# THE IMPACT OF
# CDBG FUNDS
# IN PUERTO RICO

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# PURPOSE

We chose to study the impact that the Community Development Block Grant funds has had on mortgage loan amounts in Puerto Rico. The CDBG funds started as a $25,000 to $55,000 in down payment or overall financing for first-time homebuyers. In the beginning of the distribution, the full amount was given exclusively to first responders. At the moment, it's open to anyone who is buying their first home and fits into the income limits established by HUD. We initially believed that the grant was contributing to home price inflation.

Let's find out if our hypothesis is true>>>

**01**

**INCOME LEVELS**

We analyzed the datasets for income limits per county. Puerto Rico has a total of 78 counties but we grouped them into 26 to match the information from the CDBG grant dataset.

**02**

**INTEREST RATES**

We analyzed an FHA dataset and used the average of interest rates per year from 2018 – 2022. We used FHA because it is the most common mortgage in Puerto Rico and it's the best for first-time home buyers.

**03**

**AFFORDABILITY ANALYSIS**

On the FHA dataset, we focused on interest rates and mortgage amounts to understand how much people can afford.

**04**

**GOVERNMENT POLICIES**

Finally, we analyzed the total of CDBG funds granted to each county group.

# STRATEGIES

## WEB SCRAPING

Our CDBG datasets were accessed through web scrapping for all 78 counties. Afterwards, we created functions to automate the normalization process.

## API

Our income limits per county were accessed through an API. Afterwards, we created dictionaries to group the counties and created data frames with the information given.

## DATA WRANGLING

Altogether, we worked on functions to automate the process, melt and pivot tables for better analysis. Finally, created plots to visualize our findings.

# EXPECTED OUTCOME

### EFFICIENT DATABASE

The independence of each table is key for anyone who accesses the database.

### LOOKING FORWARD

Ease of access for future real estate analysis projects & queries.

