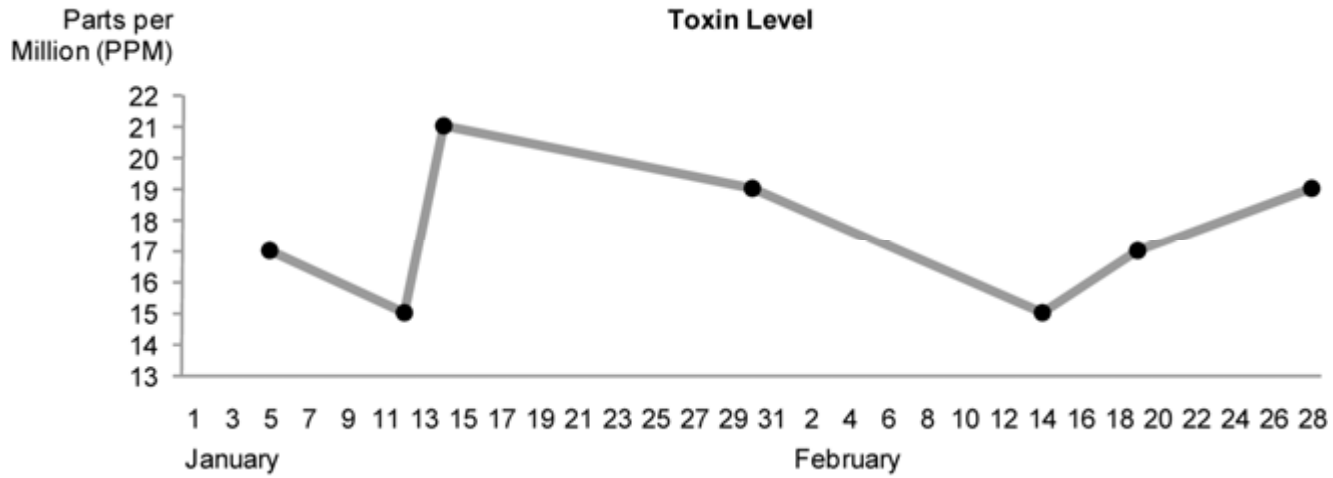

U.S. Dollars
2007 Sales Revenue
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
Plan
Actual
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

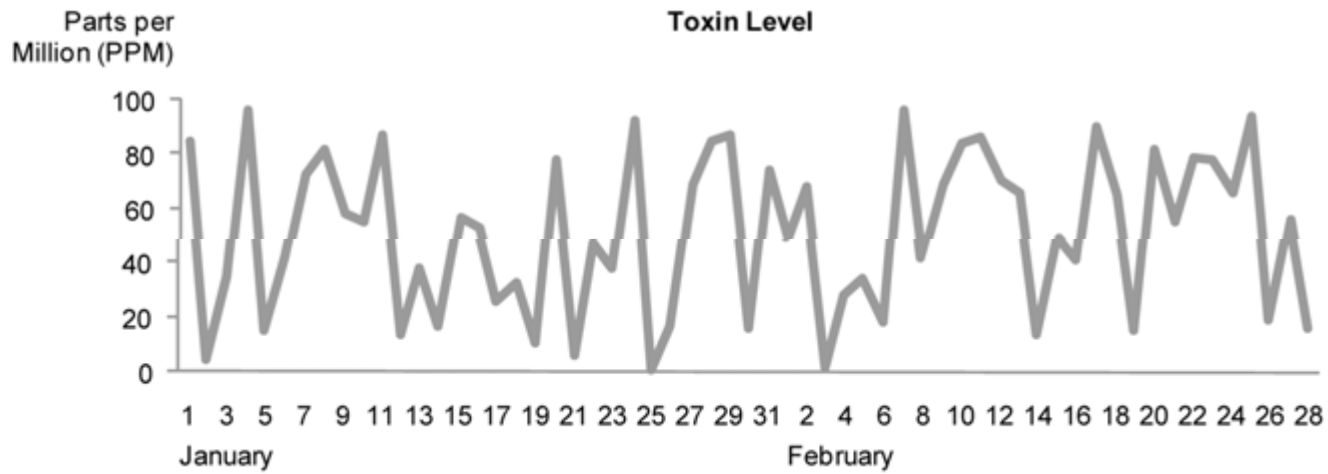

U.S. Dollars
2007 Sales Revenue
Actual
Plan
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Dot plots for irregular intervals

