

University of North Carolina, Wilmington

Data Visualization: Final project

A Comprehensive Analysis of the Cost of Living
in the Unites States (2020)

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1.About Data

Dataset: Cost of Living in the United States (2020)

The dataset used in this final project presents a comprehensive exploration of the Cost of Living in the United States for the year 2020. Each row corresponds to a unique case identified by `case_id`, providing valuable insights into various factors influencing household expenses.

Key Columns:

1. `case_id`: A unique identifier for each data entry, facilitating individual case analysis.
2. `state`:The geographical location of the case within the United States.
3. `isMetro`: A binary indicator denoting whether the area specified in `areaname` is categorized as a metropolitan area. (Not the focus)
4. `areaname`: The specific name or designation of the area under consideration.
5. `county`: The county associated with the area, providing additional granularity. (Not the focus)
6. `family_member_count`: The count of family members considered in each case, influencing overall household dynamics. (Not the Focus)
7. Cost Categories:
 - `housing_cost`: Expenses related to housing.
 - `food_cost`: Costs associated with food consumption.
 - `transportation_cost`: Expenditure on transportation.
 - `healthcare_cost`:Healthcare-related expenses.
 - `other_necessities_cost`: Costs for other essential necessities.
 - `childcare_cost`: Expenditure related to childcare.
 - `taxes`: Tax-related expenses.
8. `total_cost`: The aggregate sum of all cost categories, representing the overall cost of living for each case.
9. `median_family_income`: The median income of the family associated with the case, representing the annual average household income. It provides context for the financial landscape.

2.Data Preprocessing

The reason: The conversion of the original wide-format data into a long-format structure was critical to providing a unified and consistent representation of different cost categories in our dataset. Initially, each expense category was assigned its own column, such as `housing_cost` and `food_cost`. These various columns were merged into a single column named `'cost_category'` as a result of the data melting process. This restructure not only enabled a unified perspective of various cost aspects, but also ensured a consistent approach to dealing with them. My dataset is streamlined and ready for smooth analysis and visualization with all cost categories aggregated into the `'cost_category'` column. This consistency in cost category treatment improves the clarity and efficiency of my following data exploration and analysis.

2.1. Code

`import pandas as pd`: For simplicity, it imports the pandas library and aliases it as `pd`.

`df = pd.read_csv('cost_of_living_us.csv')`: `df` is a pandas DataFrame that reads the original CSV file ('cost_of_living_us.csv').

`df1=pd.melt(df,id_vars=['case_id','state','isMetro','areaname','county','family_member_count','total_cost','median_family_income'])`: Transforms a DataFrame (`df`) from a wide to a long format. It leaves the specified columns (`id_vars`) alone and divides the remainder into two columns: `'variable'` and `'value'`.

`df1.rename(columns={'variable':'Cost Type','value':'Cost Value'})` : Renames the `'variable'` and `'value'` columns to `'Cost Type'` and `'Cost Value,'` respectively. The argument `inplace=True` alters the DataFrame in place.

`df1.to_csv('cost_of_living_us(Reshaped).csv', index=False)`: The reshaped DataFrame (`df1`) is saved to a new CSV file called `'cost_of_living_us(Reshaped).csv'`. The `index=False` argument prevents row indices from being written to the CSV file.

3.Analysis and Design Evaluation of Data Visualizations

3.1 Total Annual Household Expenditure

Total Annual HouseHold Expenditure in the U.S. (2020)

Total annual household expenditure is 2.23B in the United States



Sum of Total Household Expenditure. The marks are labeled by sum of Total Household Expenditure.

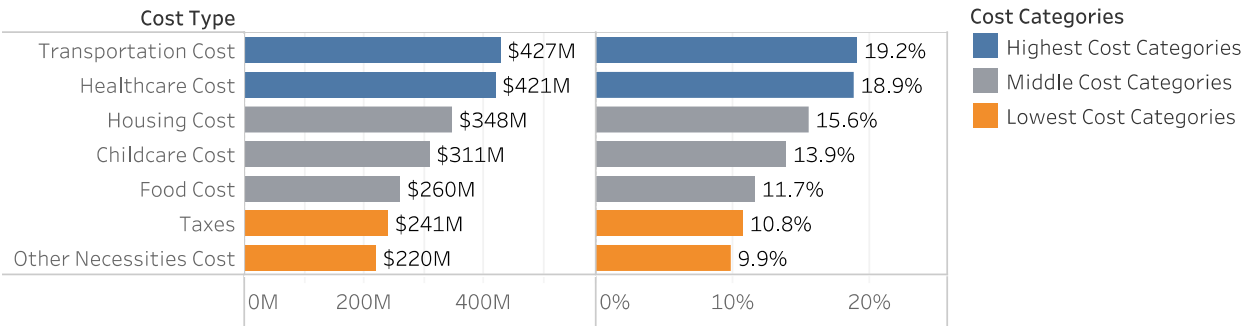
Design Critique: The visual representation I created for the total annual household expenditure in the US features a single, eye-catching horizontal bar chart, designed for a clear and straightforward communication of the key metric. The deliberate use of a singular, prominently colored bar not only enhances the simplicity of the message but also adds a visually striking element to capture attention. Additionally, the axis labels incorporating dollar signs and the "B" indicator for billion contribute to a visually appealing and straightforward interpretation of the scale.

Analysis: The bar chart graphically depicts total annual expenses across the United States, expressing an enormous financial magnitude of \$2.23 billion in a clear way.

3.2 Understanding Distribution of U.S. Household Spendings for various Cost Types

Understanding Distribution of U.S. Household Spendings for Various Cost Types (2020)

Transportation costs stand at \$427 million, comprising a substantial 19.2% of the total expenditure. This major cost category reflects expenses associated with commuting, logistics, and travel. Healthcare expenses contribute significantly, totaling \$421 million and representing 18.9% of the overall budget. This crucial category encompasses spending on medical services, insurance, and wellness. Other necessities make up the smallest share, with a total of \$220 million, constituting 9.9% of the entire expenditure. Despite being the lowest percentage-wise, this category covers a broad range of essential costs required for daily living.



Sum of Cost Value and % of Total Cost Value for each Cost Type. Color shows details about Cost Type (group). For pane Sum of Cost Value: The marks are labeled by sum of Cost Value. For pane % of Total Cost Value: The marks are labeled by % of Total Cost Value.

