Recommended Styles and Tips for Charts and Graphs
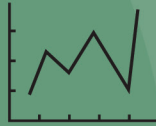
Department of the Treasury
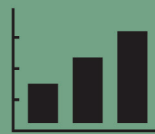Office of Intelligence and Analysis

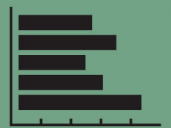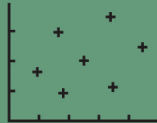Pie   Donut   Line   Bar   Horizontal Bar
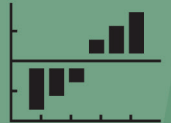
Stacked Bar   Scatter Plot   Area   Dual Axis   Waterfall

Table of Contents

Purpose

This style guide will ensure the following criteria:

- All text is legible by outlining font size, colors, and hierarchy;
- White-space is used effectively to reduce unnecessary clutter;
- Optimized layouts are used for varying data;
- Color is used logically, consistently, and strategically;
- The most effective chart or graph is used to convey the data set;
- Labels are introduced only when necessary, and only when practical;
- The analyst is informed of best practices;
- OIA branding is followed and consistent.

Creating Effective Charts/Graphs

To create effective charts, research, edit, plot, and review the chart or graph.

Research

- Research the most current data. If the data changes in the span of time the chart or graph is being developed, add the new data.

Edit

- Identify the key message.
- Choose the best data series to illustrate the point.
- Filter and simplify the data to deliver the most impact to the customer.

Plot

- Choose the right chart type to present the data.
- Label the chart or graph (e.g., title, legend, X/Y axis).
- Use OIA guidelines for color and typography .

Review

- Check the plotted data against your sources.
- Use judgment to evaluate whether the chart makes sense.
- Try to look at the chart from the customer's perspective
- Coordinate chart or graph if necessary.

Typography

The typography for charts and graphs should be Calibri Light, except where indicated.

Title

- Calibri Regular (xx pt.)

Y/X-Axis

- Calibri Light (xx pt.)

Legend Title

- Calibri Light (xx pt.)

Legend Text

- Calibri Light (xx pt.)

Chart/graph Text

- Calibri Light (xx pt.)

Color

Pie/donut chart, bar charts, stacked bar charts

- Use one color or shades of one color (see approved colors below).
- To highlight a particular segment of a pie/donut chart or a bar/stacked bar chart, use a lighter shade of the selected color (e.g., if green is selected for the pie/donut chart, use a lighter shade of the same green to highlight a particular segment).

Line, stacked bar, area, dual axis, water fall, and scatter charts

- Use contrasting colors (see approved colors below).
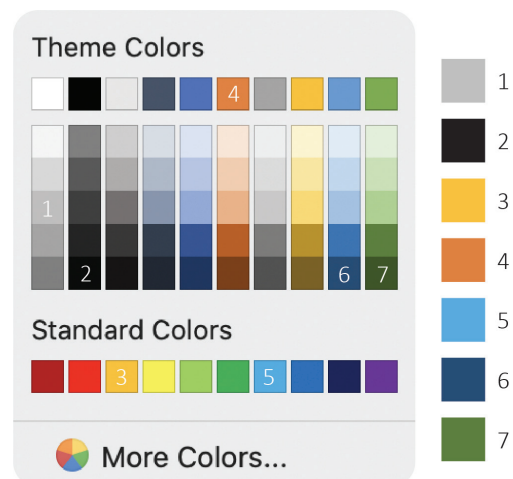
Contact Information

Vis Analytic Support Emal: visanalyticsupport@xxxxxxxx.xx.gov.

- **Tony Felt** (print based products)
  Phone
  Unclass: 202-622-xxxx
  Classified: XXX-XXXX
  Email
  Classified: visxxxxxx.xx.gov

- **Ann Bowen** (print based products)
  Phone
  Unclass: 202-622-xxxx
  Classified: visxxxxxxx.xxgov
  Email
  Classified: visxxxxxx.xx.gov

- **Jarrett Fussell** (interactive products)
  Phone
  Unclass: 202-622-xxxx
  Classified: XXX-XXXX
  Email
  Classified: visxxxxxx.xx.gov

Action Steps

1. Determine which chart/graph best represents the data.

2. Review the recommended style, following font type, size, and colors, page 3.

3. Follow "Creating Effecting Charts/Graphs," page 3.

4. Send final draft of the chart/graph with the underlying data to the analyst assigned. CC the vis analytic support mailbox.

5. Follow the progress of your project through the vis analytic tracking site on KME.

6. Questions regarding the style guide can be directed to the vis analytic support mailbox.

Prerequisite Actions

Before beginning this Style Guide, analysts will need:

- Microsoft Excel or

- Tableau

Pie/Donut Charts: Recommended Style and Tips

Use a Pie/Donut Chart:

- To show the relative relationship between no more than five variables;
- When you have data points that are significantly different. Pie/donut charts with near equal values do not convey and are difficult to discern visually;
- When comparing the percentage of a whole;
- To display a single point in time.

Recommended Style

1. **Segments**: Segment pie/donut slices from largest to smallest clockwise. The largest segment should start at the top, 12 o'clock.

2. **Color**: The pie/donut chart should be one color. Labeling near or on the slice will negate the need for color coding. Highlight the important slice mono chromatically using a different shade of the same color. See approved colors, page 3.

3. **Number of Slices**: Limit the number of slices to no more than five. If you have more than five, consider a horizontal bar chart.

4. **Labeling**: Label directly on the pie/donut slice or next to the slice. If a legend is needed, place it on the middle right of the pie/donut chart. Font type: xx. Font size: xx.

5. **Values**: When possible, remove excessive zeros from values.

6. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.

7. **Classification and Sourcing**: Below the pie/donut chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Do not compare pie/donut charts side by side. Comparisons of area are difficult to interpret. Use stacked bar charts instead.
- Do not make a pie/donut chart 3D. 3D effects visually skews the data.
- Do not use a pie/donut chart when values are similar. Similar values are difficult to compare. Use a bar chart instead.
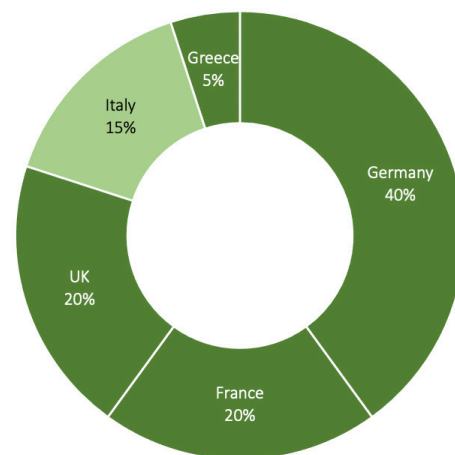
(PORTION MARK CLASSIFICATION) Figure #: Title
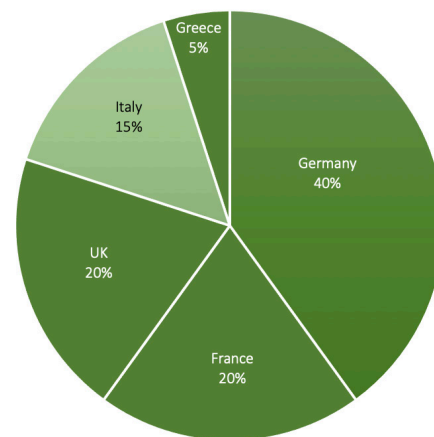
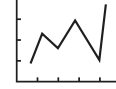*CLASSIFICATION*
Source: Source Stream/s

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

Line Chart: Recommended Style and Tips

Use a Line Chart:

- To show changes over time, trends, relationships, and predictions;
- To show the trend in one variable;
- To show multiple variables with multiples lines;
- To show the same variable for multiple observations with multiple lines.

Recommended Style

1. **Lines**: Do not add symbols or data points to line segments, such as circles, squares, triangles or numbers.

2. **Line Weight**: Do not make lines too thick. 1 - 1.5 pt is sufficient.

3. **Baseline**: The baseline of your line chart should start at zero.

4. **Color**: Use contrasting colors to identify lines. Contrasting colors help the reader to identify and visually separate data sets. See approved colors, page 3.

5. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. Font type: xx. Font szie: xx.

6. **Values**: When possible, remove excessive zeros from values.

7. **Legend**: The legend should be placed middle, right of the line chart (see chart below). Font type: xx. Font size: xx.

8. **Grid Lines**: Grid lines should be used sparingly. When appropriate, use either horizontal or vertical grid lines, never both.

9. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.

10. **Classification and Sourcing**: Below the line chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Use natural increments when creating line charts (e.g., 2, 4, 6, 8, 10) vs. (3, 6, 9, 12, 16, 20).
- Plot four or fewer lines. Charting too many lines is visually confusing. If there are more than four lines, consider using a panel of line charts.
- Use comparable scales when contrasting two or more sets of data.
- Do not use different line weights to distinguish data sets. The reader may interpret different line weight as ranking.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s
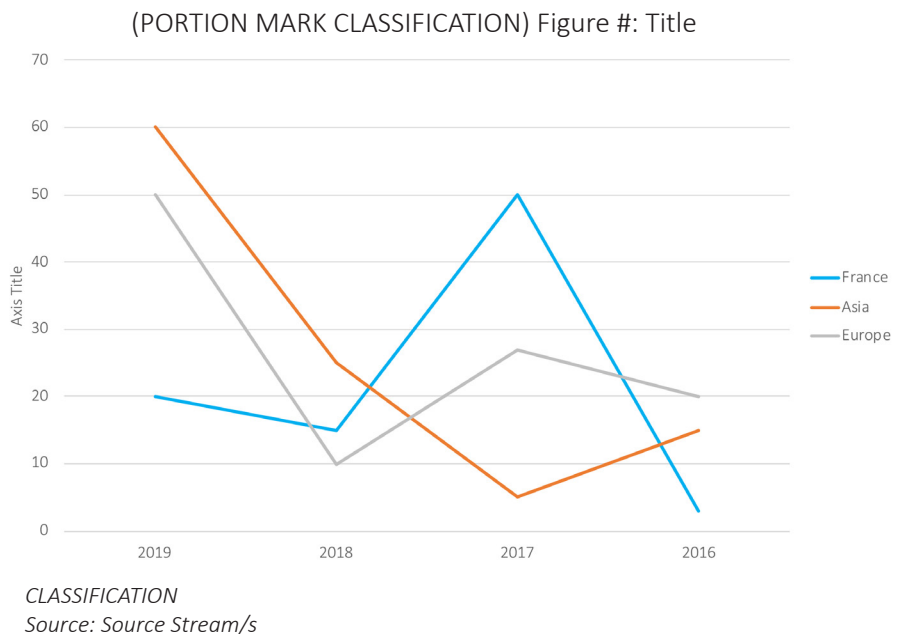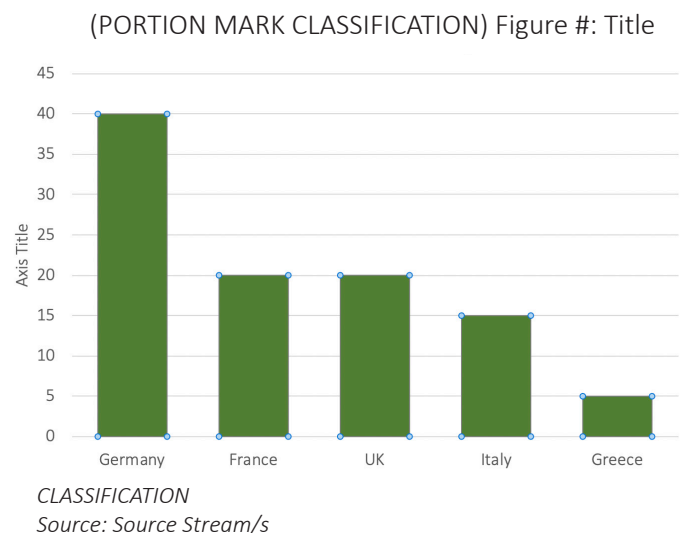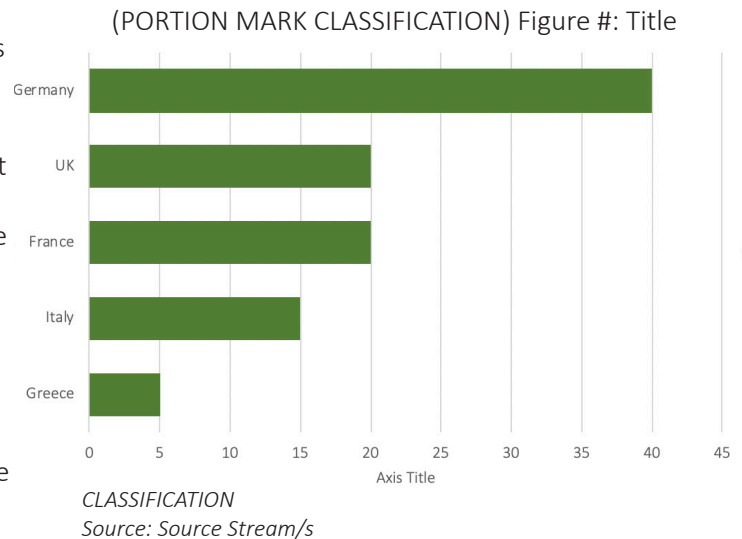
Bar Charts: Recommended Style and Tips

Use a Bar Chart:

- When showing change over time, comparing values of different categories, or comparing parts of a whole;
- To show the trend in one variable, usually across a number of categories;
- To show multiple variables with multiple bars;
- To show the same variable for multiple observations with multiple bars.
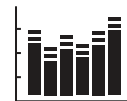
Recommended Style

1. **Bars**: The gap width between bars should be as minimal as possible to avoid narrow or thin bars.

2. **Color**: All bars in a single chart should be the same color and shade since they measure the same variable. Highlight the important bar/s mono chromatically, using a different shade of the same color. When bars of a different color are needed, use contrasting color. (See approved colors, page 3).

3. **Base line**: The base line of a bar chart should always start at zero. In a horizontal bar chart, negative values should appear to the left of the zero base line.

4. **Data**: When the data is not time based, arrange data in the descending or ascending order.

5. **Values**: When possible, remove excessive zeros from values.

6. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top. The X axis should not be labeled at an angle. Font type: xx. Font size: xx.

7. **Grid Lines**: Grid lines should be used sparingly. When appropriate use either horizontal or vertical lines, never both.

8. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.

9. **Classification and Sourcing**: Below the line chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Use consistent, defined color/s.
- Do not make a bar chart 3D. 3D effects visually skews the data.
- Do not use narrow bars, they cause the eye to focus on the negative space.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

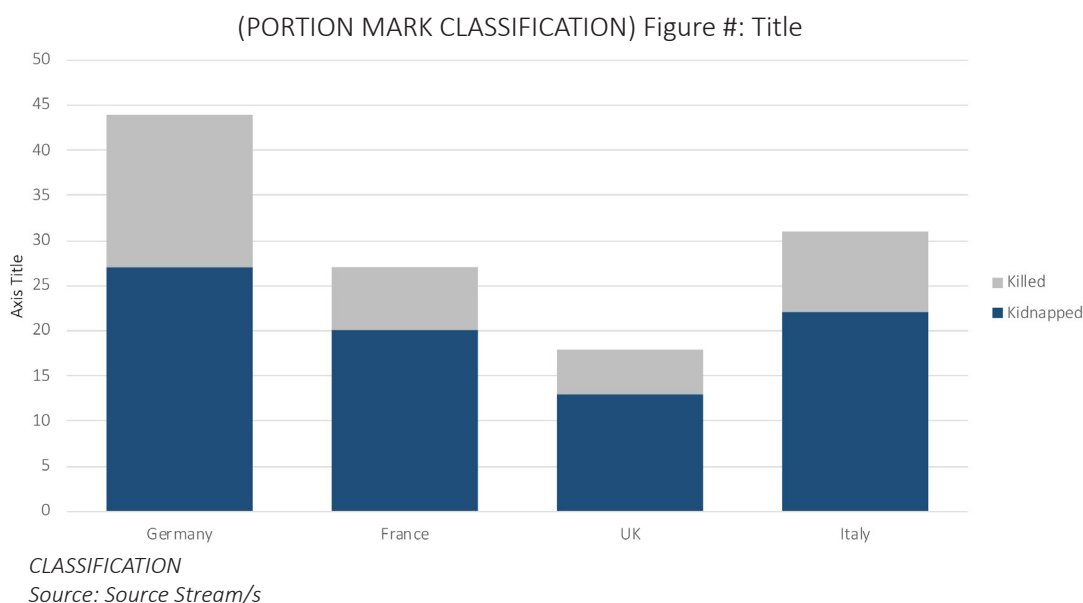# Stacked Bar Chart: Recommended Style and Tips

Use stacked Bar Charts:

- To show the composition of groups, but the data is not in a continues time series;
- To display the part-to-whole relationship of categories, as well as totals.

Recommended Style

1. **Bars**: The gap width between bars should be as minimal as possible to avoid narrow or thin bars.
2. **Color**: Use contrasting colors to identify variables within a stacked bar. Each variable should have a distinct, contrasting color. See approved colors, page 3.
3. **Base line**: The base line of a bar chart should always start at zero. Negative values should appear below the zero base line.
4. **Data**: When the data is not time based, arrange data in the descending or ascending order. Categorical values should be stacked according to which variable is primary vs. secondary. The primary and secondary should appear in the same order for each stacked bar.
5. **Values**: When possible, remove excessive zeros from values.
6. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. When category labels are too long, consider using a horizontal stacked bar chart. Font type: xx. Font size: xx.
7. **Grid Lines**: Grid lines should be used sparingly. When appropriate use either horizontal or vertical lines, never both.
8. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.
9. **Classification and Sourcing**: Below the line chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Use contrasting colors to help the reader identify and visually separate data sets.
- Make sure dates have the same intervals.
- Stack bars consistently to make it easier to read.
- Do not use narrow bars, they cause the eye to focus on the negative space.
- Bring the most important values to the bottom of the chart. Use color to make it stand out.
- Do not make a bar chart 3D. 3D effects visually skews the data.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

# Scatter Plot Chart: Recommended Style and Tips

Use a Scatter Plot Chart:

- When you have paired numerical data;
- When the dependent variable may have multiple values for each value of the independent variable;
- When trying to determine whether the two variables are related, (i.e., when trying to identify potential root causes of a problem);
- When determining whether two effects that appear to be related both occur with the same cause.

Recommended Style

1. **Color**: Use contrasting colors to identify variables within a scatter plot. Each variable should have a distinct, contrasting color. Contrasting colors help the reader to identify and visually separate data sets. See approved colors, page 3.
2. **Base line**: The base line of a scatter pot chart should always start at zero.
3. **Trend Lines**: Use trend lines; these help draw correlation between the variables to show trends (see chart below).
4. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. Font type: xx. Font size: xx.
5. **Values**: When possible, remove excessive zeros from values.
6. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.
7. **Classification and Sourcing**: Below the line chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Consider excluding outliers if they are not important to interpreting the data.
- Don't compare more than two trend-lines in a graph. Too many trend lines makes the data difficult to read and interpret.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s
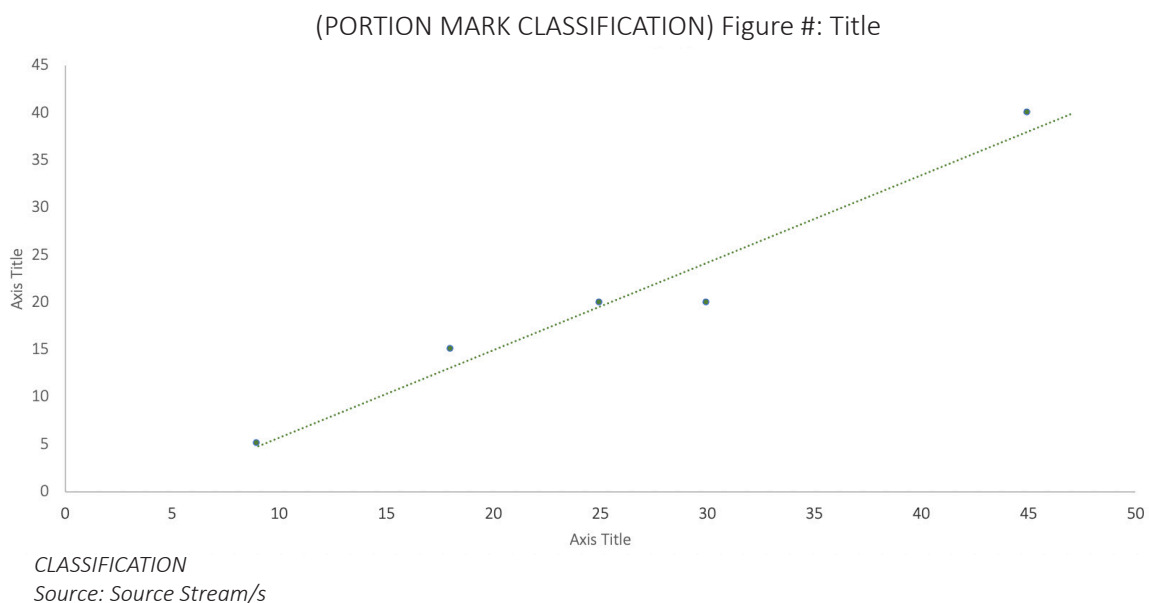
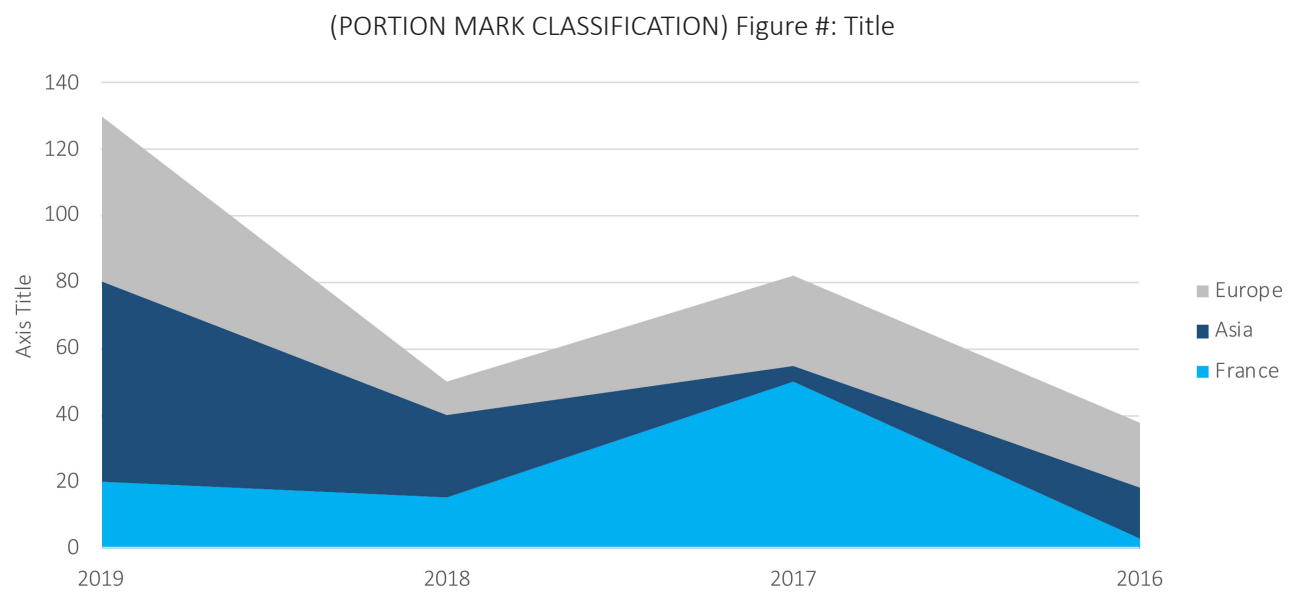# Area Graph: Recommended Style and Tips ▲▲▲

Use an Area Graph:

- To show how values develop over time;
- If there is a considerably large differences between values;
- When the magnitude of the trend is to be communicated (rather than individual data values). To showcase this magnitude, the area between the line segments and the axes is highlighted by filling it with color.