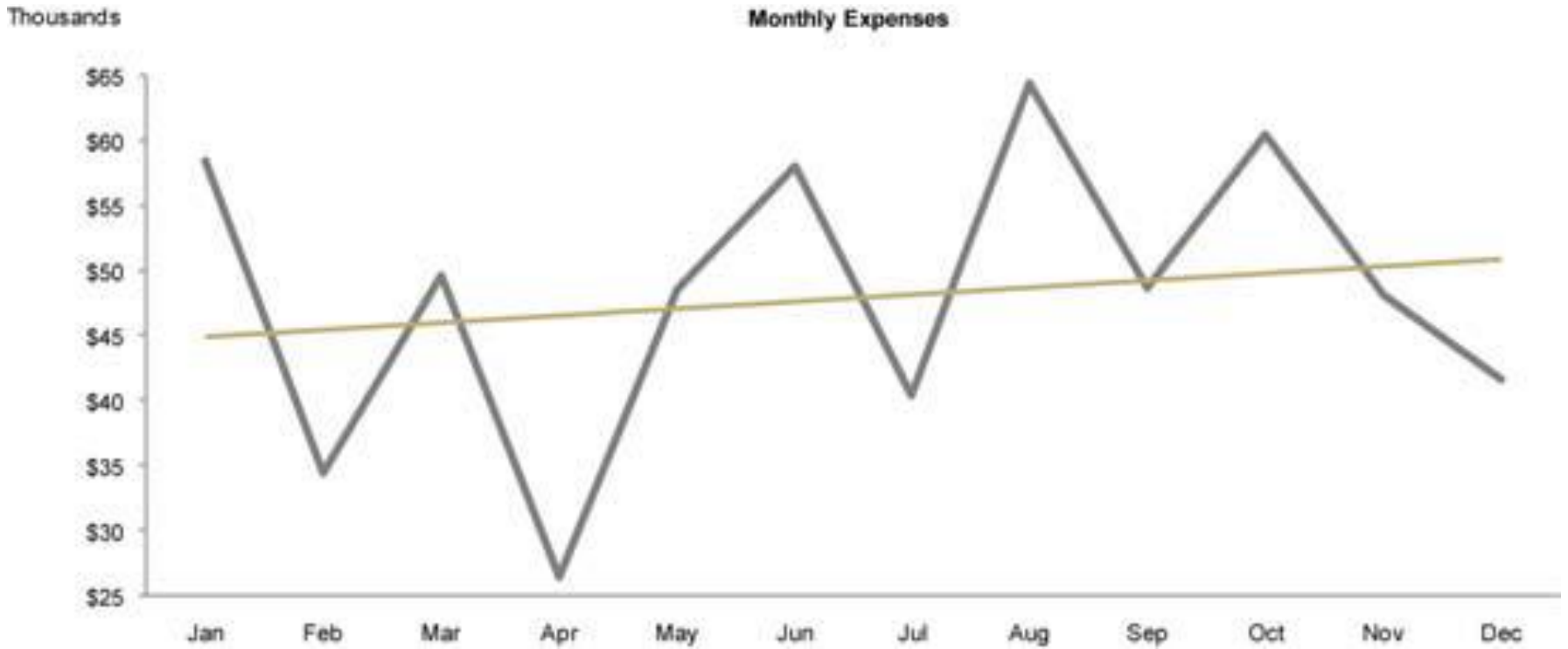


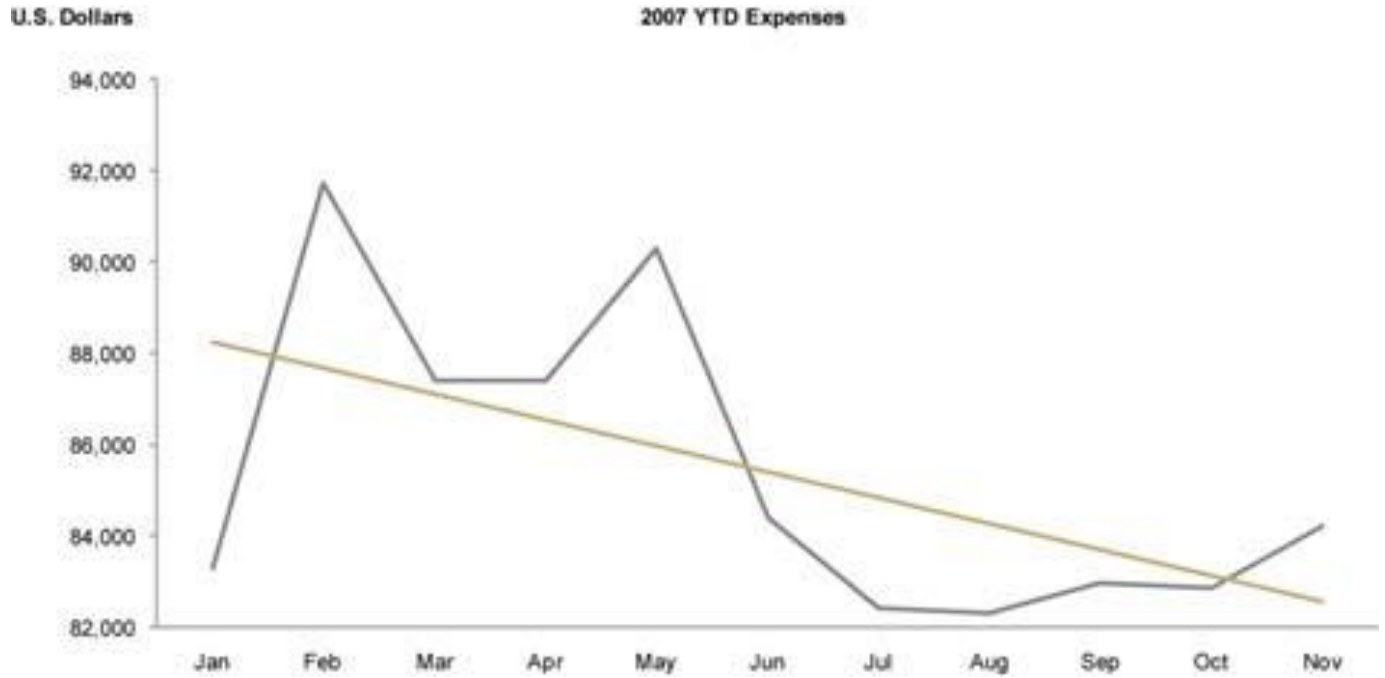


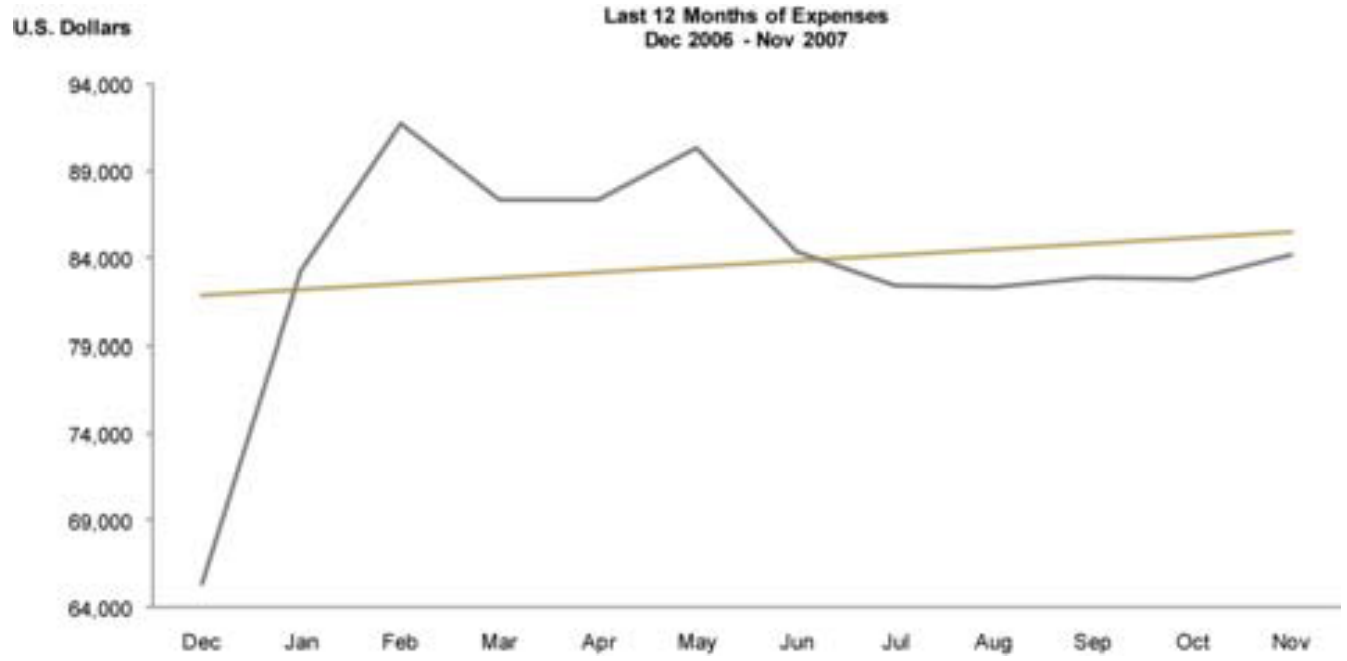

Toxin Level
Parts per Million (PPM)
22
21
20
19
18
17
16
15
14
13
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28
January
February


Toxin Level
Parts per Million (PPM)
100
80
60
40
20
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28
January
February

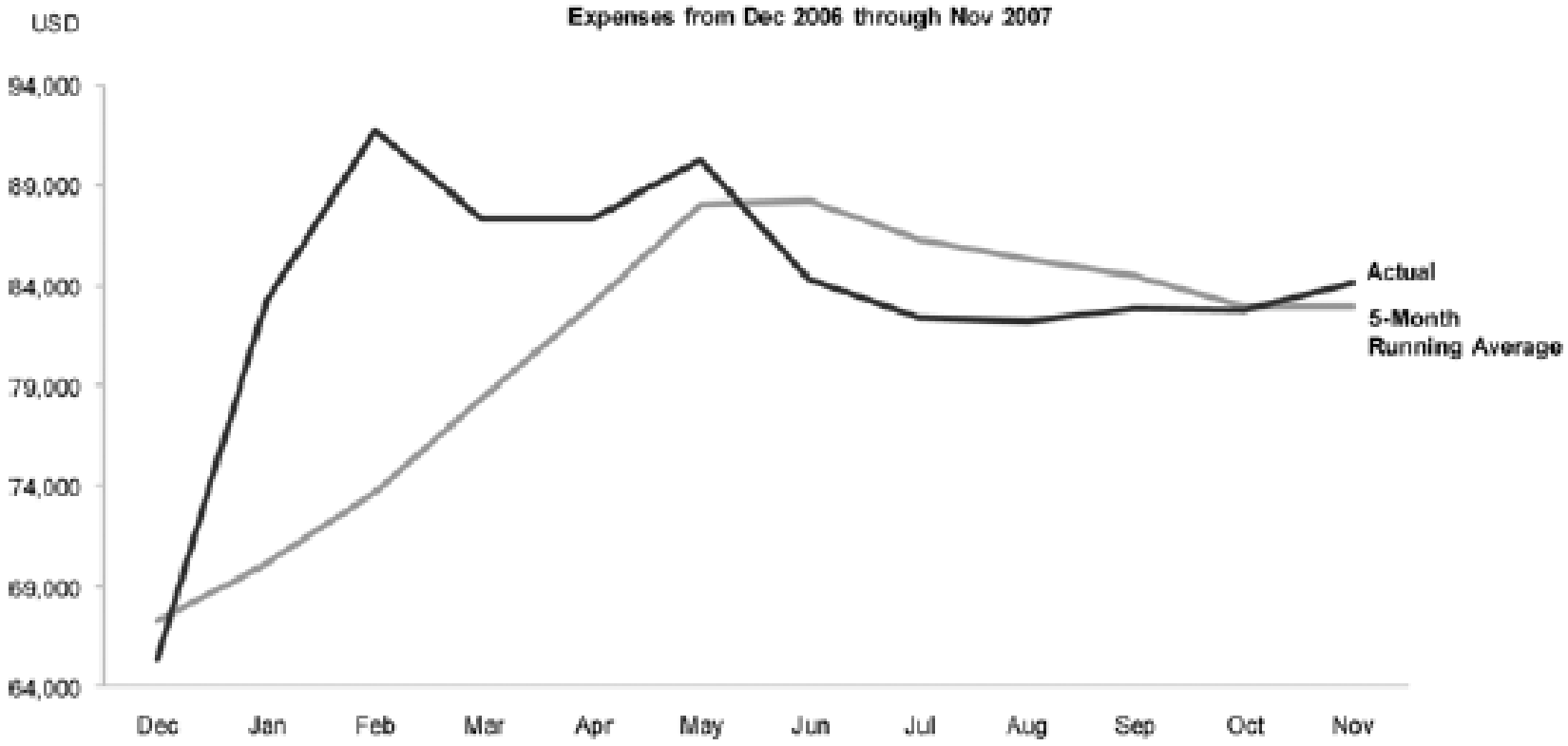

Thousands
Monthly Expenses
$65
$60
$55
$50
$45
$40
$35
$30
$25
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

