Family Income and Expenditure Analysis in the Philippines

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Objectives

- Analyze the distribution of household incomes across different regions in the Philippines, identifying the highest and lowest income regions, and comparing these to the national average.
- Examine household expenditure patterns across different regions, focusing on identifying the highest and lowest expenditure regions, and comparing these to the national average.
- Investigate the average expenditure per expenditure type to determine which categories have the highest and lowest spending.
- Build an interactive and aesthetically pleasing dashboard.

Data Overview

The dataset used in this project was retrieved from Kaggle. It originally has 60 columns but after data cleaning and preprocessing, it now only consists of four columns: Total Household Income, Region, Expenditure Type, and Expenditure. The "Total Household Income" column contains the total income of each household, the "Region" column contains the regions in the Philippines (e.g., NCR), the "Expenditure Type" column specifies the type of expenditure (e.g., Meat Expenditure), and the "Expenditure" column contains the amount spent on each type of expenditure.

Tools

- Excel: For initial data exploration and data cleaning
- SQL (BigQuery): For in-depth data analysis
- **Power BI:** For the data visualization and dashboard making

DATA CLEANING

Initial Dataset:

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Cleaned Dataset:

The dataset was streamlined by removing unnecessary columns, retaining only Total Household Income, Region, Expenditure Type, and Expenditure. Using Power Query, the expenditure types were unpivoted into two new columns: Expenditure Type and Expenditure. Data was ensured to be free of extra spaces or spelling errors, and data types were corrected for SQL compatibility.

	Α	В	C	D
1	total_household_income	region	expenditure_type	expenditure
2	480332	CAR	Bread and Cereals Expenditure	42140
3	480332	CAR	Total Rice Expenditure	38300
4	480332	CAR	Meat Expenditure	24676
5	480332	CAR	Total Fish and marine products Expenditure	16806
5	480332	CAR	Fruit Expenditure	3325
7	480332	CAR	Vegetables Expenditure	13460
3	480332	CAR	Restaurant and hotels Expenditure	3000
9	480332	CAR	Alcoholic Beverages Expenditure	0
0	480332	CAR	Tobacco Expenditure	0
1	480332	CAR	Clothing, Footwear and Other Wear Expenditure	4607
2	480332	CAR	Housing and water Expenditure	63636
3	480332	CAR	Imputed House Rental Value	30000
4	480332	CAR	Medical Care Expenditure	3457
5	480332	CAR	Transportation Expenditure	4776
6	480332	CAR	Communication Expenditure	2880
7	480332	CAR	Education Expenditure	36200
8	480332	CAR	Miscellaneous Goods and Services Expenditure	34056
9	480332	CAR	Special Occasions Expenditure	7200
0	480332	CAR	Crop Farming and Gardening expenses	19370
1	198235	CAR	Bread and Cereals Expenditure	17329
2	198235	CAR	Total Rice Expenditure	13008
3	198235	CAR	Meat Expenditure	17434
4	198235	CAR	Total Fish and marine products Expenditure	11073
5	198235	CAR	Fruit Expenditure	2035
6	198235	CAR	Vegetables Expenditure	7833
7	198235	CAR	Restaurant and hotels Expenditure	2360
8	198235	CAR	Alcoholic Beverages Expenditure	960
9	198235	CAR	Tobacco Expenditure	2132
0	198235	CAR	Clothing, Footwear and Other Wear Expenditure	8230
1	198235	CAR	Housing and water Expenditure	41370
2	198235	CAR	Imputed House Rental Value	27000
3	198235	CAR	Medical Care Expenditure	3520
4	198235	CAR	Transportation Expenditure	12900
5	198235	CAR	Communication Expenditure	5700
6	198235	CAR	Education Expenditure	29300
7	198235	CAR	Miscellaneous Goods and Services Expenditure	9150

DATA ANALYSIS

Note: The data analysis was conducted using SQL (BigQuery), and the visualizations were created using Power BI.