# EXPECTED OUTCOME
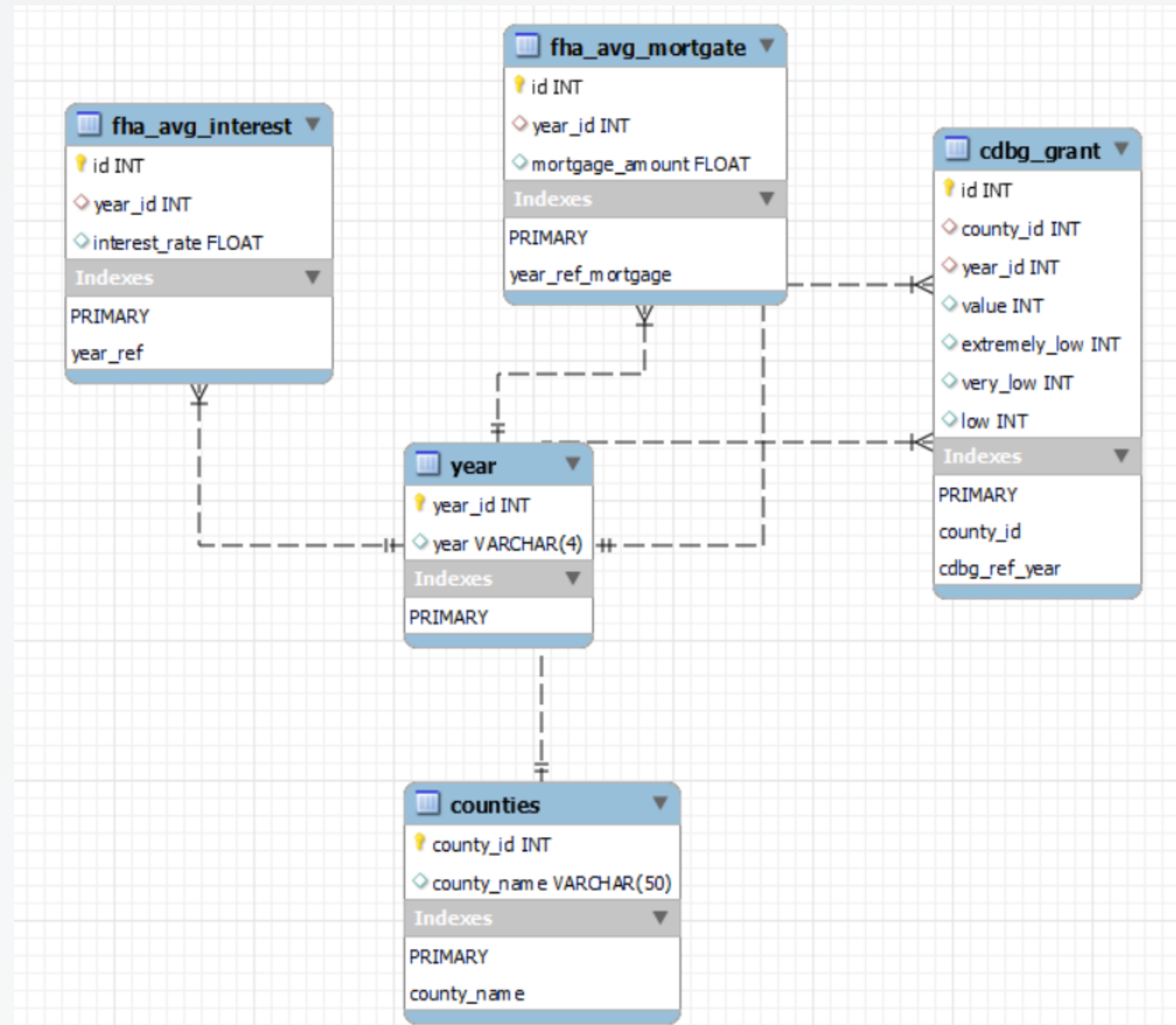
# ISSUES ENCOUNTERED



Importing json files resulted in nested dictionaries. We solved this by sticking to CSV files for uploading the data.

## JSON FILES

In order to create an efficient database, we focused on normalizing the data we had in python for each table to exists independently. This was time consuming.

## NORMALIZATION

# NORMALIZATION SUCCESS!

## Jupyter Notebook

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | Total |
|---|---|---|---|---|---|---|
| **Municipality** | | | | | | |
| San Sebastián Municipio, PR | 674443 | 663425 | 664429 | 652730 | 630781 | 3285808 |
| Cayey Municipio, PR | 659697 | 654943 | 656552 | 641484 | 603629 | 3216305 |
| Cidra Municipio, PR | 576143 | 578677 | 598170 | 571772 | 575730 | 2900492 |
| San Germán Municipio, PR | 550256 | 557490 | 564905 | 556410 | 535073 | 2764134 |
| Fajardo Municipio, PR | 541810 | 527987 | 531217 | 520693 | 489153 | 2610860 |

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | Total |
|---|---|---|---|---|---|---|
| **Municipality** | | | | | | |
| San Juan Municipio, PR | 6993886 | 7055896 | 7375269 | 7363131 | 6969795 | 35757977 |
| Ponce Municipio, PR | 2483950 | 2396777 | 2483341 | 2444414 | 2351583 | 12160065 |
| Bayamón Municipio, PR | 2294269 | 2220066 | 2227107 | 2214251 | 2149057 | 11104750 |
| Carolina Municipio, PR | 1866124 | 1802252 | 1753063 | 1758787 | 1757420 | 8937646 |
| Caguas Municipio, PR | 1739589 | 1705935 | 1763496 | 1708674 | 1706443 | 8624137 |