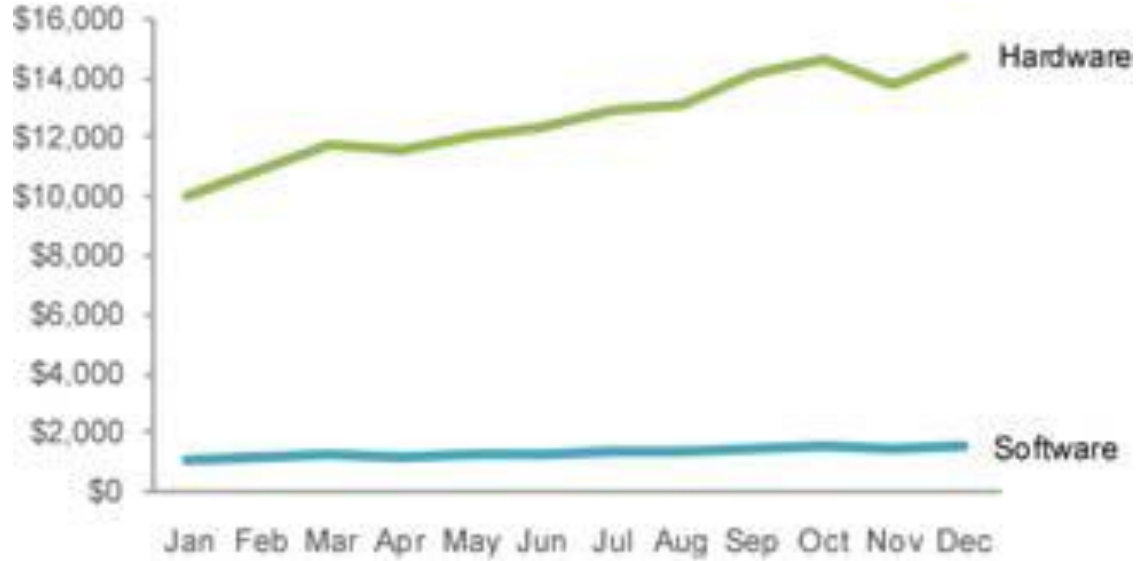

Thousands
Monthly Expenses
$65
$60
$55
$50
$45
$40
$35
$30
$25
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


U.S. Dollars
2007 YTD Expenses
94,000
92,000
90,000
88,000
86,000
84,000
82,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov


U.S. Dollars
Last 12 Months of Expenses
Dec 2006 - Nov 2007
94,000
89,000
84,000
79,000
74,000
69,000
64,000
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov

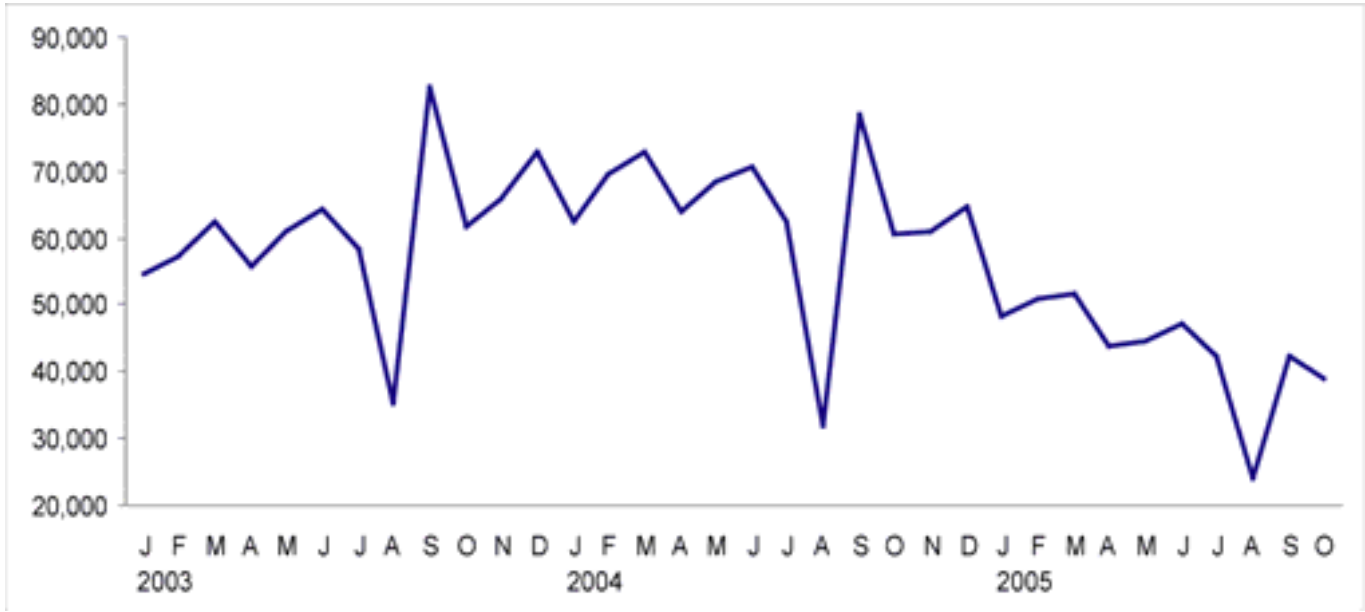
Using running averages to smooth trends

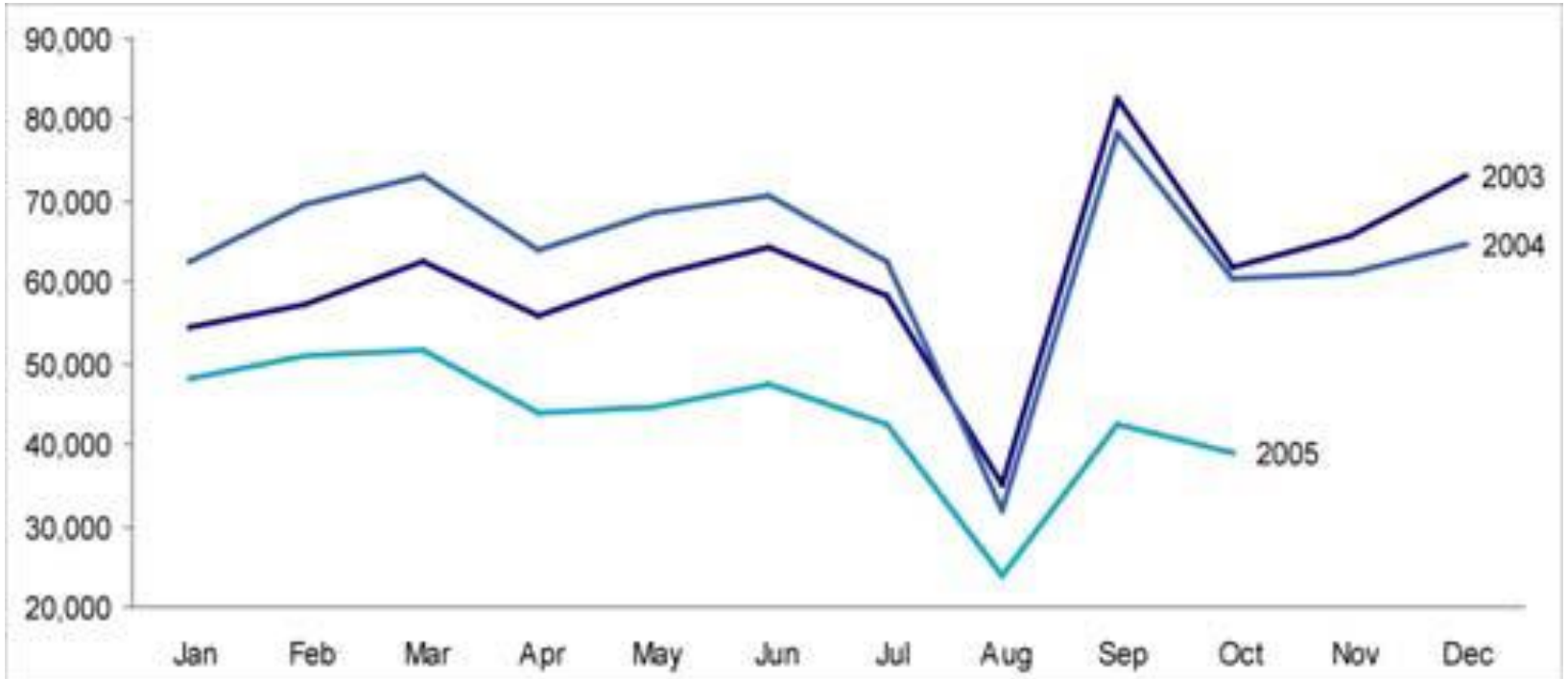


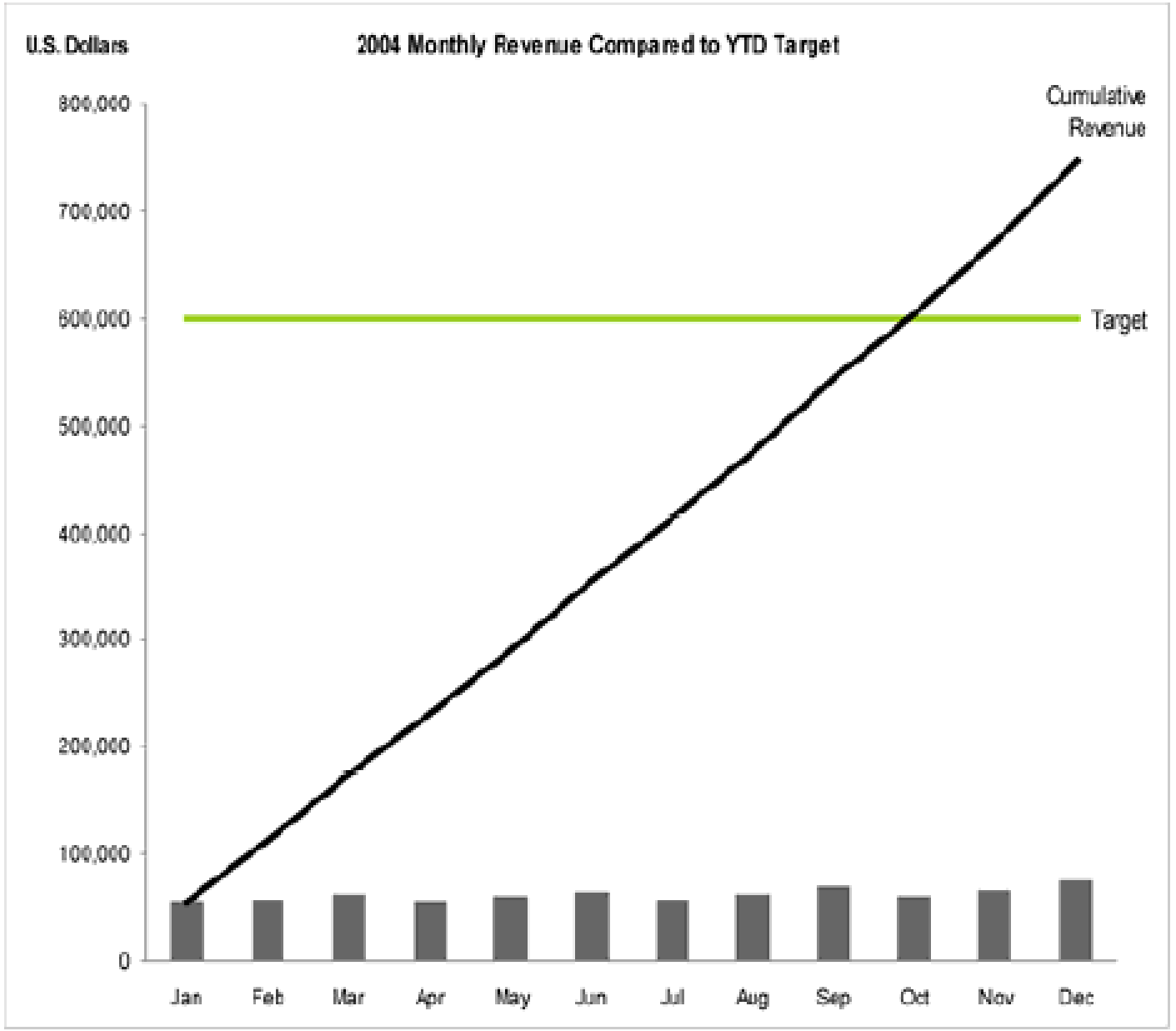

$16,000
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0
Hardware
Software
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

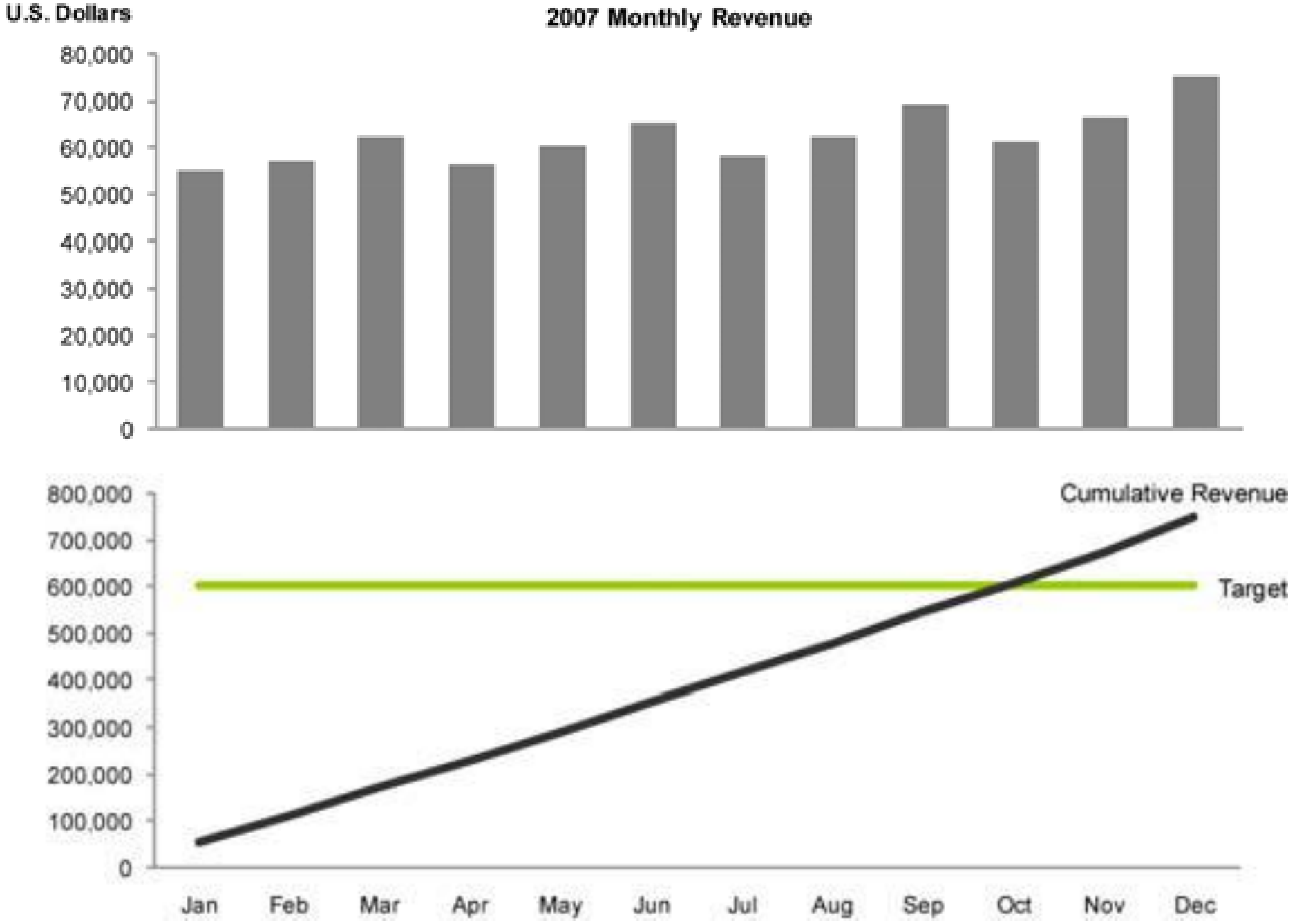

10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
Hardware
Software
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec


50%
40%
30%
20%
10%
0%
Hardware
Software
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

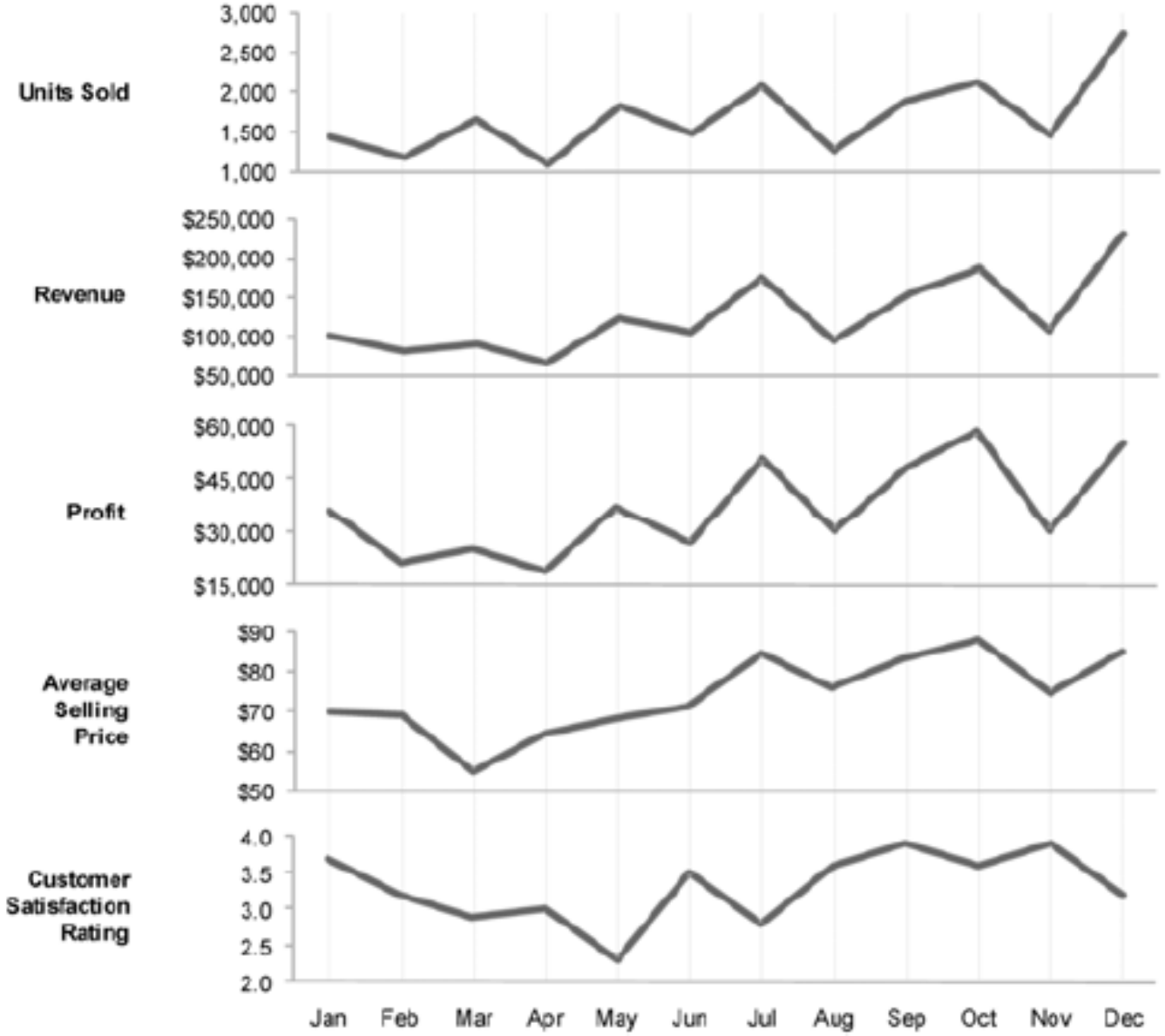

90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O
2003
2004
2005

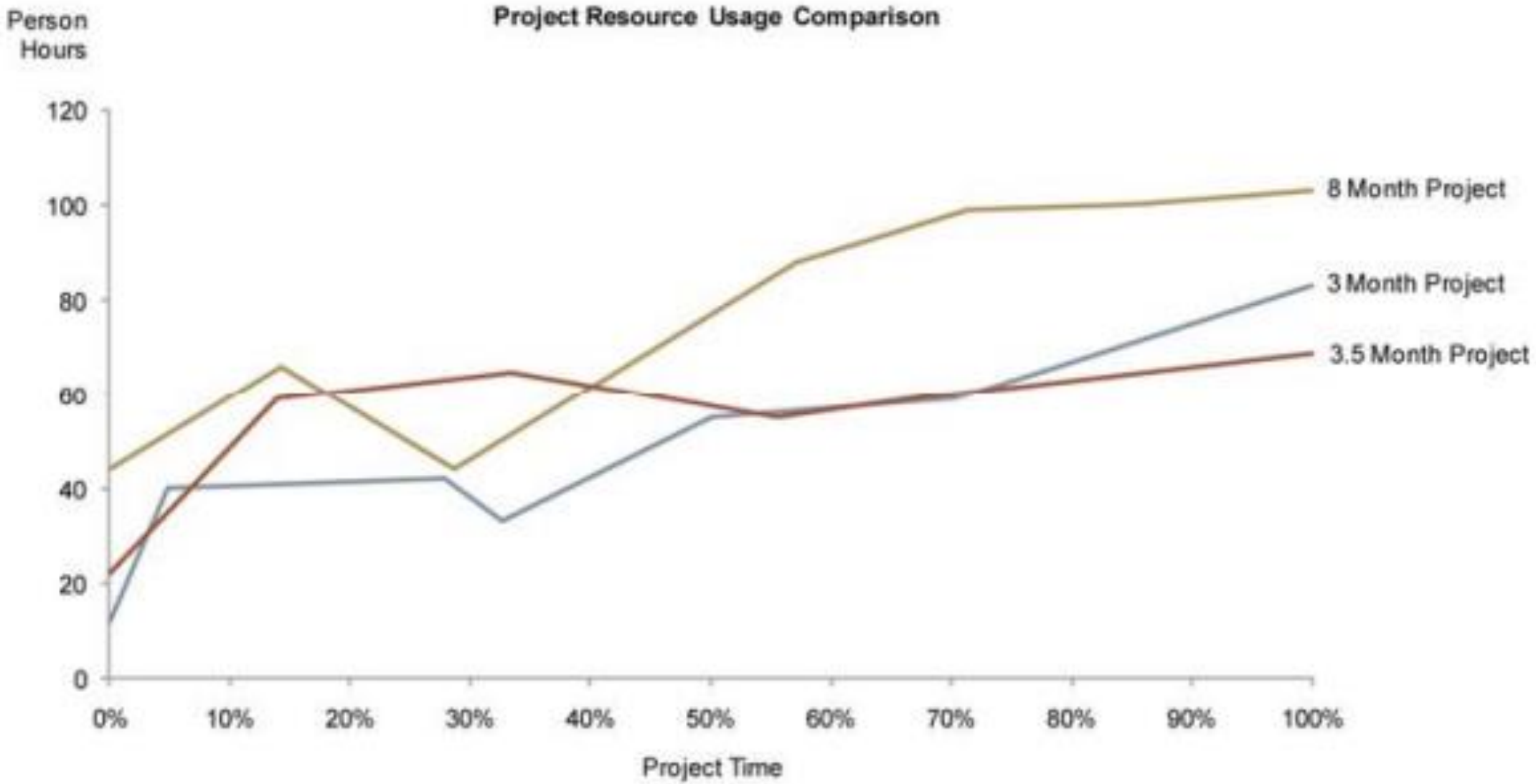

90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2003
2004
2005


U.S. Dollars
2004 Monthly Revenue Compared to YTD Target
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Cumulative Revenue
Target
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


U.S. Dollars
2007 Monthly Revenue
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Cumulative Revenue
Target
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Compare multiple related variables