Average Household Income per Region

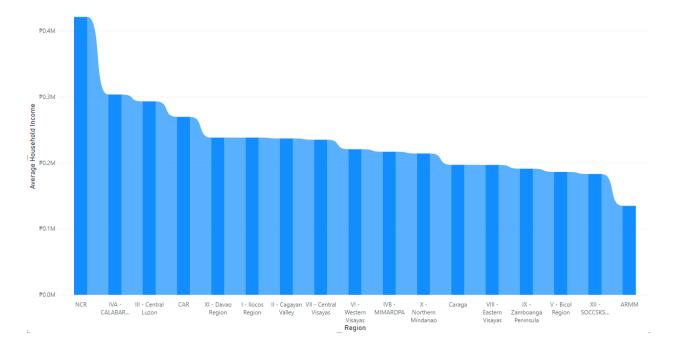
Query:

```
1   SELECT region, AVG(total_household_income) AS average_household_income
2   FROM _`projects.family_income_and_expenditure`
3   GROUP BY region
4   ORDER BY average_household_income DESC;
```

Result:

Row	region ▼	average_household_income 🔻
1	NCR	420861.86150121031
2	IVA - CALABARZON	303360.53604036744
3	III - Central Luzon	292965.18164967682
4	CAR	269540.48463768046
5	XI - Davao Region	238115.89125102296
6	I - Ilocos Region	238110.08432708486
7	II - Cagayan Valley	236778.22172149658
8	VII - Central Visayas	234909.31404958604
9	VI - Western Visayas	220481.26025955856
10	IVB - MIMAROPA	216685.12489991979
11	X - Northern Mindanao	214057.77954424953
12	Caraga	196907.37654320934
13	VIII - Eastern Visayas	196736.581086863
14	IX - Zamboanga Peninsula	191000.90827740551
15	V - Bicol Region	186105.49271844488
16	XII - SOCCSKSARGEN	182984.80254476974
17	ARMM	134746.81761565793

Visualization:



Findings:

- 1. The National Capital Region (NCR) has the highest average household income, totaling PHP 420,862.
- 2. The Autonomous Region in Muslim Mindanao (ARMM) has the lowest average household income, amounting to PHP 134,747.

Comparison of the Highest/Lowest Average Household Income to National Average Income

Query:

```
WITH overall_average_income AS (
      SELECT AVG(total_household_income) AS national_average_income
      FROM `projects.Family Income and Expenditure`
    average_income_per_region AS (
      SELECT region, AVG(total_household_income) AS average_household_income
FROM <u>`projects.Family Income and Expenditure`</u>
GROUP BY region
10
    SELECT average.region,
      CASE
13
14
         WHEN average.region = "NCR" THEN
         ((average_average_household_income - overall.national_average_income) / overall.national_average_income) * 100
16
         NULL
         END AS ncr_percent_difference,
18
         WHEN average.region = "ARMM" THEN
20
21
         ((overall.national_average_income - average_household_income) / overall.national_average_income) * 100
         NULL
         END AS armm_percent_difference
    FROM overall_average_income AS overall
    JOIN average_income_per_region AS average
    WHERE average.region IN ("NCR", "ARMM");
```

Result:

Row	region ▼	ncr_percent_difference 🔻	armm_percent_difference 🔻
1	ARMM	null	45.569065741893056
2	NCR	70.007015530843447	null

Findings:

- 1. The average household income of NCR is 70.01% higher than the national average household income.
- 2. The average household income of ARMM is 45.57% lower than the national average household income.

Difference Between the Average Household Income of NCR and ARMM

Query:

Result:



Findings:

1. The average household income of NCR is 212.34% higher than that of ARMM, showing a significant disparity where NCR's average household income is more than double that of ARMM.