Design Critique: The dual-bar chart I created depicts the breakdown of expense categories in the United States. Each cost category is color-coded, with blue representing the greatest costs, grey representing the medium costs, and orange representing the lowest costs. The adjacent bars for each category provide a more detailed perspective, displaying both cost totals and the % contribution of each category to total expenses. The use of colors assures that the various cost groups are simply understood. The distinct color differentiations guide viewers through the expense hierarchy as they interact with the chart. The addition of data labels on each bar

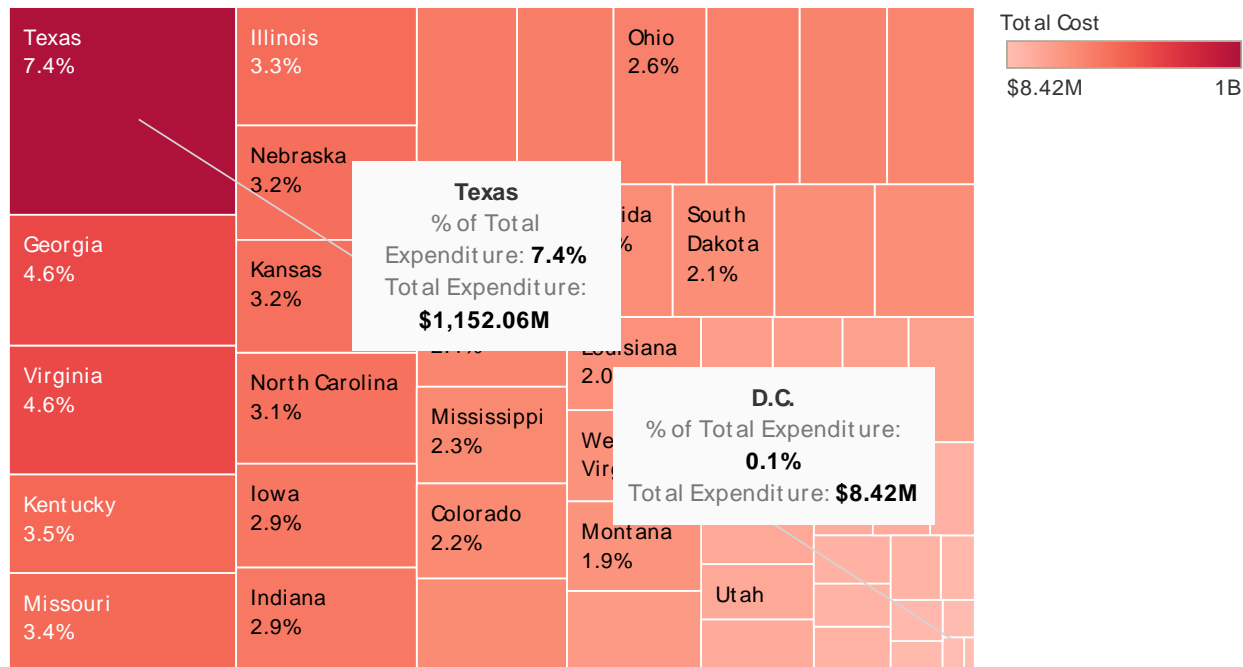
improves information accessibility by providing viewers with specific values for both total cost and the % contribution of each category to total expenses.

Analysis: The cost distribution analysis gives important insights into the expenditures in the United States. Transportation is the largest category, accounting for \$427 million, or 19.2% of total expenses. This substantial allocation emphasizes the significance of commuting and travel-related expenditures in the national budget. Healthcare comes in second, with \$421 million in costs, accounting for 18.9% of total spending. This significant percentage demonstrates the financial landscape's emphasis of health-related spending, such as medical services, insurance, and overall wellbeing. Housing costs, reaching \$348 million and accounting for 15.6% of the total, highlight the significant financial commitment associated with securing housing. Childcare expenditures, which totaled \$311 million (13.9%), highlight the financial implications of assisting families with young children. Individuals make a considerable contribution to public finances, with taxes totaling \$241 million and accounting for 10.8% of the total expenses. Finally, additional essentials, with a total of \$220 million and a 9.9% share, cover a wide range of necessary living costs.

3.3 Statewise Household Expenditure Analysis Over the U.S.

Statewise Household Expenditure Analysis Over the U.S.
(2020)

Texas emerges as the state with the highest expenditure share with 7.4% of the total household spending expenditure in the U.S.
D.C. emerges as the state with the lowest expenditure share with 0.01% of the total household spending expenditure in the U.S.



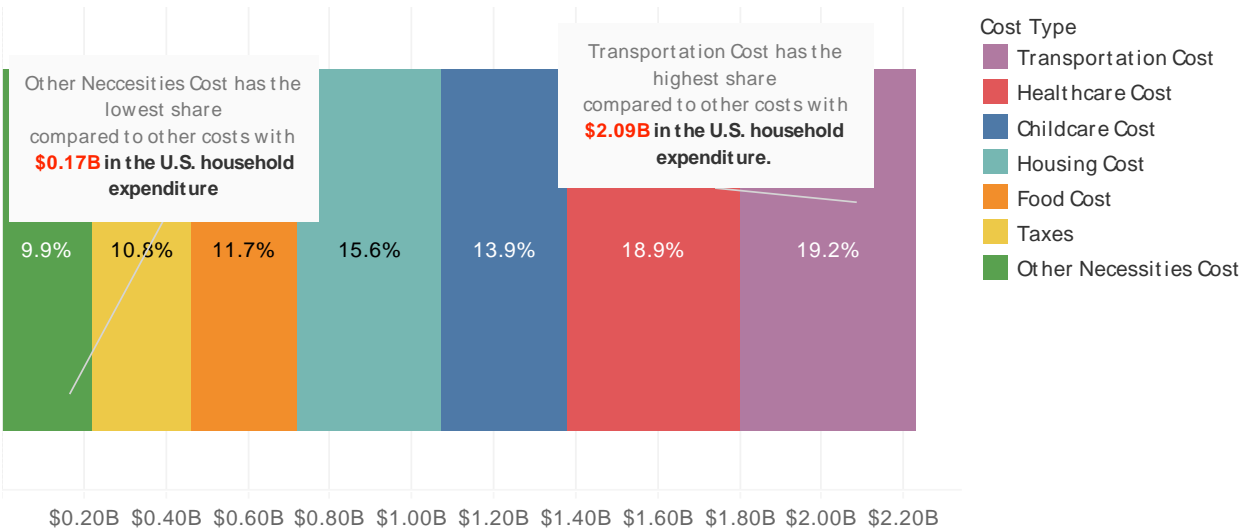
State and % of Total Total Cost . Color shows sum of Total Cost . Size shows sum of Total Cost .
The marks are labeled by State and % of Total Total Cost .

Design Critique: The tree map visualization communicates the distribution of total expenditure percentages across U.S. states, offering a hierarchical and visually engaging representation. The strategic use of a red color palette, with darker shades indicating higher percentages, enhances the visual impact and facilitates the quick identification of regional disparities. Size encoding further reinforces the hierarchy, with larger tiles representing states with more substantial contributions. The inclusion of percentage values as sizes provides precise numerical information, adding clarity to the visual representation. Notable insights, such as taxes having the highest expenditure and D.C. the lowest, are easily discerned. State labels ensure clear identification, contributing to the overall effectiveness of the tree map in conveying insights into regional spending patterns. Furthermore, the inclusion of annotations for Texas and D.C. enhances the tree map visualization by providing specific details for these key data points.