Project Resource Usage Comparison
Person Hours
120
100
80
60
40
20
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Project Time
8 Month Project
3 Month Project
3.5 Month Project

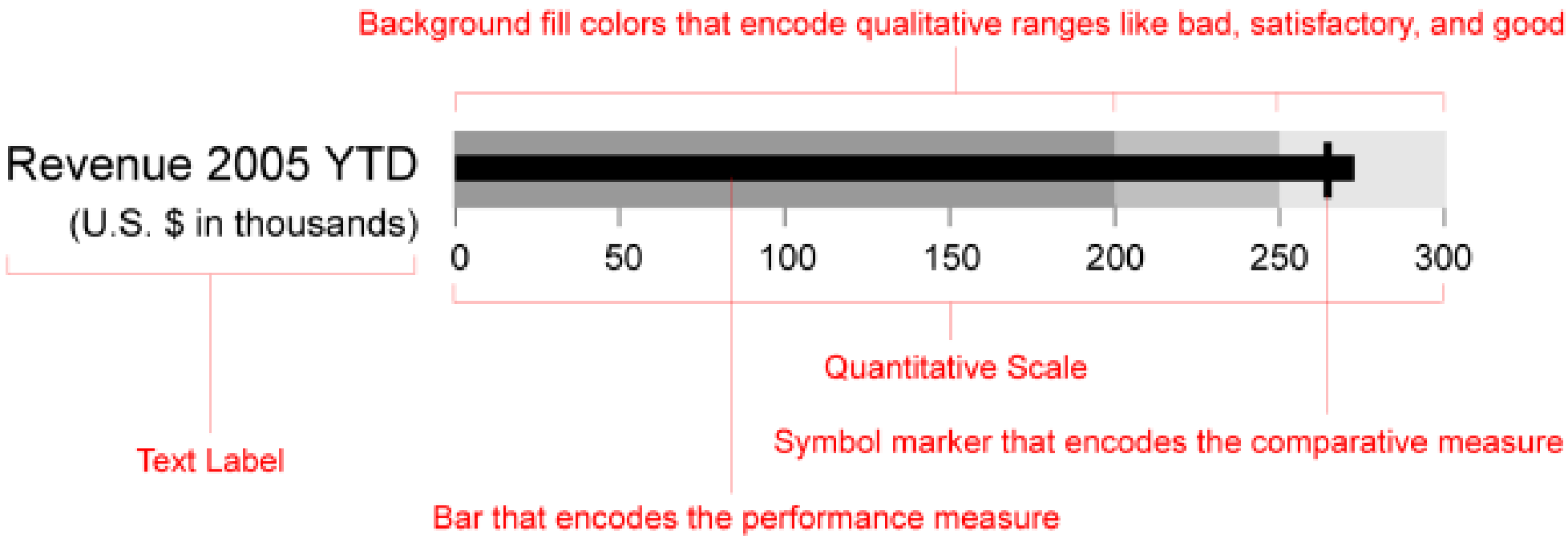
Lines

- Trend
- Straightforward
- Pattern
- Sequence
- Seasonality
- Time

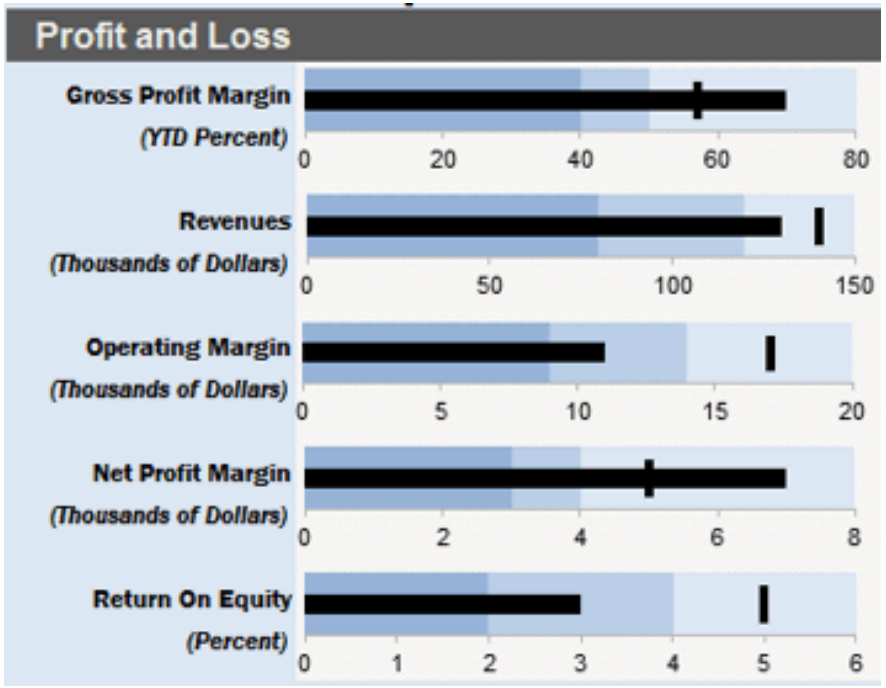
Deviation:
2 Measures

Actual Vs Plan (Target)