## SQL

| county_id | year_id | value | extremely_low | very_low | low |
|---|---|---|---|---|---|
| 13 | 1 | 805703 | 9719 | 16203 | 25903 |
| 14 | 1 | 738265 | 7725 | 12885 | 20589 |
| 15 | 1 | 720411 | 8104 | 13500 | 21591 |
| 16 | 1 | 692099 | 9719 | 16203 | 25903 |
| 17 | 1 | 1399737 | 8757 | 14569 | 23304 |
| 18 | 1 | 2351583 | 8104 | 13500 | 21591 |
| 19 | 1 | 695363 | 9719 | 16203 | 25903 |
| 20 | 1 | 535073 | 7557 | 12576 | 20112 |
| 21 | 1 | 6969795 | 9719 | 16203 | 25903 |
| 22 | 1 | 630781 | 7725 | 12885 | 20589 |
| 23 | 1 | 781162 | 9719 | 16203 | 25903 |
| 24 | 1 | 1034426 | 9719 | 16203 | 25903 |
| 25 | 1 | 774442 | 9719 | 16203 | 25903 |
| 26 | 1 | 826620 | 9719 | 16203 | 25903 |
| 1 | 2 | 876284 | 7765 | 12957 | 20700 |
| 2 | 2 | 1342974 | 7995 | 13297 | 21273 |
| 3 | 2 | 2149057 | 9746 | 16246 | 25973 |

| county_name | year | extremely_low | low | very_low | CDBG_granted |
|---|---|---|---|---|---|
| Aguadilla | 2018 | 7725 | 20589 | 12885 | 876284 |
| Aguadilla | 2019 | 7765 | 20700 | 12957 | 876284 |
| Aguadilla | 2020 | 7780 | 20740 | 12982 | 876284 |
| Aguadilla | 2021 | 7809 | 20820 | 13032 | 876284 |
| Aguadilla | 2022 | 7779 | 20735 | 12979 | 876284 |
| Arecibo | 2018 | 7981 | 21235 | 13274 | 1342974 |
| Arecibo | 2019 | 7995 | 21273 | 13297 | 1342974 |
| Arecibo | 2020 | 8007 | 21301 | 13312 | 1342974 |
| Arecibo | 2021 | 8023 | 21347 | 13341 | 1342974 |
| Arecibo | 2022 | 8014 | 21328 | 13331 | 1342974 |
| Bayamon | 2018 | 9719 | 25903 | 16203 | 2149057 |
| Bayamon | 2019 | 9746 | 25973 | 16246 | 2149057 |
| Bayamon | 2020 | 9729 | 25933 | 16222 | 2149057 |
| Bayamon | 2021 | 9768 | 26031 | 16282 | 2149057 |
| Bayamon | 2022 | 9728 | 25924 | 16215 | 2149057 |

# HOUSING AFFORDABILITY

## Average Incomes by County and Income Category

| data.county_name | extremelylow_avg | low_avg | verylow_avg |
|---|---|---|---|
| Aguadilla Municipio, PR | 8262.50 | 22050.00 | 13818.75 |
| Arecibo Municipio, PR | 8312.50 | 22162.50 | 13850.00 |
| Bayamón Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Cabo Rojo Municipio, PR | 7862.50 | 20931.25 | 13087.50 |
| Caguas Municipio, PR | 10068.75 | 26775.00 | 16737.50 |
| Canóvanas Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Carolina Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Cayey Municipio, PR | 10068.75 | 26775.00 | 16737.50 |
| Cidra Municipio, PR | 10068.75 | 26775.00 | 16737.50 |
| Fajardo Municipio, PR | 9143.75 | 24306.25 | 15193.75 |
| Guayama Municipio, PR | 7812.50 | 20775.00 | 12987.50 |
| Guaynabo Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Humacao Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Isabela Municipio, PR | 8262.50 | 22050.00 | 13818.75 |
| Juana Díaz Municipio, PR | 8175.00 | 21743.75 | 13600.00 |
| Manatí Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Mayagüez Municipio, PR | 8725.00 | 23287.50 | 14575.00 |
| Ponce Municipio, PR | 8175.00 | 21743.75 | 13600.00 |
| Río Grande Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| San Germán Municipio, PR | 7862.50 | 20931.25 | 13087.50 |
| San Juan Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| San Sebastián Municipio, PR | 8262.50 | 22050.00 | 13818.75 |
| Toa Alta Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Toa Baja Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Trujillo Alto Municipio, PR | 9806.25 | 26112.50 | 16318.75 |
| Vega Baja Municipio, PR | 9806.25 | 26112.50 | 16318.75 |