Analysis: In the realm of total household spending expenditure in the U.S., Texas takes the lead with a substantial 7.4% share, signifying a significant economic footprint within the nation. This high percentage suggests that Texas shoulders a considerable portion of the overall expenditure burden, likely influenced by factors such as population size, and economic activity. On the other hand, the District of Columbia (D.C.) registers as the state with the lowest expenditure share, contributing a minimal 0.01% to the national total. While D.C.'s small percentage may be indicative of its relatively smaller

3.4 Expenditure Categories

Summary of Expenditure Categories:A Brief Overview



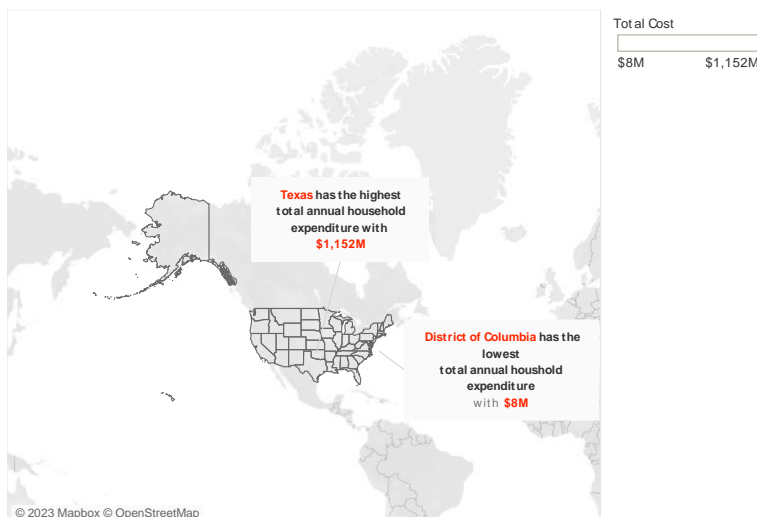
Sum of Cost Value. Color shows details about Cost Type. The marks are labeled by % of Total Cost Value.

Design Critique: The bar chart I designed communicates the distribution of expenditure categories by using separate colors to distinguish each group and allowing for easy visual recognition. The inclusion of percentage labels on each category clarifies its contribution to the total expenditure. Notably, transportation costs are the largest, and they are annotated with their original dollar number, which is critical for communicating the true financial impact.

Analysis: Following closely after, healthcare costs account for a sizable amount (18.9%), demonstrating the priority of health and medical expenses. Childcare and housing expenditures are next at 13.9% and 15.6%, demonstrating the significant financial resources dedicated to family-related and housing demands. Food prices account for 11.7% of total expenditure. Taxes, at 10.8%, are the percentage of total annual cost that is committed to various tax responsibilities. Finally, other requirements prices, which account for 9.9% of total spending, demonstrate the wide range of necessities required for day-to-day existence.

3.5 U.S. Total Annual Expenses Map

US Total Annual Household Expenditure Map



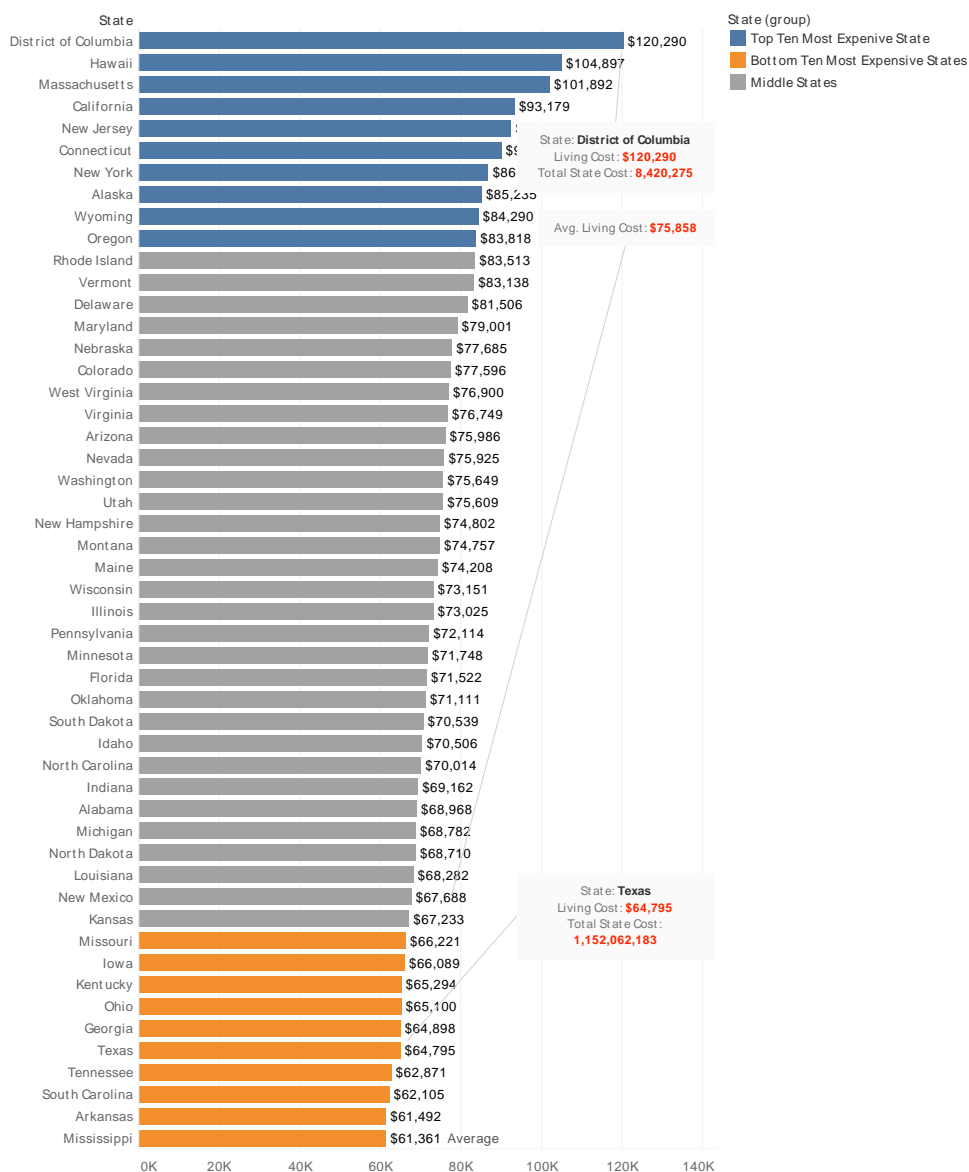
Design Critique: In analyzing the U.S. total annual household expenditure map I created, the strategic use of a color palette stands out as a key strength. The darker shades employed for states with higher expenditures and lighter shades for those with lower expenditures allow for a quick and intuitive understanding of the nationwide spending variation. This visual hierarchy not only enhances the overall impact of the map but also aids viewers in interpreting the geographic distribution of household expenditures. The inclusion of annotations, particularly the highlighting of Texas with the highest expenditure and D.C. with the lowest, adds valuable context to the visualization. These annotations, presented in a distinctive red color, effectively draw attention to significant data points, contributing to a visually compelling and informative representation of household expenditure across U.S. states.