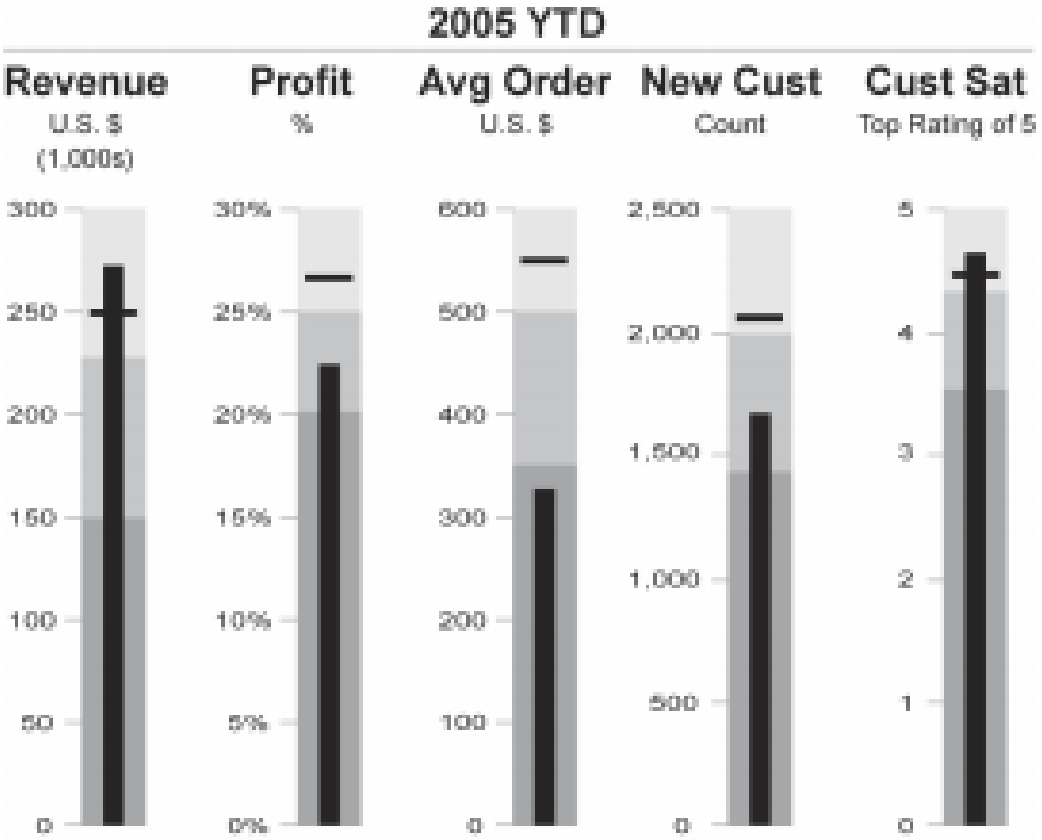
Bullet Charts



Bullet Charts

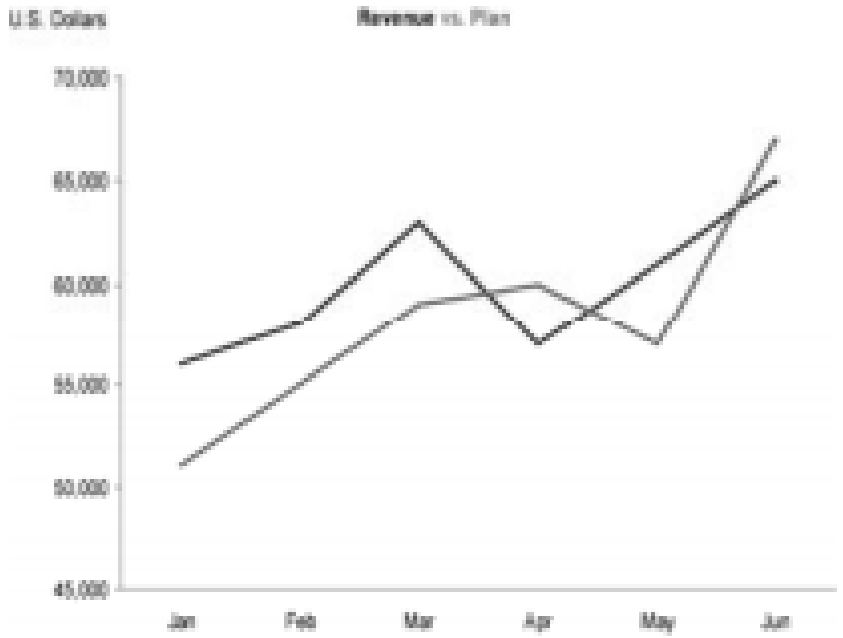


Source: http://exceluser.com/excel_dashboards/bullet-graph.htm



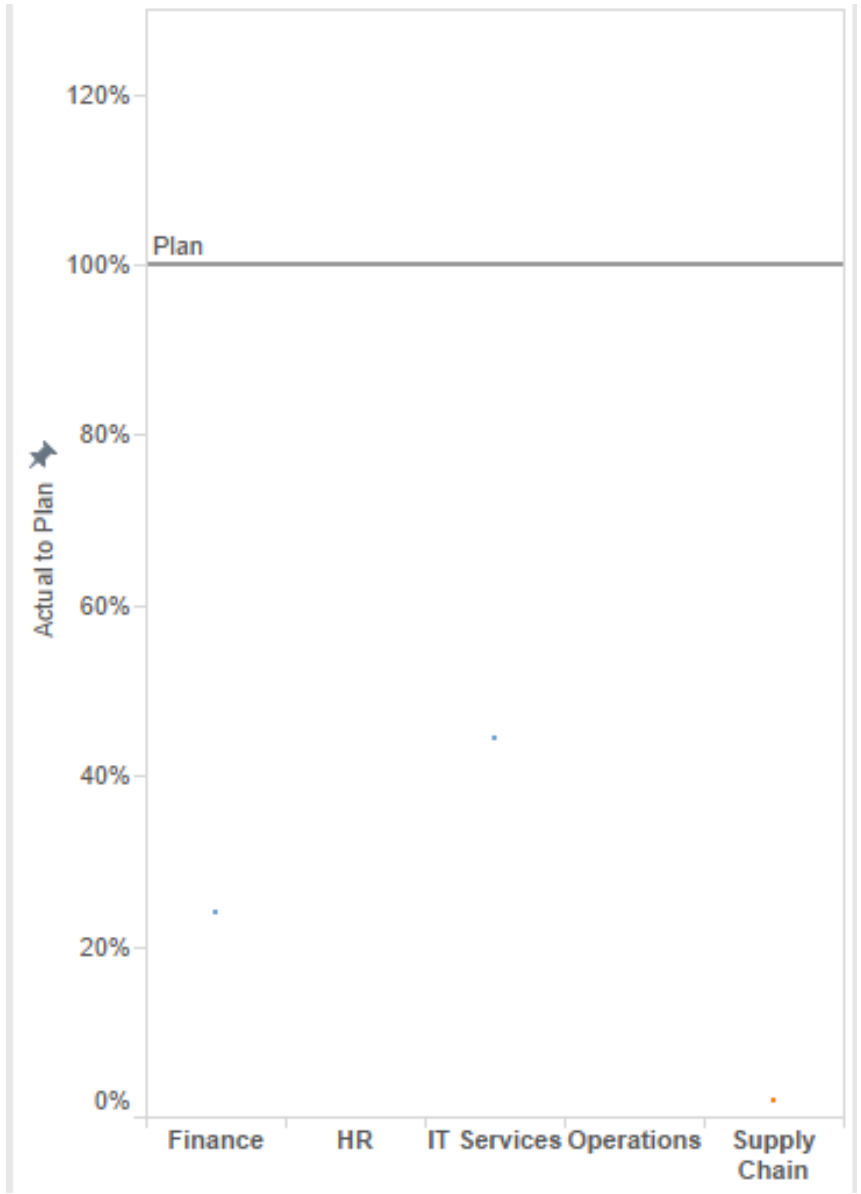
Source: http://www.bioteams.com/2010/10/08/transform_your_online.html