Income Category

# AFFORDABILITY
## DECREASE



Percent Change Over Time
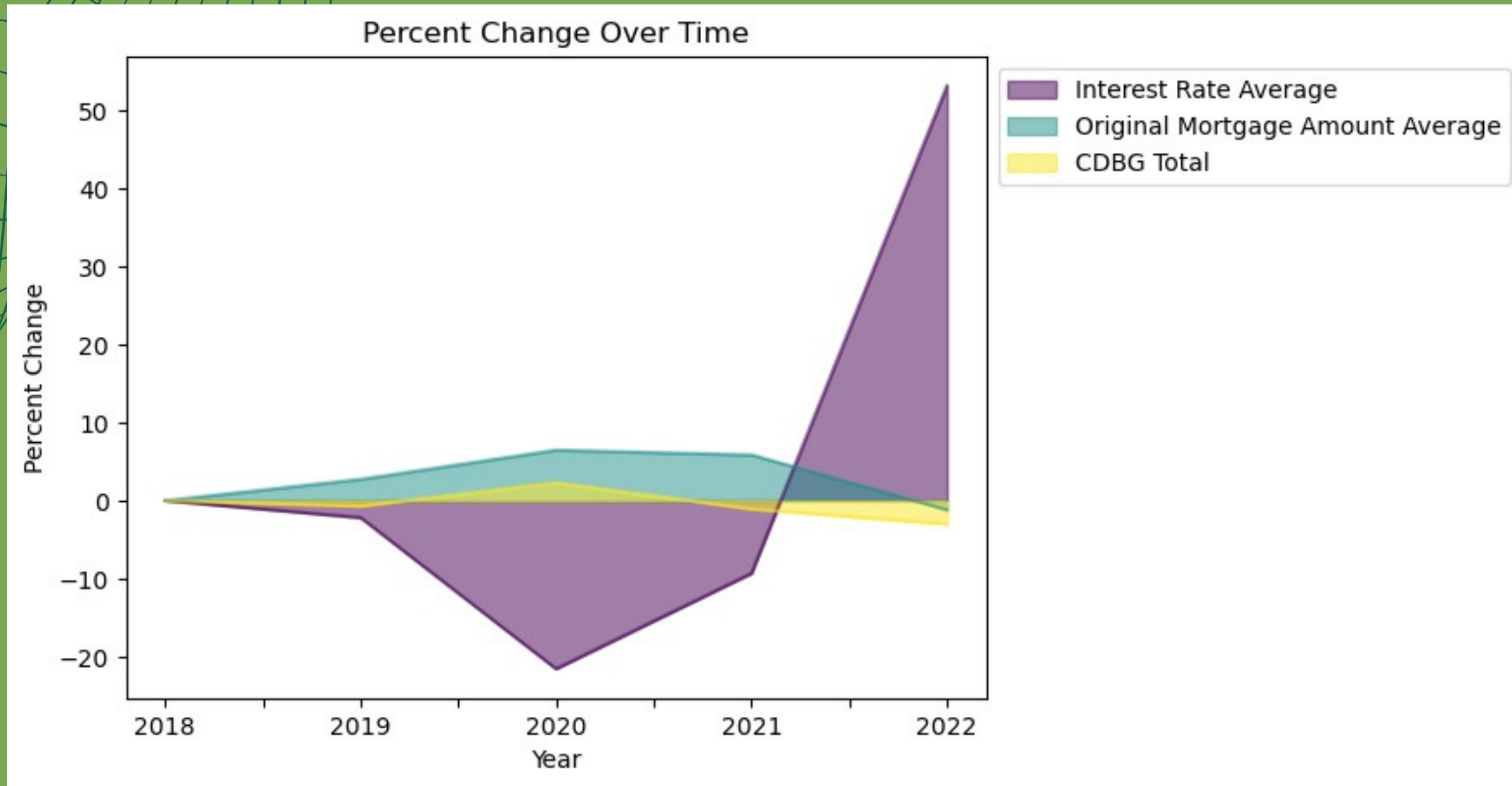
| year | interest_rate | mortgage_amount |
|------|---------------|-----------------|
| 2018 | 4.47187 | 122444 |
| 2019 | 4.37423 | 125794 |
| 2020 | 3.43057 | 133942 |
| 2021 | 3.11061 | 141794 |
| 2022 | 4.80621 | 139529 |