Analysis: In examining the U.S. total annual household expenditure map that I created, it's evident that Texas boasts the highest total annual household expenditure with \$1,152M. On the other hand, the District of Columbia (D.C.) exhibits the lowest total annual household expenditure, amounting to \$8M. This stark contrast between the highest and lowest expenditure states provides valuable insights for total annual household expenditures by states.

3.6 Statewise Average Living Cost: U.S. Household Expenses (2020)

Statewise Average Living Cost: U.S. Household Expenses (2020)

Washington, D.C., residents face the highest average living cost at \$120,290, making it the most costly state to live in. Surprisingly, despite this, D.C. maintains the lowest total state cost among all states, totaling \$8,420,275. In Texas, residents enjoy a relatively low average living cost of \$64,795, placing it among the bottom ten states in terms of individual expenses. However, Texas stands out with the highest total state cost, reaching \$1,152,062,183. Average living cost is \$75,858. Scroll down to see more detail.



Average of Total Cost for each State. Color shows details about State (group). The marks are labeled by average of Total Cost.

Design Critique: Several remarkable features emerge when viewing the bar chart depicting average yearly household expenditures across all U.S. states. The use distinctive colors to categorize states as Top Ten Most Expensive, Middle States, and Bottom Ten Most Expensive improves visual clarity and facilitates easy classification. Annotations strategically placed for Washington, D.C. and Texas provide significant insights, highlighting D.C. as the state with the highest average living cost and Texas as the state with the highest overall yearly living cost but considerably lower average living cost.

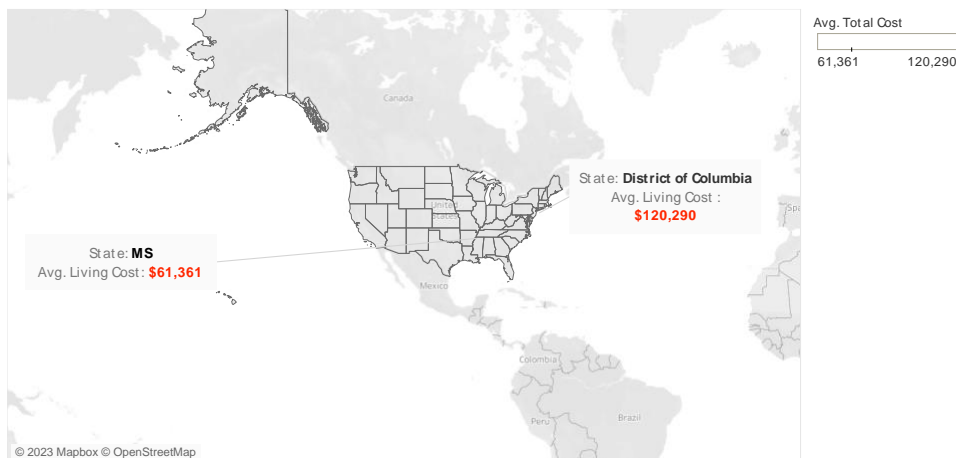
Analysis: The bar chart illustrating average yearly household expenditure per household in U.S. states gives remarkable insights into the nations of living costs. Washington, D.C., is the most expensive state to live in, with an extraordinarily high average living cost of \$120,290. This contrasts with its lowest total state cost of \$8,420,275, indicating a unique dynamic in which individual expenses may be high but overall state expenditure stays relatively modest. The inclusion of an average line with appropriate annotation provides a standard for comparison, expanding the viewer's knowledge even further.

3.7 Average Cost of Living Map

Average Cost of Living Map Across the U.S.

Mississippi emerges with the lowest average living cost among all states with \$61,361.

On the opposite end, Washington, D.C. takes the lead with a staggering \$120,290 average living cost, marking it as the most expensive state to reside in.



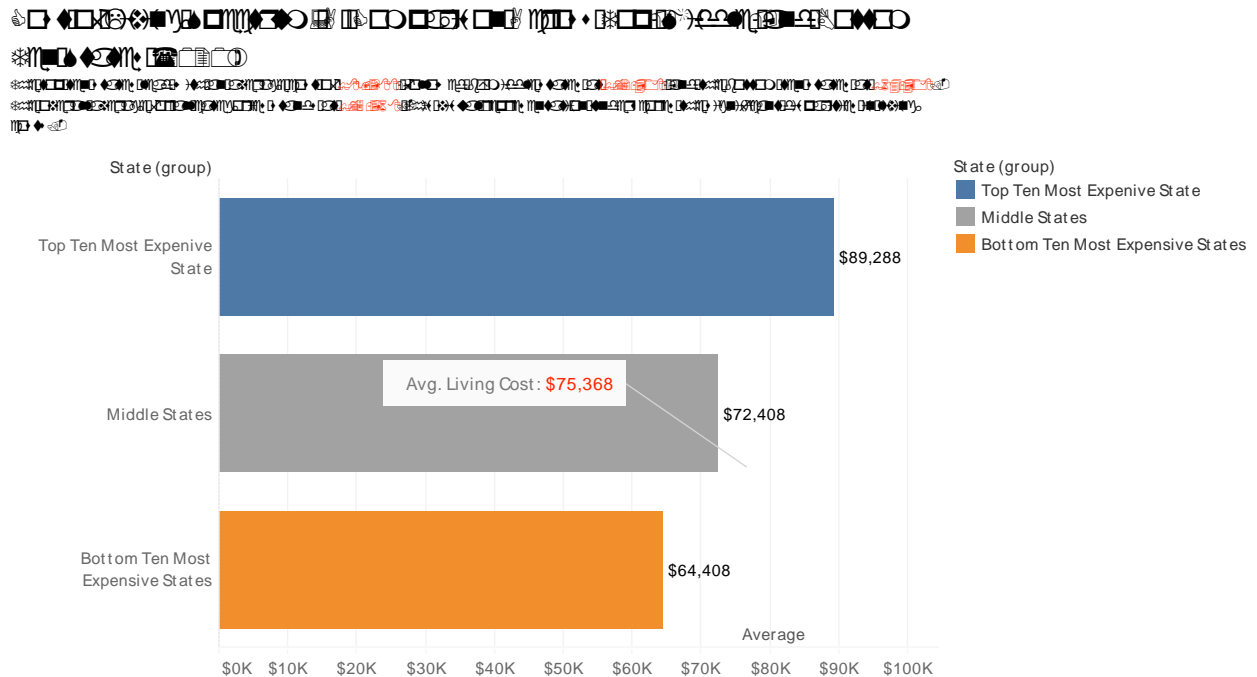
Map based on Longitude (generated) and Latitude (generated). Color shows average of Total Cost. Details are shown for State.

Design Critique: The map I created, which depicts the average cost of living across the United States, uses a visually appealing color gradient. Darker orange indicates higher living costs, whereas blue indicates less expensive states. This color scheme makes it easier to discern relative cost differences. Strategic annotations highlight Mississippi as the lowest-cost state and D.C. as the highest-cost state.

Analysis: The Average Cost of Living Map provides a detailed snapshot of the financial scenario for residents across the United States. Mississippi is the most cost-effective state, with the lowest average living cost of \$61,361. This affordability stands in stark contrast to Washington,

D.C., which is the costliest state, with an average living cost of \$120,290. The large disparity between these two states demonstrates the wide range in living expenses across the country.

3.8 Cost of Living Spectrum: A Comparison Across Top, Middle, and Bottom Ten States



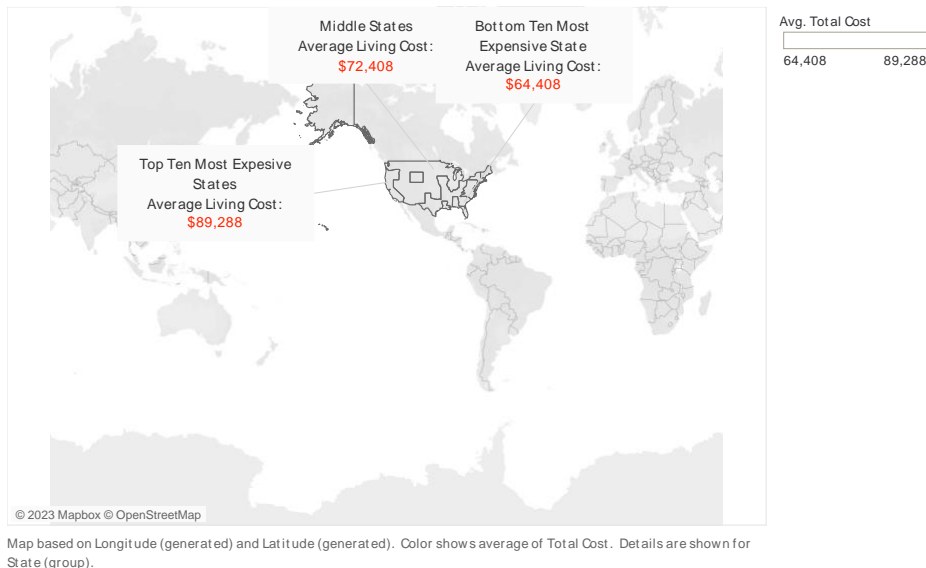
Average of Total Cost for each State (group). Color shows details about State (group). The marks are labeled by average of Total Cost.

Design Critique: The bar chart illustrating the Top Ten Most Expensive States, Middle States, and Bottom Ten Most Expensive States provides a clear and insightful visual representation of average living costs among state groups. The separate color scheme applied to each group improves visual separation and makes interpretation easier. The incorporation of data labels right on the bars provides exact information on the average living costs for each state group. The average line, which is marked with the overall average for the three state groupings, serves as a useful reference point.

Analysis: The bar chart I created depicts the disparities in average living costs among state categories. With an average cost of \$89,288, the Top Ten States clearly lead, indicating the considerable financial commitments for inhabitants in these locations. In comparison, the average cost in the Middle and Bottom Ten States is \$72,408 and \$64,408, respectively. A \$75,368 overall average line serves as a critical reference point, representing the overall average for all state categories.

3.9 Geographic Insights: Cost of Living Variation Across State Categories

Geographic Insights: Cost of Living Variation Across State Categories



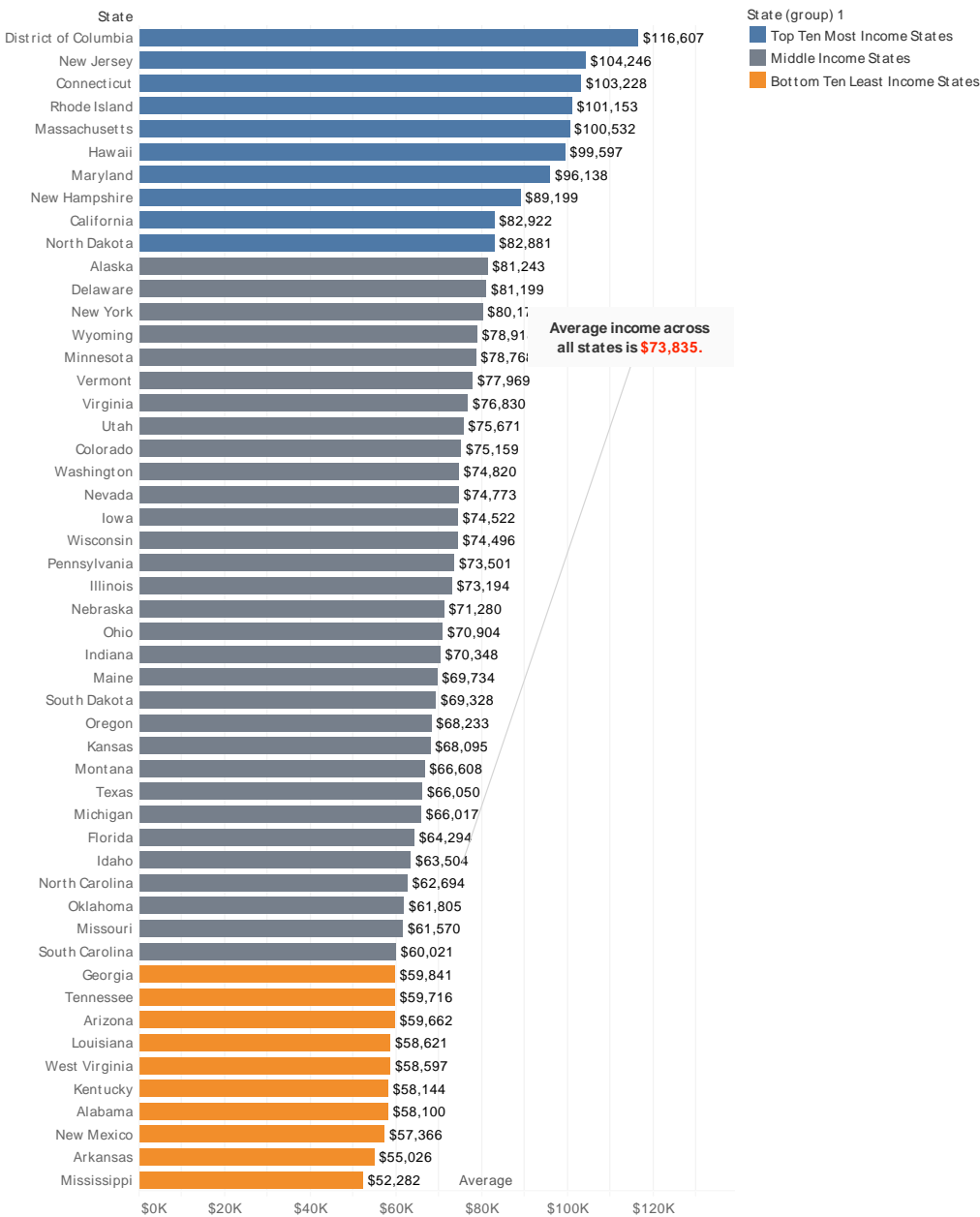
Desing Critique: The map I created shows the differences in typical living costs across several state categories. A separate color scheme darker orange for the Top Ten States, lighter orange for the Middle States, and lightest orange for the cheapest States provides an immediate visual differentiation. This color-coded technique makes it easier for viewers to distinguish the varied levels of living costs in each state group. The addition of annonations for each state group, indicating their average living costs, provides additional context to the map.