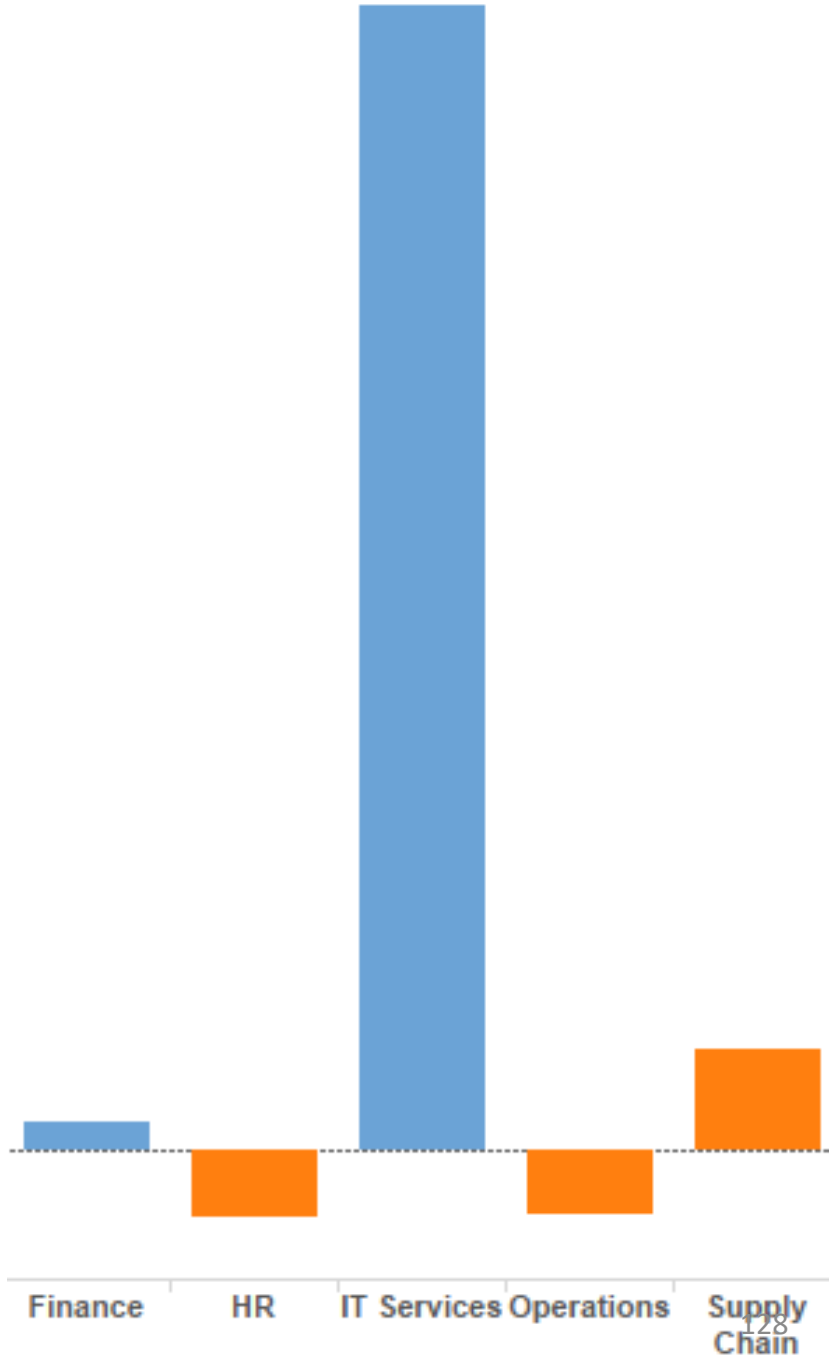
Deviations

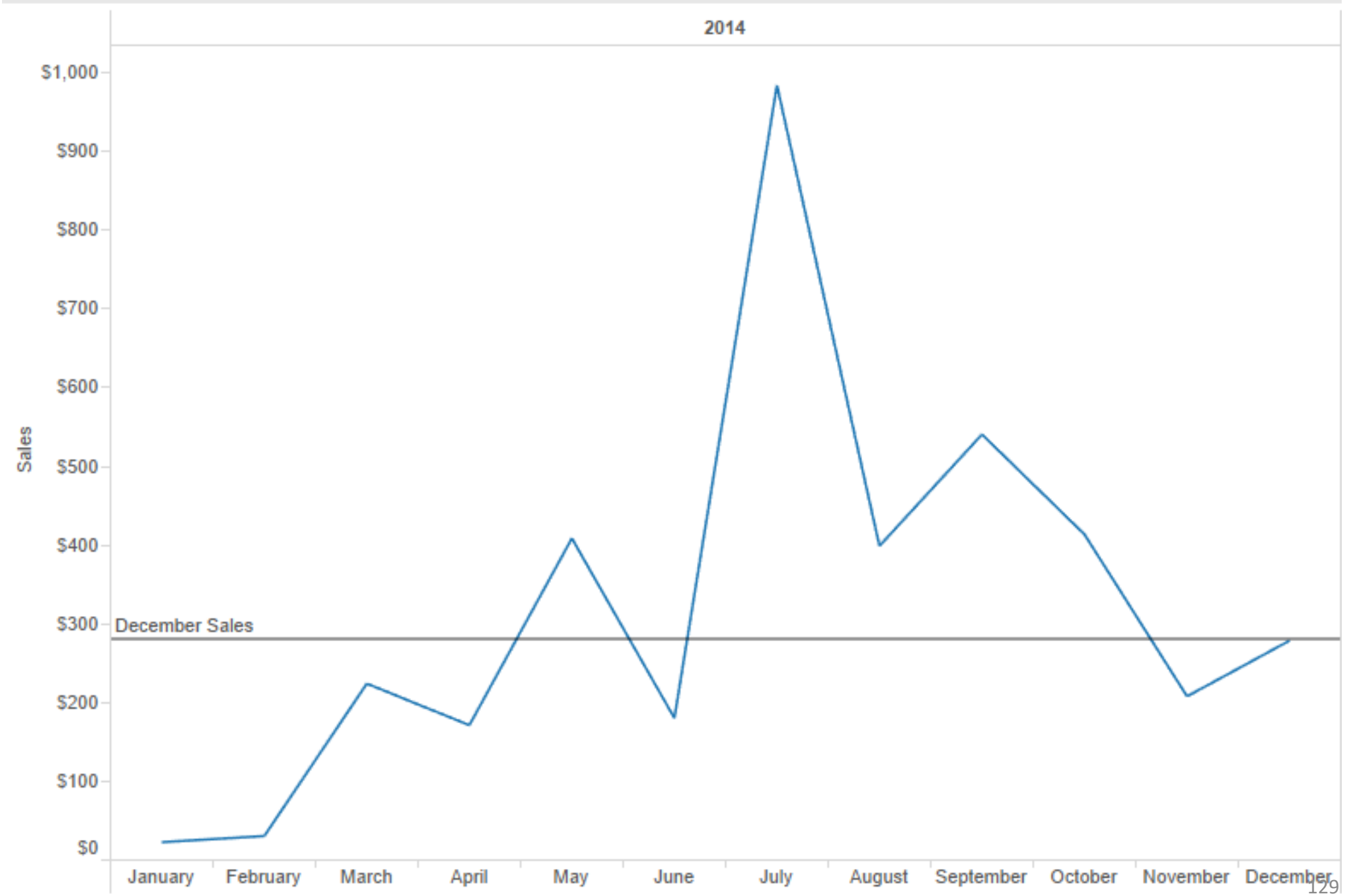


Indirect encoding

Direct encoding

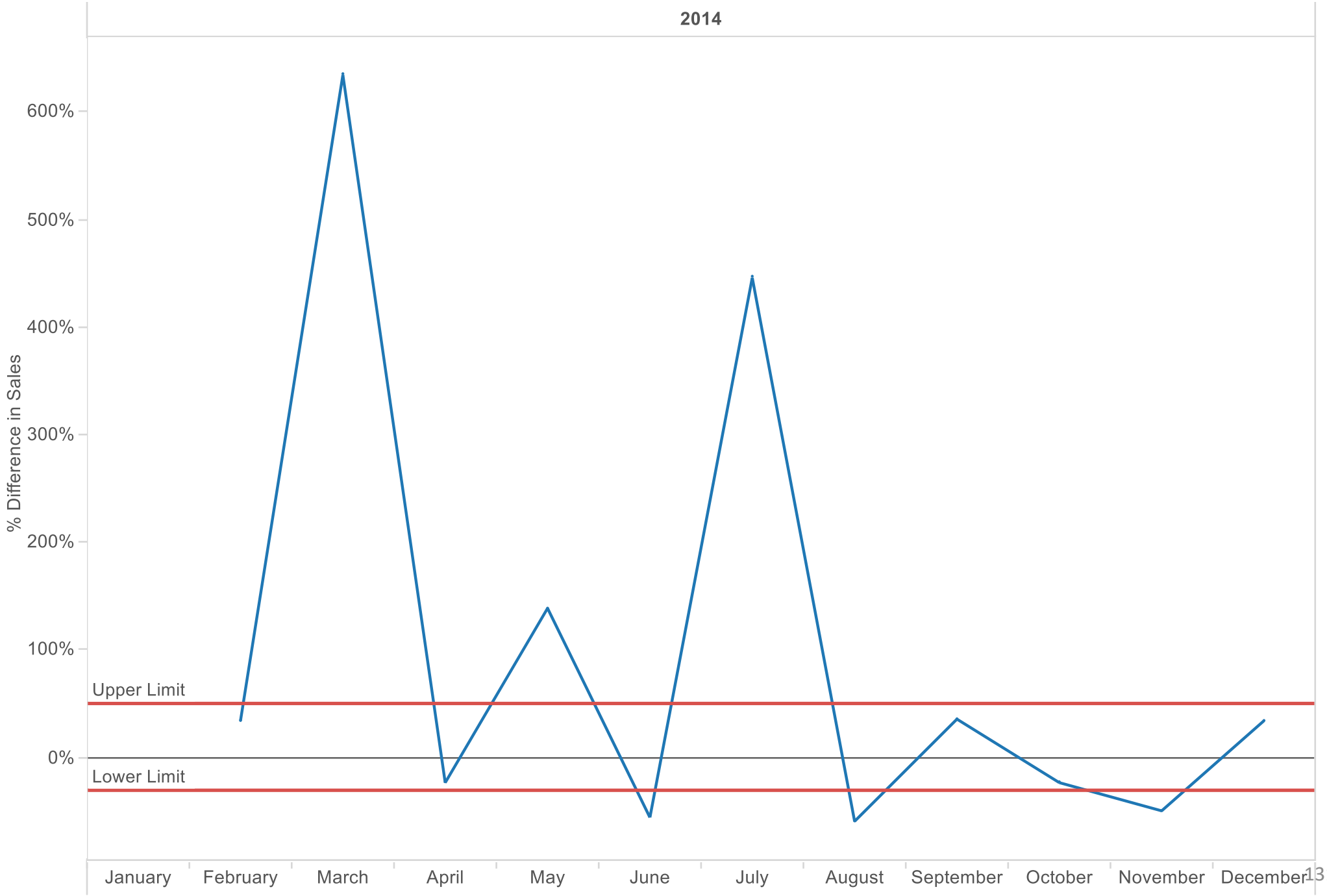

120%
Plan
100%
80%
Actual to Plan
60%
40%
20%
0%
Finance
HR
IT Services
Operations
Supply Chain


Finance
HR
IT Services
Operations
Supply Chain


2014
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
Sales
December Sales
January
February
March
April
May
June
July
August
September
October
November
December

Deviations


Expense Variance from Budget
$15,000
$10,000
$5,000
$0
-$5,000
-$10,000
Domestic
International
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
25%
20%
15%
10%
5%
0%
-5%
-10%
-15%
-20%
International
Domestic
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


2014
600%
500%
400%
300%
200%
100%
0%
% Difference in Sales
Upper Limit
Lower Limit
January
February
March
April
May
June
July
August
September
October
November
December

Deviation

- Plan to Actual
- Ranges
- Rate of Change
- Comparison
- Normalizing
- Variance
- Reference Lines