# PROJECT MANAGEMENT

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# DATA-DRIVEN PREDICTIONS

**Next Projects:**

Current market analysis leveraging data from most recent purchases in the MLS + local property listing websites.
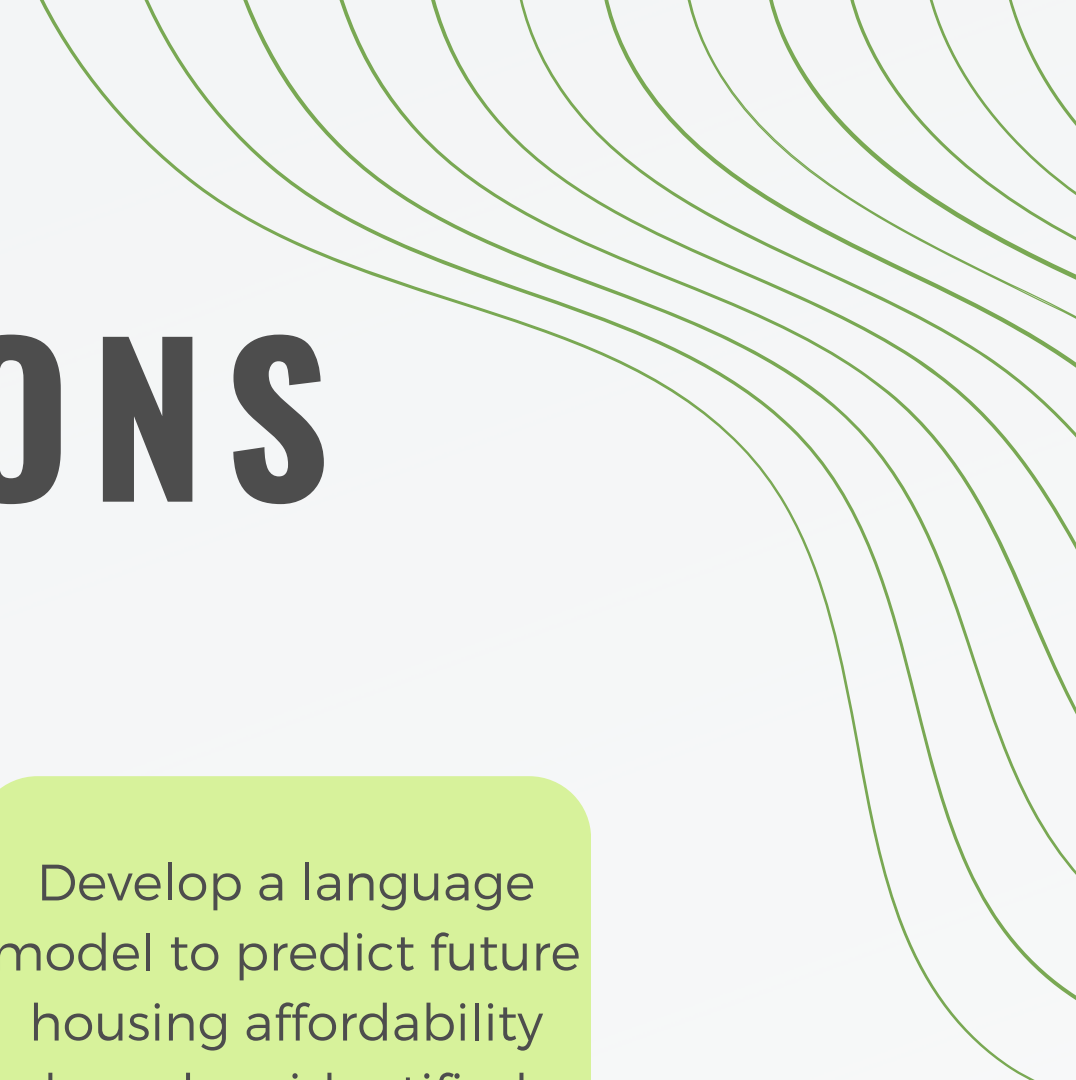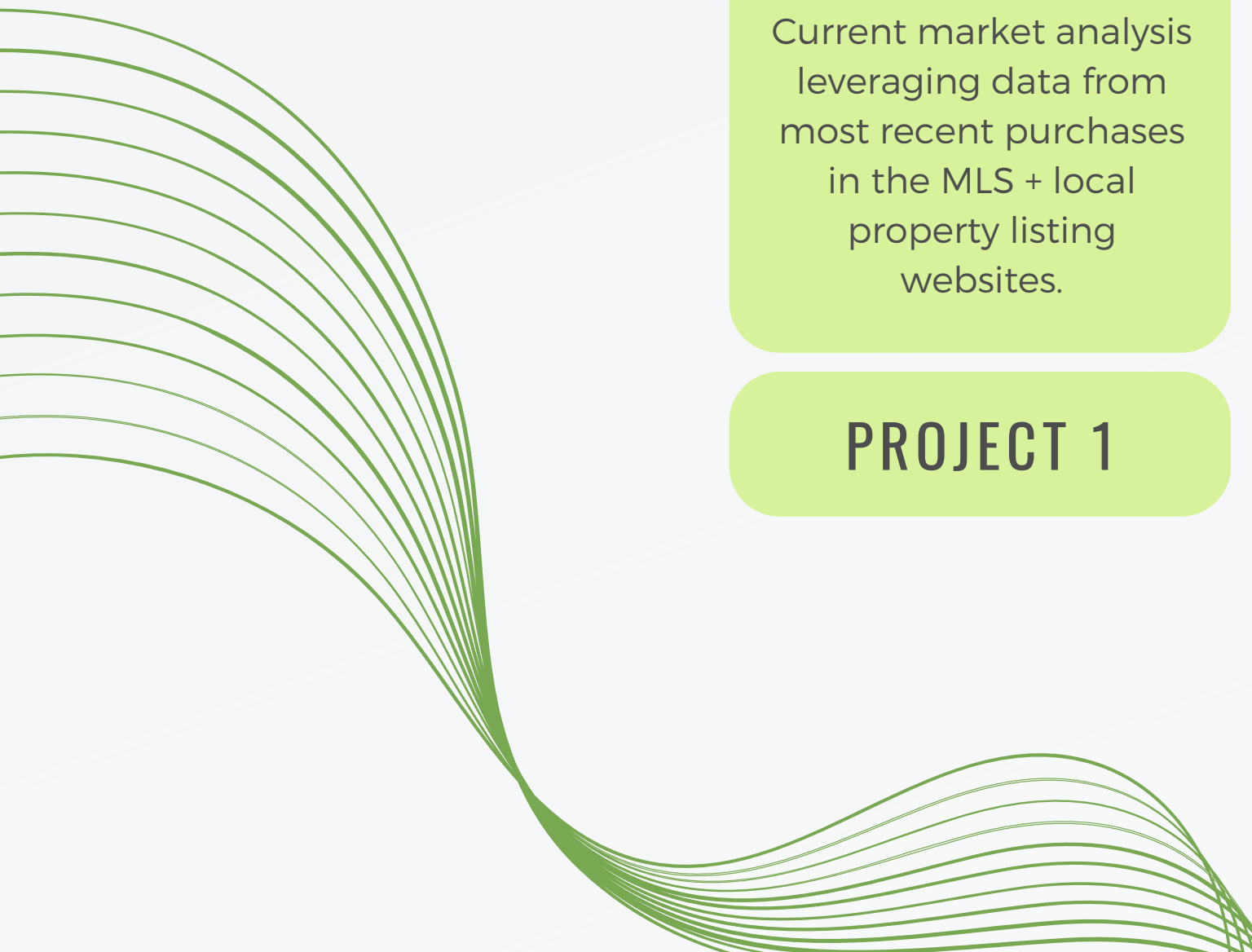
**PROJECT 1**

Analyze housing affordability in the states populated by a big amount of puertoricans to visualize housing affordability overall.

**PROJECT 2**

Develop a language model to predict future housing affordability based on identified factors.

**PROJECT 3**

# THANK YOU FOR WATCHING

*Let us know if you have any questions or if you would like to see similar real estate analysis from us!*