Analysis: The map I designed clearly depicts the different geography of typical living expenditures in the United States, classifying states into the Top Ten, Middle, and Cheapest groupings. The darker orange tones indicate the Top Ten States, with an average living cost of \$89,288, and highlight locations with significantly greater prices. The lighter orange tones of the Middle States, with an average cost of \$72,408, represent locations with more affordable living conditions. The lightest orange tones, representing the Cheapest States, show an average living cost of \$64,408, indicating locations with lesser expenses.

3.10 Statewise Household Finances: Average Annual Income Analysis

Statewise Household Finances: Average Annual Income Analysis in the U.S. (2020)

In the realm of American household incomes, the District of Columbia takes the lead with the highest average income at \$116,607, followed closely by New Jersey at \$104,246. On the other end of the spectrum, Mississippi and Arkansas have the lowest average annual incomes, standing at \$52,282 and \$55,026, respectively. The nationwide average income paints a broader picture at \$73,835. Scroll down to see more details.



Average of Median Family Income for each State. Color shows details about State (group) 1. The marks are labeled by average of Median Family Income.

Design Critique: Using a visually appealing and accessible color scheme, I built a bar chart that provides a complete summary of average yearly household income across different state groupings in the United States. The prominent color of blue reflects the top ten income states,

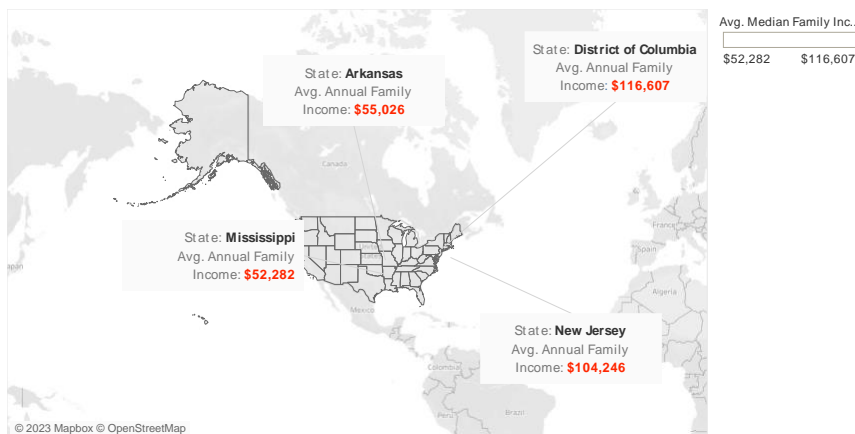
with an average income of \$89,288. The Middle Income states are separated by mid-tone grey tones, representing an average income of \$72,408, providing a clear contrast for regions with moderate income levels. The bright orange tones represent the bottom ten lowest-income states, with an average income of \$64,408, showing locations where citizens confront difficult economic situations.

Analysis: The bar chart I developed depicts the variation in average annual household incomes across the United States. The District of Columbia is at the top of this economic environment, with the highest average income at \$116,607, closely followed by New Jersey at \$104,246. Mississippi and Arkansas, on the other hand, are at the opposite end of the spectrum, with the lowest average yearly incomes of \$52,282 and \$55,026, respectively. The national average income of \$73,835 serves as a critical reference point, highlighting the enormous differences in earning potential among states.

3.11 Income Diversity Across the U.S.

Income Diversity Across the U.S.

With this map illustrating average earnings across states, you may explore the economic tapestry of the United States. The District of Columbia has the highest average income at \$116,607, followed closely by New Jersey at \$104,246. Mississippi and Arkansas, on the other hand, are at the bottom of the income scale, with average incomes of \$52,282 and \$55,026, respectively.

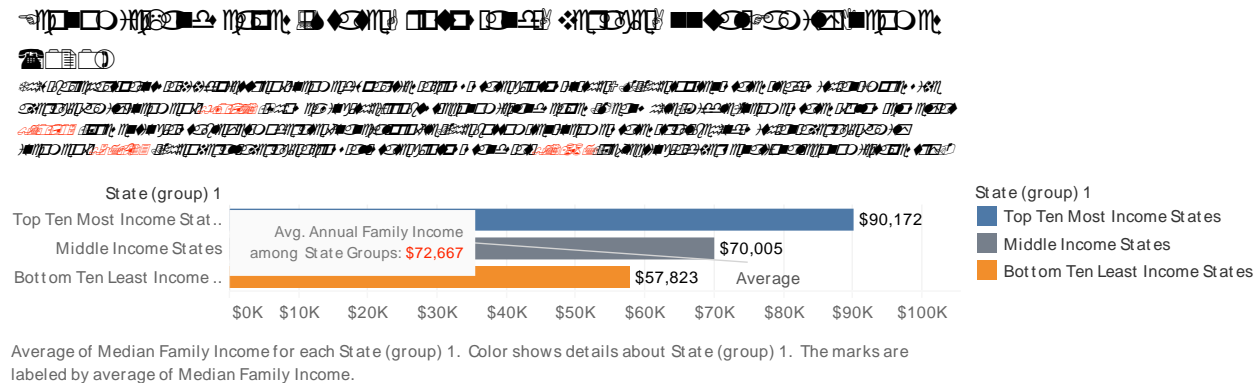


Map based on Longitude (generated) and Latitude (generated). Color shows average of Median Family Income. Details are shown for State.

Design Critique: The map I created depicts the average yearly income landscape in the United States in detail. The intentional use of a blue color palette, with darker shades representing greater earnings and lighter hues representing lower incomes, provides a quick visual understand of the income distribution. Arkansas, the District of Columbia, Mississippi, and New Jersey are annotated to highlight their distinct economic importance. The inclusion of dollar income values within these annotations provides clarity and context to the visual narrative.

Analysis: The map I developed reveals noteworthy trends and differences in the United States' economic environment when viewed through a perspective of average annual incomes. The District of Columbia emerges as the affluent epicenter, with the highest average income at \$116,607, demonstrating its economic vitality. New Jersey comes in second, with an average annual income of \$104,246 demonstrating a strong economic environment. Mississippi and Arkansas, on the other hand, are at the lower end of the scale, with average salaries of \$52,282 and \$55,026, respectively.

3.12 Economic Landscapes: State Groups and Average Annual Family Incomes (2020)



Design Critique: Several major elements show out when I examine the bar chart I made to distinguish state groups based on average annual family income. The usage of various colors for the top ten highest income states, middle-income states, and bottom ten lowest income states gives a clear visual categorization, improving the chart's overall readability. The addition of an average line that spans these state groups aids in understanding the overall economic landscape, with exact annotation providing significant context to the average income numbers. This intentional use of color difference, an average line, and annotations leads to a visually appealing and informative depiction of the various income levels among state groups, allowing for a deeper evaluation of the data.

Analysis: The bar chart depicts the landscape of income differences among various state groups in the United States. The top 10 states have a significant average family income of \$90,172, whereas the middle-income states have a more consistent but more moderate financial profile, with an average family income of \$70,005. The bottom ten income states fall behind, with an average family income of \$57,823, highlighting the nation's enormous economic variety. The overall average on the figure, \$72,667, captures the varied nature of the US economy, depicting a dynamic range of income levels and economic realities.

3.13 Family Finances: Average Income, Cost of Living, and Financial Variations

Family Finances: Average Income, Cost of Living, and Financial Variations

In this table, the top ten wealthiest states showcase a robust average annual income surplus of \$5,534, emphasizing their financial prosperity. In contrast, middle-income states exhibit a deficit of -\$1,418, indicating a delicate balance between income and cost. The bottom ten least wealthy states face a more significant challenge with an average income deficit of -\$8,013. These stark differences underscore the striking income inequality among state groups.

State (group) 1	Annual Average Family		Annual Income Cost	
	Income	Annual Average Living Cost	Difference	Income Cost Difference (%)
Top Ten Most Income States	\$90,172	\$84,639	\$5,534	3.6%
Middle Income States	\$70,005	\$71,426	-\$1,418	-4.8%
Bottom Ten Least Income States	\$57,823	\$65,836	-\$8,013	-17.7%

Annual Average Family Income, Annual Average Living Cost, Annual Income Cost Difference and Income Cost Difference (%) broken down by State (group) 1. Color shows details about State (group) 1.

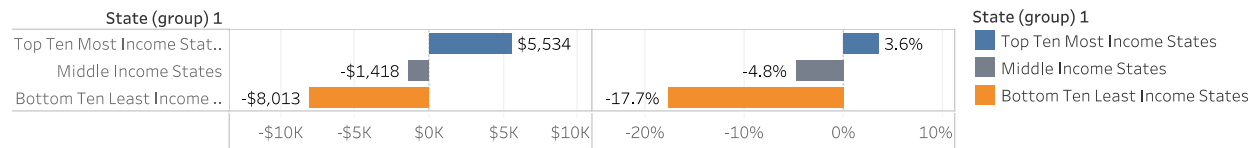
Design Critique: The table that I created presents a view of financial data of states by categorizing it into three income levels: top ten, middle ten, and bottom ten. Using different colors for each category makes it easier to see the important features at a quick glance. The table includes important factors such as Annual Average Income, Annual Average Family Income, and Annual Average Living Cost, as well as the variances between them. These details aid in understanding the differences in income and living costs between states in the United States both in amount and percentages. The simple form makes comparisons easier providing an extensive overview of the financial environment in 2020 in the U.S. Ultimately, it's an easily understood resource for learning about the various economic situations that exist between states groups.

Analysis: The table shows a complete summary of income dynamics among states in the United States, classified into three main state-income groups. The top ten wealthiest states have a healthy average annual income surplus of \$5,534, resulting in a 3.6% positive difference between yearly average income and living costs. Middle-income states, on the other hand, are in an unstable balance, with a deficit of -\$1418, signifying a -4.8% difference. The bottom ten states face more significant issues, with an average income gap of -\$8,013, representing a considerable -17.7% disparity. These precise numbers emphasize the strong income inequality among state groups, providing a clear insight of the United States' economic differences and disparities in 2020.

3.14 Wealth Spectrum: Analyzing Income and Cost Disparities Across State Groups

Wealth Spectrum: Analyzing Income and Cost Disparities Across State Groups

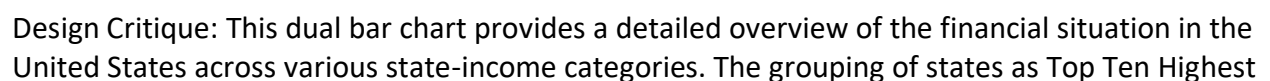
The top ten showcase an annual income surplus of **\$5,534**, representing a **3.6%** positive difference. Conversely, middle-income states exhibit a deficit of **\$-1,418**, reflecting a **-4.8%** difference in income and cost balance. The most striking contrast emerges in the ten least wealthy states, grappling with an income deficit of **\$-8,013**, translating to a staggering **-17.7%** difference. Notably, only the wealthiest states manage a surplus in the delicate equilibrium between income and cost.



Average of Income-Total Cost and average of Income-Total Cost (%) for each State (group) 1. Color shows details about State (group) 1. For pane Average of Income-Total Cost (%): The marks are labeled by average of Income-Total Cost (%). For pane Average of Income-Total Cost: The marks are labeled by average of Income-Total Cost.

Design Critique: This adjacent bar charts compares the economic dynamics of the top ten income states, middle-income states, and bottom ten income states in the United States. The use of various colors for each state group improves clarity and makes the data easier to grasp. The figure not only displays the exact values of average income and cost of living, but also the percentage disparities, providing a broader perspective of each state group's financial health. The dual presentation improves the information's visual appeal and comprehension. This bar chart, complete with data labels, provides a detailed assessment of the United States' economic landscape across three major state groups. The addition of data labels improves the visualization's readability by providing statistics for average income and cost of living comparison, and percentage gaps.

Analysis: This dual bar chart illustrates the financial dynamics between the top ten income states, middle-income states, and bottom ten income states. The top 10 states' positive income surplus of \$5,534, corresponding to a 3.6% positive difference, demonstrates their strong economic strength. Middle-income states, on the other hand, face a \$-1,418 shortfall, representing a -4.8% gap in income and cost balance. The most significant inequality is found in the ten poorest states, which have a considerable income shortfall of \$-8,013, equivalent to a -17.7% difference. This striking disparity highlights the economic constraints encountered by the least wealthy states, whereas the surplus in the wealthiest states implies a more advantageous income-cost equilibrium.