Recommended Style

1. **Color**: Use contrasting colors to identify variables within an area chart. Each variable should have a distinct, contrasting color. See approved colors, page 3.
2. **Base line**: The base line of an area chart should always start at zero.
3. **Data**: Bring the most important value to the bottom of the chart and use color to make it stand out.
4. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. Font type: xx. Font size: xx.
5. **Grid Lines**: Grid lines should be used sparingly. When appropriate use either horizontal or vertical lines, never both.
6. **Values**: When possible, remove excessive zeros from values.
7. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.
8. **Classification and Sourcing**: Below the area chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s.

Tips

- Don't use an area graph if the data is close in value.
- Use contrasting colors to help the reader identify and visually separate data sets.

(PORTION MARK CLASSIFICATION) Figure #: Title

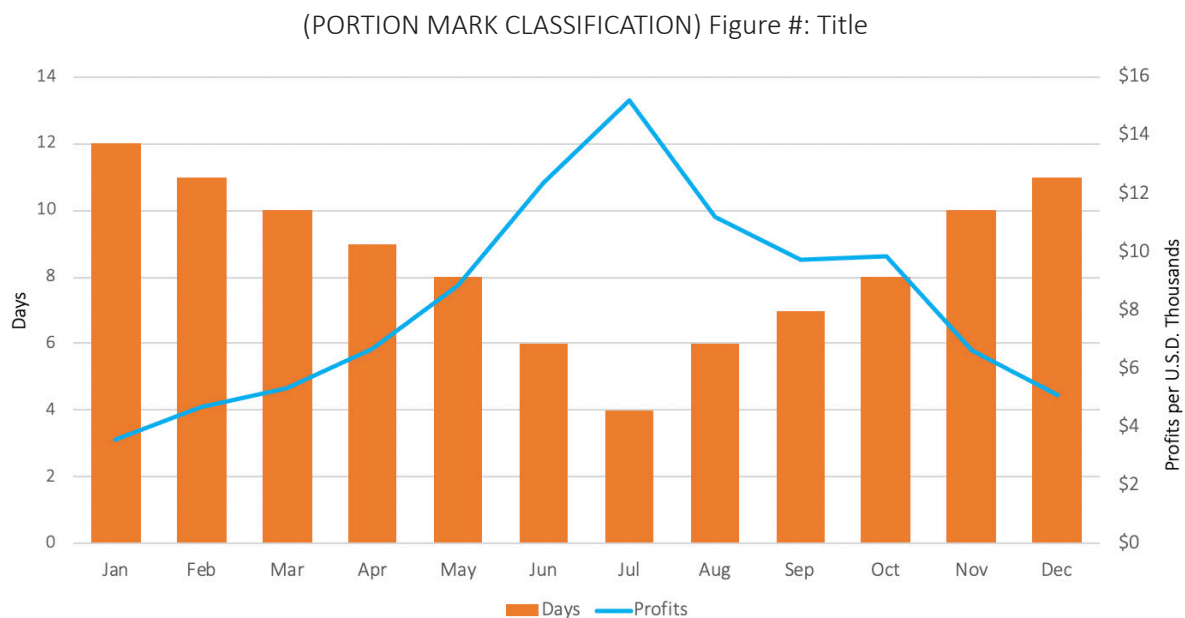CLASSIFICATION
Source: Source Stream/s

Dual Axis Chart: Recommended Style and Tips

Use a Dual Axis Chart:

- To show correlation (or lack of correlation) between two data series;
- Use a bar chart when showing change over time, comparing values of different categories, or comparing parts of a whole;
- Use a line chart for changes over time to show trends, relationships, change, and predictions.

Recommended Style

1. **Bars**: The gap width between bars should be as minimal as possible to avoid narrow or thin bars (see chart below).
2. **Lines**: Do not add symbols or data points to line segments, such as circles, squares, triangles.
3. **Line Weight**: Do not make lines too thick. 1 - 1.5 pt is sufficient.
4. **Color**: All bars in a single chart should be the same color and shade since they measure the same variable. Highlight the important bar/s mono chromatically using a different shade of the same color. When bars of a different color are needed, use contrasting color. See approved colors, page 3.
5. **Base line**: The base line of a dual axis chart should always start at zero.
6. **Bar Data**: When the data is not time based, arrange data in the descending or ascending order.
7. **Values**: When possible, remove excessive zeros from values.
8. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. Font type: xx. Font size: xx.
9. **Values**: When possible, remove excessive zeros from values.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

10. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font type: xx. Font size: xx.

11. **Classification and Sourcing**: Below the dual axis chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Make sure the y-axes are related.
- Place primary y-axis on the left of the axis chart. We read left to right. The most important variable should be on the y axis.
- When using a bar chart, use consistent, defined color/s
- Use natural increments when creating line charts (e.g., 2, 4, 6, 8, 10) vs. (3, 6, 9, 12, 16, 20).
- Plot no more than two lines. Charting too many lines is visually confusing. If there are more than four lines, consider using a panel of line charts and a separate bar chart.
- Use comparable scales when contrasting two or more sets of data.
- Do not use different line weights to distinguish data sets. The reader may interpret different line weight as ranking.
- Do not make a bar chart 3D. 3D effects visually skews the data.
- Do not use narrow bars, they cause the eye to focus on the negative space.

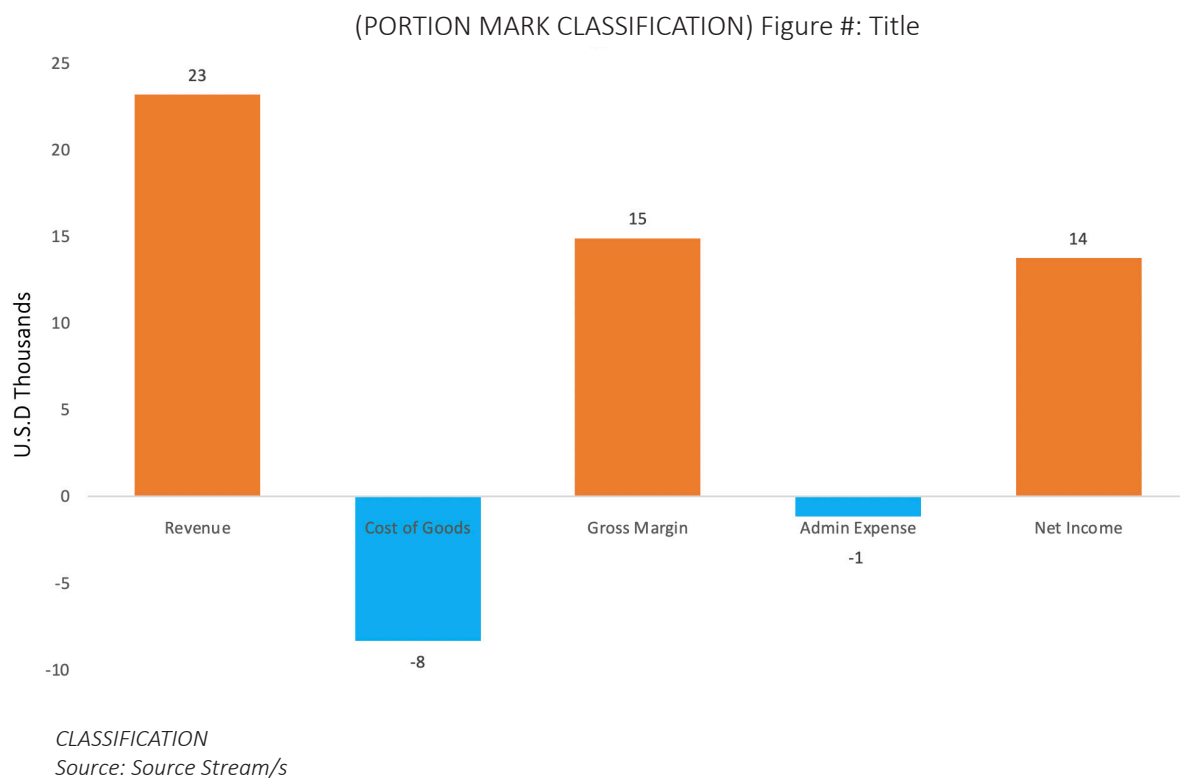# Waterfall Chart: Recommended Style and Tips

Use a Waterfall Chart:

- To show how an initial value is increased and decreased by a series of intermediate values, leading to a final value;
- To effectively show gradual changes in the quantitative value of something over time.

Recommended Style

1. **Bars**: The gap width between bars should be as minimal as possible to avoid narrow or thin bars (see charts below).
2. **Color**: All bars in a single chart should be the same color and shade since they measure the same variable. Highlight the important bar/s mono chromatically using a different shade of the same color. When bars of a different color are needed, use contrasting color. See approved colors, page 3.
3. **Base line**: The base line of a waterfall chart should always start at zero. Negative values should appear below the zero base line.
4. **Data**: When the data is not time based, arrange data in the descending or ascending order.
5. **Values**: When possible, remove excessive zeros from values.
6. **Labeling**: When appropriate, the X and Y axis should be clearly labeled. The Y axis label should be turned 90 degrees, reading from bottom to top (see chart below). The X axis should not be labeled at an angle. Font type: xx. Font size: xx.
7. **Grid Lines**: Grid lines should be used sparingly. When appropriate use horizontal or vertical lines, never both.
8. **Values**: When possible, remove excessive zeros from values.
9. **Title**: Begin your title with the portion mark classification, followed by Figure #: Title. Font style: xx. Font size: xx.
10. **Classification and Sourcing**: Below the area chart, bottom left, list the overall classification of the chart and directly below the classification, list the source and source stream/s. Font type: xx. Font size: xx.

Tips

- Do not make a bar chart 3D. 3D effects visually skews the data.
- Do not use narrow bars, they cause the eye to focus on the negative space.

(PORTION MARK CLASSIFICATION) Figure #: Title

CLASSIFICATION
Source: Source Stream/s

Sources

1. Urban Institute Data Visualization style guide. (n.d.). Retrieved May 7, 2020, from https://urbaninstitute.github.io/graphics-styleguide/

2. Wong, D. M. (2013). The Wall Street journal guide to information graphics: the dos and donts of presenting data, facts, and figures. New York: W.W. Norton and Co.

3. Cairo, Alberto (2020). How Charts Lie: getting smarter about visual information. NYC, NY: W W NORTON.

4. Kopf, D. (2018, April 26). The pie chart: Why data visualization's greatest villain will never die. Retrieved April 14, 2020, from https://qz.com/1259746/when-should-you-use-a-pie-chart-according-to-experts-almost-never/

5. Evergreen, S. D. H. (2020). Effective data visualization: the right chart for the right data. Los Angeles, CA: SAGE.

6. Smith, J. M. (2014). Meaningful graphs: converting data into informative Excel® charts. Place of publication not identified: publisher not identified.

7. Datawrapper. (2019, December 18). What to consider when creating pie charts. Retrieved April 14, 2020, from https://academy.datawrapper.de/article/127-what-to-consider-when-creating-a-pie-chart

8. Chart Do's and Don'ts: The Ultimate Data Visualization Guide. (2018, July 13). Retrieved April 14, 2020, from https://infogram.com/blog/dataviz-chart-guide-101-dos-and-donts/

9. Acampora, J. (2018, November 13). When to Use Pie Charts – Best Practices. Retrieved April 15, 2020, from https://www.excelcampus.com/charts/pie-charts-best-practices/

10. Romanenchuk, K. (2018, September 21). Line chart design made simple. Retrieved April 13, 2020, from https://uxdesign.cc/line-chart-design-made-simple-a1b823510674

11. Krystian, M. (2018, September 13). Do This, Not That: Line Charts. Retrieved April 13, 2020, from https://infogram.com/blog/do-this-not-that-line-charts/

12. The Line Chart - How And When To Use It. (2018, October 26). Retrieved April 13, 2020, from https://infogram.com/blog/the-line-chart-how-and-when-to-use-it/

13. Knaflic, N. (2012, October 14). Horizontal Bar Charts and my Penchant for Them. Retrieved April 15, 2020, from http://www.storytellingwithdata.com/blog/2012/10/my-penchant-for-horizontal-bar-graphs

14. Bar Charts: A guide for Beginners. (n.d.). Retrieved April 15, 2020, from https://www.fusioncharts.com/bar-charts

15. Star, B. (2016, October 4). Data Visualization 101: Bar Charts. Retrieved April 15, 2020, from https://visage.co/data-visualization-101-bar-charts/

16. Yi, M. (2020, September 24). A Complete Guide to Stacked Bar Charts. Retrieved April 15, 2020, from https://chartio.com/learn/charts/stacked-bar-chart-complete-guide/

17. Pica, L. (2019, March 27). How to Create A Brain-Friendly Stacked Bar Chart in Excel. Retrieved April 15, 2020, from https://leapica.com/blog-stacked-bar-chart/

18. GmbH, D. (2019, July 24). What to consider when creating stacked column charts. Retrieved April 15, 2020, from https://blog.datawrapper.de/stacked-column-charts/

19. Oetting, J. (n.d.). Data Visualization 101: How to Choose the Right Chart or Graph for Your Data. Retrieved April 16, 2020, from https://blog.hubspot.com/marketing/types-of-graphs-for-data-visualization

20. Create a Scatter Chart. (n.d.). Retrieved April 16, 2020, from https://infogram.com/create/scatter-plot-chart

21. Area Charts. (n.d.). Retrieved April 16, 2020, from https://www.fusioncharts.com/resources/chart-primers/area-chart

22. Romanenchuk, K. (2018, September 21). Line chart design made simple. Retrieved April 13, 2020, from https://uxdesign.cc/line-chart-design-made-simple-a1b823510674

23. Waterfall Chart. (n.d.). Retrieved April 16, 2020, from https://www.fusioncharts.com/resources/chart-primers/waterfall-chart