Project Report
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Summary

In this project I created a Dashboard using Big Data Studio and Big Query using the GDP and Income by County dataset ("GDP and Income by County", 2020). This is a free dataset provided by Google Cloud. The dashboard analyses different aspects of the United States (US) economy and tries to find patterns between economic variables. The dataset analyzes years 2012-2018, which are part of the economic boom after the 2009 market crash in the US (Salvatore, 2020). The dashboard contains two parts. The first part shows overall economic and income patterns in the United States. In this section, it was observed that overall wages and salaries have increased in the US from 2012-2018, while unemployment insurance per capita has decreased. In addition, the analysis showed that Santa Clara and San Mateo counties in California had the highest and second highest average paying salaries in the United States, respectively. Moreover, Teton county in Wyoming was found as the county with the highest personal income per capita in the US. This was an interesting finding, as this is the least populated state in the US ("US States - ranked by population 2021", n.d.). New York also stood out in the analysis as the third county with the highest paying salaries and second count with the highest personal per capita income.

The second part of the report focused on analyzing income patters in Florida by County. The report showed that population is correlated with both total employment and average wage and salary. As population increased, so did total employment rates, as well as the average paying salaries. Furthermore, the report showed that overall personal income per capita and average wages and salaries have both increased in Florida from 2012-2018. Miami had the highest population in the state. These results match the overall upward pattern in salaries and wages in part one, where all the US was analyzed. In addition, since Florida is a preferred state for retirement (Brandon, 2020), an analysis was done to show the proportional difference between retirement income and overall per capita income in Florida over the 6 years. Results showed that the retirement income was low in Florida, compared to overall average income. Further analysis included comparing the number of people who were on wage and salary to the number of proprietors, by county. Overall, more people were on wage and salary in Florida. Miami had the highest number of both proprietors and peoples on wage and salary, which correlates which the earlier results that increase in population results in an increase in income. The graph showed that about 1/3 of Miami's population were proprietors. Finally, an analysis of the farm proprietors' income versus other proprietors was done. It was found that farmers make very low income in Florida when compared to other business owners. The income has gotten slightly lower over the years for farmers, while it has steadily increased for other business owners.

The purpose of this dashboard was to show the economic boom in the 2012-2018 in the US. It is a user-friendly tool that allows for exploration of economic patterns in the US. It could be used by someone looking to move to US or to a new county. In addition, it could be used by someone who is looking to move into a place with a high paying salary or open a business somewhere. Finally, it is also a good tool for someone interested in moving to Florida, whether it is to find a job, open a business or retire there.

The dashboard can be found using the following URL:
https://datastudio.google.com/reporting/8c8c0c12-c04d-4ab7-98bc-ba7567f825ed

Problem Statement and Dataset Selection

The dataset selected for this project was the "GDP and Income by County" dataset ("GDP and Income by County", 2020). I chose this dataset because I have always been interested in the United States' economy. Even though it is a powerful country economy-wise, this dataset allows us to observe trends of the economy growth and the diversity in economy in the different counties in the US. In addition, I chose this dataset because I personally have always been interested in moving to Florida. This dataset allowed me to analyze and observe which areas are most successful and developed financially in Florida. Finally, I chose this dataset over a COVID dataset, as I have worked with a few COVID datasets in the past, as well I come from a medical background. Therefore, I wanted to challenge myself with a financial dataset instead.

The dataset contains 24 distinct columns, which include salaries and wages, proprietors' income, dividends, interest, rents, and government benefits. The dataset is between 2012-2018 and it allows us to observe economic growth pre-pandemic area. For this project, only 10 variables were chosen for analysis. The final dataset contains 10 columns and 3198 rows. The 10 chosen variables are: Area/County, Per Capita Personal Income, Population, Total Employment, Average Wages and Salaries, Per Capita Retirement and Other, Number of People on Wage and Salary, Number of Proprietors, Farm Proprietors Income and Non-Farm Proprietors Income. Please note that these columns were renamed from the original name, to help the user of the dashboard better understand the data. There are two parts in the dashboard explained below.

The purpose of the first part is to show overall trends in the economic in the United States from 2012-2018. The datasets look at the change in wages and salaries and unemployment insurance over time. It also allows the user to see which areas have the highest per capita income and wages and salaries. This can be very helpful to users who are deciding to move to the United States. In addition, it can also be useful to people who are deciding to move from one county to another. It can allow them to see which counties are doing better financially.

The second part of the dashboard focuses on economic patterns in Florida. First, the dashboard analyzes the relationship of economic growth to population size. Then, it shows the change in personal per capita income over time. In addition, it compares the personal income to retirement income over time. This can be useful for people who are planning to retire in Florida, as it is one of the preferred states for retirement (Brandon, 2020). Furthermore, the dashboard shows the changes in wages and salaries over time. This is a useful tool to determine if the economy is growing overall and if Florida is a stable financially. This information is particularly useful to someone looking to move to Florida for a new job. In addition, it shows the proportion of people who are on salary vs. proprietors by county. This can be useful when people can determine how much competition there will be if they decide to be a business owner in a certain county. Finally, as there have been news of the farming market crashing in the United States ("Farmers are losing money on many major commodities", 2020), a comparison of the income of farm proprietors to non-farm proprietors was done. This can allow users to decide if farming or a regular proprietor is a good career in Florida. It also can allow them to observe what is the average income they can expect in each career.

Interface Description

There are 12 charts in the dashboard. Each chart title is numbered to make the report easy to follow. There are two total filters connected to all the charts. The first filter is called Area and it allows you to filter by certain areas or county in the US. The second filter is the County Name filter, which was created to make it easier to select only counties in Florida, for the second part

of the dashboard. Each chart will be explained below. It is important to note that all the time series charts show only 10 values, however, the filter can be used to observe the desired counties or areas of the user.

Chart 1: This chart shows the portion of the data from the original dataset that was chosen for this report. It contains 10 columns and 3198 rows. It also has the Optional Metrics tool available. This tool allows the user to explore the data by selecting certain columns at a time. This table was created to allow the user to explore the dataset prior to viewing the rest of the report.

Chart 2: This is a time series chart that allows the user to observe the trend in changes in wages and salaries from 2012-2018 by county. The chart displays only changes in 10 counties in wages and salaries in the United States, however, by using the Area filter, the user can choose different areas to explore. This chart was chosen as it allows the user to overall an overall trend in the wages and salaries in the US, as well as to observe which are the counties that offer the highest salaries. This is useful for someone looking to move for a new job in the US.

Chart 3: This is a time series chart that allows the user to observe the trend in changes in unemployment insurance per capita from 2012- 2018. This chart was placed beside chart 2 for comparison, as it allows the user to see overall decrease in unemployment insurance per capita versus the increase in salaries. It also allows someone to make decision on moving into a county. The lower the trend in with unemployment insurance per capita, the better the job market in the area.

Chart 4: In this chart, the top 10 counties with the highest average wages and salaries in 2018 are displayed. This is useful for someone who is looking for a high paying position in the US. It is also useful for someone who wants to move to a different county.

Chart 5: This chart shows the 10 counties with the highest personal income per capita in 2018. This purpose of this chart is to compare personal income to wages and salaries (chart 4) and to observe if there is correlation. This could be useful for people who are looking to open a business to see in which areas personal income is the highest. It could also be useful to someone who is looking to move to a new county.

Chart 6: Chart 6 shows the total distribution of population by county in Florida. This chart was chosen for two reasons. First it allows the user to see which areas are most populated in Florida. This can be useful for people looking for a job (looking for the most populated areas) or for people looking for retirement (less populated areas). I chose this chart, because as mentioned above, Florida is one of the top desired places for retirement in the US.

Chart 7: This chart has 3 variables: population, total employment and average wages and salaries by County. It allows the user to see the relationship between the 3 variables. This chart was chosen as it can be used by people who are looking for employment. The chart shows the user the importance of looking for a populated area if they are looking for employment or a high salary in Florida. This chart has the Optional Metrics filter added, which allows the user to observe each of these variables individually or 2 at a time.

Chart 8: This is a time series chart that allows the user to observe the trend in changes in personal income from 2012-2018 by county in Florida. This chart allows the user to observe the economic growth in Florida, as well as in which counties people's income is increasing. It was chosen as it can be useful for someone who is looking to move into a different county or move to Florida.

Chart 9: This chart is a comparison between overall personal per capita income and retirement and other income. The bar graph shows the difference in proportions between these two types of incomes in Florida. It is a great visual to allow the user to see how much retirement income to

expect in Florida. This chart is also user friendly, as it has the Optional Metrics tab activated, which allows the user to see one variable at a time. This zooms-in the retirement income and allows the user to observe the values more clearly. Also, the chart shows whether the average retirement income grew over the years. This was chosen as Florida is a top choice for retirement in the US. It can help a user decide whether working and retiring in Florida is a good option and what amount of income to expect.

Chart 10: This Chart shows the overall trend in change in wages and salaries in Florida by county over the 6 years. It shows the overall increase in salaries, as well as what is the expected average salary in each county. This is a useful tool for someone who is planning to move to Florida for work.

Chart 11: This chart shows the number of people on wage and salary versus the number proprietors. This is a great visual to see which areas are booming in business owners. It can be helpful to someone who is deciding to open a business in one of the counties. The chart is user friendly and allows you to select each metric separately by the Options Metric tool.

Chart 12: This chart shows the average income over the 6 years of proprietors who are farmers and the ones who are not. This chart was chosen, as news have reported that the income of US farmers has decreased substantially ("Farmers are losing money on many major commodities", 2020). It is also useful to someone who is wanting to open a farm in Florida, as it shows the income expected. On the other hand, it shows the average income expected as a proprietor (non-farmer proprietor) in Florida. Since the bars are quite small for the farmers proprietor columns, the chart has been made user-friendly by using the Option Metrics tool. This tool allows you to select each metric separately and it will zoom-in the farm proprietors' average income values.

Research Questions and Analysis

In this section the list of questions that were answered by the dashboard are included, as well as the answer to them. The questions are numbered and italicized, while the answers are shown below.

1. *Did the salaries and wages increase in the United States from 2012-2018?*
   Yes, the salaries and wages have overall increased in the United States from 2012-2018 as chart 2 shows an overall uptrend. This chart shows only 10 counties, however, while experimenting with other counties using the filter, a similar pattern was observed.
2. *Did unemployment insurance use change in the United States from 2012-2018?*
   Unemployment insurance per capita has decreased overall in US from 2012-2018, as chart 3 shows an overall downtrend. The use of unemployment insurance has steeply decreased until 2015, and then plateaued overall from 2015-2018. In this chart, only 10 counties are shown, however, similar pattern was seen in other counties using the Area filter.
3. *Which counties had the top 10 highest paying salaries in the United States in 2018?*
   Chart 4 shows the 10 counties with the highest paying salaries in 2018. The county that had the highest average paying salaries and wages in US is Santa Clara, California.
4. *Which counties had the top 10 highest income per capita in the United States in 2018?*
   Chart 5 shows the 10 counties with the highest income per capita in 2018. The county that had the highest income per capita in US is Teton, WY.
5. *Is population related to total employment rate and average paying salary in Florida?*
   Yes. As seen in chart 7, as population increases, total employment rate increases and average wages and salaries increase.
6. *Has income per capita increase in Florida from 2012-2018?*

Yes, as chart 8 shows an overall uptrend pattern.

7. *How does personal retirement and other income relate to overall personal income in Florida?*
   As seen in chart 9, retirement (and other) income category is lower than overall personal income in Florida. The chart shows that overall personal income is about 4 times higher than retirement income in Florida.
8. *Have the wages and salaries increased in Florida from 2012-2018?*
   Yes, the salaries have increased overall in Florida in those years. As seen in chart 10, about $10,000 increase in income is seen in the 10 counties displayed in the graph during those 6 years.
9. *Do the counties in Florida have more business owners or people that work on salary?*
   By looking at chart 11, Florida has overall less proprietors than people that work with salary. The highest number of people working in salary and owning businesses live in the Miami-Dade County.
10. *How does the farmers income compare to other proprietors in Florida? Is Florida a good place to own a farming business?*
    Graph 12 shows a substantial difference in income between farm and non-farm business owners. Owning a farm in Florida might not lead to high income. Owning a different type of business is more profitable and can lead to very high income in Florida.

Self-reflection

There are several things that I learned by completing this project. First, I learned how to use the Big Data Studio with Big Query. As I was already familiar with using SQL queries, I focused doing my report using the second method learned in class. I imported the whole dataset, and I used the Big Data Studio features to build my charts. I learned how to select different graphs, how to filter the data in the graphs and how to change the metrics. I also learned how to make the charts interactive and user-friendly by using the Optional Metrics tool and Filters. I learned how to make the filters attached to different charts and select certain data in the dashboard. In addition, I learned how to customize each chart by using filters to select by year or state, using the customizable filter tab within each chart. Finally, I learned how to make the dashboard more appealing by adding text, changing the theme, and customizing each graph's appearance.

Overall, this project helped me with learning a simpler way to do data analysis. I have always done analysis by coding each query from scratch. Using the Big Data Studio showed me that I can use this tool to do a quick overall data analysis quickly without needing to do any queries. I can then do queries if needed. This will save me time to do the data analysis. Part of being a data scientist, which is my future career, will be to do reports. I can use this tool to create professional reports for companies and stakeholders.

It was difficult to navigate the dashboard. I had difficulties understanding which metrics to use in which section of the chart. I also had difficulty finding different ways on how to filter the charts, for example by year. Finally, I had difficulty naming the charts. There were no instructions anywhere on how to do so. I overcame most of these difficulties by looking at YouTube videos or other resources online. To learn how to use the Dashboard, I experimented with different charts and tried to understand what each part of the chart was doing. After some practice, I got familiar with the process. In the future, I would do a comparison between the financial profile of the East Coast and West Coast of the United States. This could make my dashboard more attractive, as it can help users decide if living the west or east coast of the US is

better financially. Also, since my dataset is also focused on users who are looking for employment, I would do a total employment analysis in the US by county.

References

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