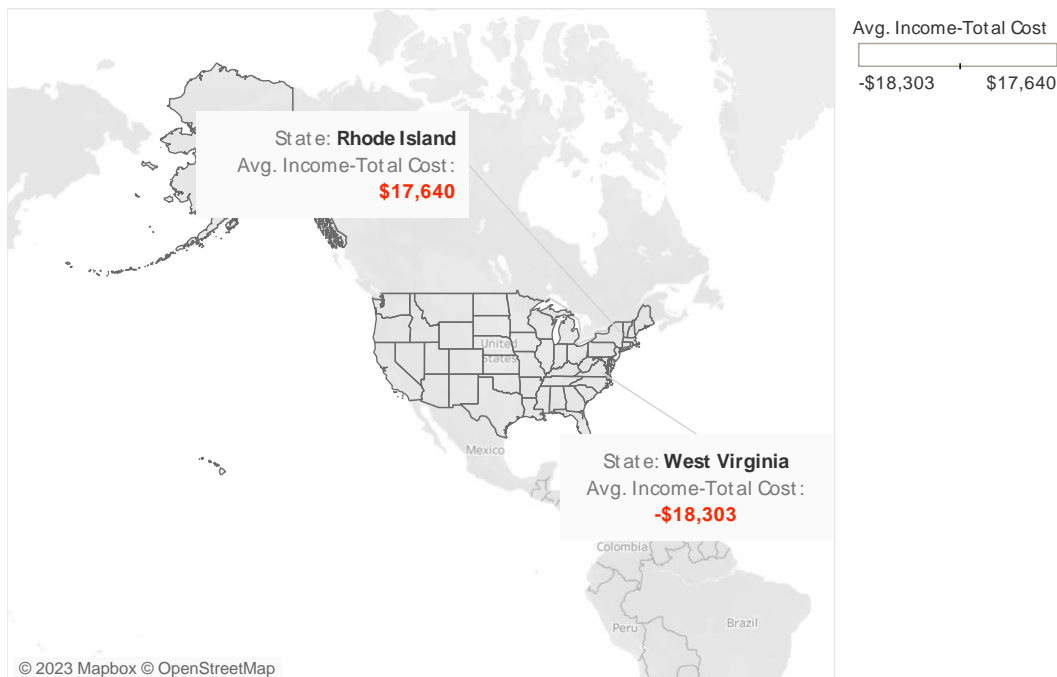
[illegible]

Income, Middle Income, and Bottom Ten Lowest Income improves clarity and enables for easy comparisons. The usage of different colors for each state-income group improves visual distinctiveness. The chart efficiently communicates both average annual income and the difference between average annual income and living costs, allowing for a deeper comprehension of state economic differences. The annotations improve the chart's interpretability by directing the viewer's attention to crucial findings.

Analysis: This analysis provides insights into the income dynamics across the United States in 2020. Washington, D.C. has the highest average family income, but surprisingly, it faces an income deficit of -\$3,682. Rhode Island, ranking fourth in wealth, stands out with the highest income surplus at \$17,640. The top ten wealthiest states consistently show a trend towards income surplus, while middle-income states have a more varied picture, experiencing both surplus and deficit scenarios. In contrast, the bottom ten least wealthy states uniformly face income deficits, with West Virginia having the most significant deficit at -\$18,303. Overall, there are substantial income variations within and among state groups, with the average income-cost difference standing at -\$2,021.

3.16 Statewise Wealth Landscape: Mapping Family Income and Cost Dynamics

Statewise Wealth Landscape: Mapping Family Income and Cost Dynamics



Map based on Longitude (generated) and Latitude (generated). Color shows average of Income-Total Cost. Details are shown for State.

Design Critique: The income-cost difference map that I created depicts the economic inequalities between states in the United States in 2020. The use of a blue color palette for

higher income states and an orange color palette for lower income states allows for a straightforward understanding of the data. The decision to mark Rhode Island as having a highest income surplus and West Virginia as having the biggest income deficit adds vital context to the map. The inclusion of red annotations for excess and deficit numbers highlights these essential elements, improving the viewer's understanding. Overall, my design utilizes color differentials and comments to highlight the differences in income and living costs between states.

Analysis: The income-cost difference map depicts the financial landscape of the United States in 2020. Rhode Island stands out as a state with a significant income surplus of \$17,640. West Virginia, on the other hand, emerges as a state with a significant income deficit of -\$18,303. The deficit reveals a severe financial issue for West Virginia residents, demonstrating that their annual living expenses are not covered by their average income. These significant variations in income dynamics highlight the economic diversity and contrasts between states, providing valuable insights into the financial well-being of Americans nationwide.

4.Conslusion

Examining the cost-of-living and income patterns across states in the United States in 2020 reveals interesting insights into the country's economic structure. Texas is a significant contributor, accounting for 7.4% of total yearly household expenditure. This emphasizes the importance of the state in national spending. The District of Columbia (D.C.), on the other hand, registers with a meager 0.01% share in total. While Texas is a significant spender, it is important to remember that substantial spending does not always signal overall economic strength. When it comes to individual cost categories, transportation takes the lead with a whopping \$427 million, accounting for 19.2% of overall spending. Healthcare comes in second, accounting for \$421 million or 18.9% of total spending, demonstrating the nation's preference for health-related expenses. Housing costs \$348 million (15.6%), demonstrating the financial commitment required to secure housing. The average cost of living, as illustrated in visualizations, reveals large variations. Washington, D.C., has the highest average living cost of \$120,290, while Mississippi is the most affordable state, with a cost of \$61,361. The District of Columbia has the highest average income at \$116,607, followed by New Jersey at \$104,246. Mississippi and Arkansas, which have the lowest average yearly incomes of \$52,282 and \$55,026 respectively, highlight the economic diversity of states. Despite having the highest living costs, Washington, D.C. suffers a deficit, highlighting the specific economic hurdles even in high-cost cities. This dynamic underline the need of having a thorough awareness of the economic landscape. Rhode Island stands out as having the biggest income surplus at \$17,640, showing a strong financial balance in which income comfortably exceeds living costs. West Virginia, on the other hand, suffers economic challenges, with the highest significant income gap among the 10 least wealthy states at -\$18,303. This dramatic gap highlights West Virginia residents' financial duress, indicating that their average salary falls far short of meeting their annual living needs. Furthermore, the income-cost differences provide clarity on the financial processes. The top ten wealthiest states have a \$5,534 (3.6%) surplus, reflecting their economic strength, whereas

middle-income states have a \$-1,418 (-4.8%) deficit. Notably, the ten lowest income states have a significant deficit of -\$8,013 (-17.7%), highlighting the economic issues that these regions face. In summary, the detailed examination of cost-of-living and income patterns in each state of the United States in 2020 reveals a complex economic picture. The substantial differences in total annual household spending highlight the disparities in financial spending between states. The income distribution analysis highlights the disparities in affluence among states. These discrepancies and trends highlight the need of having an in-depth knowledge of economic situations at the state and national levels. These findings can help governments, businesses, and individuals understand the complex economic forces that impact Americans' financial well-being across states.