Average Household Expenditure per Region

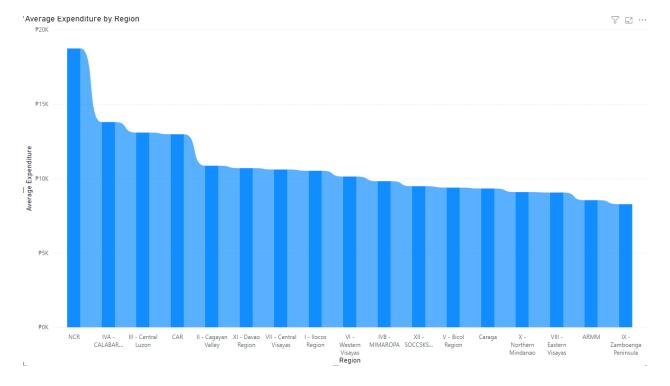
Query:

- 1 SELECT region, AVG(expenditure) AS average_expenditure
- 2 FROM 'projects.family_income_and_expenditure'
 3 GROUP BY region
- 4 ORDER BY average_expenditure DESC;

Result:

Row	region ▼	average_expenditure 🔻
1	NCR	18740.114846438209
2	IVA - CALABARZON	13793.288563190859
3	III - Central Luzon	13084.8345771751
4	CAR	12973.429748283739
5	II - Cagayan Valley	10858.369132610816
6	XI - Davao Region	10696.041464044354
7	VII - Central Visayas	10603.698564593253
8	I - Ilocos Region	10518.311283959396
9	VI - Western Visayas	10130.727334822466
10	IVB - MIMAROPA	9818.353251021972
11	XII - SOCCSKSARGEN	9480.7198521752016
12	V - Bicol Region	9386.89024442171
13	Caraga	9326.6404690176278
14	X - Northern Mindanao	9087.0556438792137
15	VIII - Eastern Visayas	9056.50823142584
16	ARMM	8543.4683929574785
17	IX - Zamboanga Peninsula	8273.0707935947521

Visualization:



Findings:

- 1. NCR has the highest average expenditure at PHP 18,740.
- 2. Region IX Zamboanga Peninsula has the lowest average expenditure at PHP 8,273.

Comparison of the Highest/Lowest Average Expenditure to National Average Expenditure

Query:

Result:

Row	region ▼	ncr_percent_difference ▼/	zamboanga_percent_difference
1	NCR	63.9596158591738	null
2	IX - Zamboanga Peninsula	null	27.617865717009966

Findings:

- 1. The average expenditure of NCR is 63.96% higher than the national average expenditure.
- 2. The average expenditure of Region IX Zamboanga Peninsula is 27.62% lower than the national average expenditure.

Difference Between the Average Expenditure of NCR and Region IX – Zamboanga Peninsula

Query:

```
WITH Zamboanga_average_expenditure AS (
SELECT AVG(expenditure) AS average_expenditure
FROM `projects.Family Income and Expenditure`
WHERE region = "IX - Zamboanga Peninsula"
),

NCR_average_expenditure AS (
SELECT AVG(expenditure) AS average_expenditure
FROM `projects.Family Income and Expenditure`
WHERE region = "NCR"
)

SELECT ((ncr.average_expenditure - zamboanga.average_expenditure) / zamboanga.average_expenditure) * 100 AS percent_difference
FROM Zamboanga_average_expenditure AS zamboanga
CROSS JOIN NCR_average_expenditure AS ncr;
```

Result:



Findings:

1. The average expenditure in NCR is 126.52% higher than in Region IX – Zamboanga Peninsula. Similar to the income disparity, this result highlights a significant difference in expenditures between the two regions.

Average Expenditure per Expenditure Type

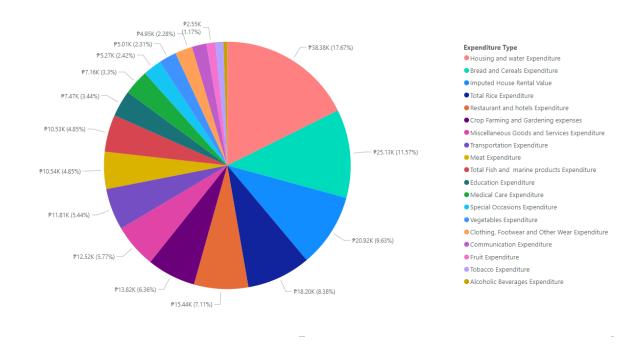
Query:

- 1 SELECT expenditure_type, AVG(expenditure) as average_expenditure
- 2 FROM `projects.Family Income and Expenditure` 3 GROUP BY expenditure_type
- 4 ORDER BY average_expenditure DESC;

Result:

Row	expenditure_type ▼	average_expenditure ▼
1	Housing and water Expenditure	38375.467793183387
2	Bread and Cereals Expenditure	25133.72364240318
3	Imputed House Rental Value	20921.544627382875
4	Total Rice Expenditure	18195.825004814014
5	Restaurant and hotels Expendit	15436.566074523351
6	Crop Farming and Gardening e	13816.859715000839
7	Miscellaneous Goods and Serv	12522.07163489304
8	Transportation Expenditure	11806.344454072751
9	Meat Expenditure	10540.072573656849
10	Total Fish and marine product	10529.318337184613
11	Education Expenditure	7473.5004814172889
12	Medical Care Expenditure	7160.2309358752264
13	Special Occasions Expenditure	5265.7260013478926
14	Vegetables Expenditure	5006.9185682649231
15	Clothing, Footwear and Other	4954.6210764490488
16	Communication Expenditure	4095.49205661473
17	Fruit Expenditure	2550.4749903716688
18	Tobacco Expenditure	2294.7361833236932
19	Alcoholic Beverages Expenditure	1085.0681205468966

Average Expenditure by Expenditure Type



Findings:

- 1. Families allocate the highest expenditure to Housing and Water, averaging PHP 38,375.
- 2. Families allocate the lowest expenditure to Alcoholic Beverages, averaging only PHP 1,085.

Summary of Findings

The National Capital Region (NCR) exhibits the highest average household income at PHP 420,862, significantly surpassing the Autonomous Region in Muslim Mindanao (ARMM), which records the lowest at PHP 134,747. NCR's average income is 70.01% higher than the national average, whereas ARMM's is 45.57% lower. The income disparity between NCR and ARMM is stark, with NCR's income being 212.34% higher. Similarly, NCR leads in average expenditure at PHP 18,740, while Region IX – Zamboanga Peninsula reports the lowest at PHP 8,273. NCR's expenditure exceeds the national average by 63.96%, while Region IX lags by 27.62%. The expenditure gap between NCR and Region IX stands at 126.52%. On average, families spend the most on Housing and Water (PHP 38,375) and the least on Alcoholic Beverages (PHP 1,085).

Conclusion

The data highlights significant regional disparities in both income and expenditure across the Philippines, with the National Capital Region consistently showing higher averages compared to other regions. The big differences, especially between NCR and ARMM or Region IX, show the economic divide within the country.

Insights

- 1. The significant income and expenditure disparities between regions like NCR and ARMM highlight a notable economic divide, which likely leads to unequal access to opportunities and resources.
- 2. The high spending in NCR indicates a higher cost of living, potentially driven by factors such as urbanization, housing costs, and infrastructure development, which may not be as prevalent in other regions.
- 3. These findings can help policymakers create targeted economic strategies to reduce regional inequalities. This could include investing in infrastructure, education, and healthcare in less affluent areas to promote economic growth.
- 4. The differences in expenditure categories, especially the high spending on Housing and Water and the low spending on Alcoholic Beverages, demonstrate varying priorities and living conditions. This information could assist businesses in customizing their services and products to meet regional demands.
- 5. The government and non-profit organizations can use this data to develop social programs that cater to the specific needs of regions with lower incomes and expenditures, fostering inclusive growth and development.

DASHBOARD

Summary Page:



Detail Page:

