



## Housing Finance Market Analytics

⭐ Tech Stack	DAX	Google BigQuery	Power BI Desktop & Service	SQLServer
≡ Brief Summary	End-to-end analytics project using <b>Google BigQuery</b> as the data source for a <b>Power BI</b> report with 2 pages <i>Market Overview &amp; Sales Performance</i> , and <i>House Type Analysis</i> .			
🔗 Link	<a href="https://github.com/khanhmdinh/khanhmdinh.github.io/tree/main/03_Housing%20Finance%20Market%20Analytics.ipynb">https://github.com/khanhmdinh/khanhmdinh.github.io/tree/main/03_Housing%20Finance%20Market%20Analytics.ipynb</a>			



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# Summary

## Scope of Work

- **Data Source & Access:** Set up Google account and connect **Google BigQuery** as the primary data source for Power BI.
- **Data Preparation:** Use **SQL in BigQuery** for transformations and data understanding; apply **Power Query** in Power BI for cleaning and type/format standardization.
- **Modeling & DAX:** Define model fields/relationships and create **10+ DAX measures**, including **Year-over-Year (YoY) growth** using functions such as **CALCULATE** and **FILTER**.
- **Report Design (3 pages):**
  - **Page 1: Housing Market Overview** (high-level KPIs and trends) & **Sales Performance** (comparisons, YoY)
  - **Page 2: House Type Analysis** (breakdowns by property type)
- **Publish & Share:** Publish to **Power BI Service**.

## Deliverables

- **Power BI (.pbix)** with BigQuery connection, cleaned model, **3 report pages**, and finalized visuals.
- **SQL & DAX Pack:** Key **BigQuery SQL** scripts and a **DAX measure catalog** (name • purpose • expression).
- **Setup Notes (concise):** Steps to enable BigQuery access and configure the Power BI connector; brief publish/share guide.

## Success Criteria

- Reliable Power BI ↔ BigQuery connectivity; data loads without errors.
- YoY and other DAX measures compute correctly and match expected logic.
- Three pages clearly communicate insights (overview → performance → type analysis).

# Data Assessment & Cleaning Tools

## ▼ Dataset Information

Column Name	Description
date	The date when the data was recorded or when the transaction took place.
quarter	The fiscal quarter in which the event occurred (e.g., Q1, Q2, Q3, Q4).
house_id	A unique identifier for each house in the dataset.
house_type	The type of house (e.g., detached, semi-detached, apartment, etc.).
sales_type	The type of sale, such as "new" or "resale" (indicates if the house is newly built or pre-owned).
year_build	The year the house was built.
purchase_price	The price at which the house was purchased.
%_change_between_offer_and_purchase	The percentage change in the price between the offer and the purchase price.
no_rooms	The number of rooms in the house.
sqm	The total area of the house in square meters.
sqm_price	The price per square meter of the house.
address	The street address of the property.
zip_code	The postal code of the property's location.
city	The city where the property is located, which is an urban area and part of a municipality (e.g., Copenhagen, Aarhus).
area	The specific district, neighborhood, or part of the city where the property is located (e.g., Vesterbro in Copenhagen).
region	The broader administrative region of Denmark in which the property is located (e.g., Capital Region of Denmark, Central Denmark).
nom_interest_rate%	The nominal interest rate on a mortgage loan for the house (expressed as a percentage).
dk_ann_infl_rate%	The annual inflation rate in Denmark, as a percentage.
yield_on_mortgage_credit_bonds%	The yield on mortgage credit bonds, expressed as a percentage.
SQM	The total area of the house in square meters



## ▼ Using SQL in BigQuery for Data understanding and transformations

▼ Query 1: Looking for the average purchase price

▼ Query 2: Update the SQM column equal to 100

```

3 CREATE TABLE `feisty-proton-471822-d4_1.Test` AS
4 SELECT * FROM `feisty-proton-471822-d4_1.Housing`;
5
6 SELECT * FROM `feisty-proton-471822-d4_1.Test` LIMIT 1000
7
8 SELECT
9   , AVG(purchase_price) AS avg_purchase_price
10  FROM `feisty-proton-471822-d4_1.Test`
11 GROUP BY sales_type;
12
13 UPDATE `feisty-proton-471822-d4_1.Test` SET sqm = 100 WHERE no_rooms = 3;
14 SELECT DISTINCT SQM FROM `feisty-proton-471822-d4_1.Test` WHERE no_rooms = 3;

```

Query completed

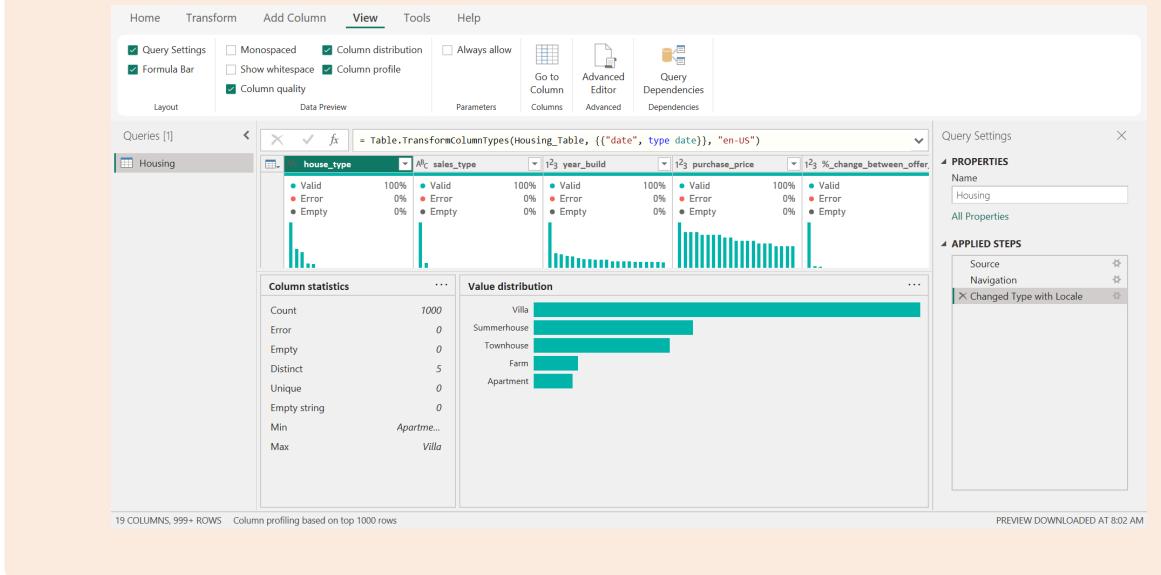
Query results

Job information	Results	Visualization	JSON	Execution details
Row	sales_type	avg.purchase_price		
1	regular_sale	1974129.115615...		
2	family_sale	1509872.060797...		
3	other_sale	1788306.866211...		

Job information	Results	Visualization	JSON	Execution details
Row	SQM			
1	100			

## ▼ Understanding & Cleaning Data using Power Query Editor



## DAX Functions

### ▼ Housing Finance Market Analytics Page

- **YOY Sales Growth (DAX used: CALCULATE, YEAR, MAX, IF, BLANK):** representing the year on year sales growth for different sales type categories.

```
YOY_Sales_Growth =  
Var CurrYearSales =  
    CALCULATE(SUM(Housing[purchase_price]),  
              YEAR(Housing[date])=YEAR(max(Housing[date])))  
  
Var Prevyearsales =  
    CALCULATE(SUM(Housing[purchase_price]),  
              YEAR(Housing[date])=year(max(Housing[date]))-1)  
Return  
IF(Prevyearsales<>0, (CurrYearSales-Prevyearsales)/Prevyearsales,BLANK())
```

- Adding the **Offer Price** column

```
Offer Price = (100*Housing[purchase_price])/(100-Housing[%_change_between_offer_and_purchase])
```

- Using **MEDIAN DAX Function** to find out the **Median Sales Price Change**

```
Median Sales Price Change =  
Var CurrMedianPrice =  
    MEDIANX(FILTER(Housing,  
                  YEAR(Housing[date].[Date])=  
                  YEAR(MAX(Housing[date].[Date]))),  
                  Housing[purchase_price])  
  
Var PreMedianPrice =  
    MEDIANX(FILTER(Housing,YEAR(Housing[date].[Date])=YEAR(MAX(Housing[date].[Date]))-1),Housing[purchase_price])  
  
RETURN  
IF(PreMedianPrice<>0, (CurrMedianPrice-PreMedianPrice)/PreMedianPrice,  
BLANK())
```



- Adding **Units Sold in latest Year & Quarter (DAX used: CALCULATE, DISTINCTCOUNT, YEAR, QUARTER, MAX)**

```
Units sold in latest Year & Quarter =  
CALCULATE(DISTINCTCOUNT(Housing[house_id]),  
          YEAR(Housing[date])= YEAR(MAX(Housing[date])) && QUARTER(Housing[date])=QUARTER(MAX(Housing[date])))
```

- **Last 12 month Sales (DAX used: CALCULATE, DATESINPERIOD & SUM):** represent the total sales value for the last 12 months

```
Last 12 Month Sales = CALCULATE(SUM(Housing[purchase_price]),DATESINPERIOD(Housing[date],MAX(Housing[date]),-12,MONTH))
```

- **Sales by Region (DAX used: CALCULATE, SUM & ALLEXCEPT)**

Sales by Region =  
CALCULATE(SUM(Housing[purchase\_price]), ALLEXCEPT(Housing, Housing[region]))

- **TotalYTD**

TotalYTD Sales = TOTALYTD(SUM(Housing[purchase\_price]), Housing[date].[Date])

- **Average Price SQM**

Average Price SQM = AVERAGE(Housing[sqm\_price])

- **Adding Age column**

Age = ABS(YEAR(Housing[date].[Date]) - Housing[year\_build] )

- **Offer to SQM Price**

Offer to SQM Ration = DIVIDE(SUM(Housing[Offer Price]), SUM(Housing[sqm]))

## ▼ House Type Analysis Page

# Project Showcase

📌 [Detailed Report \(For More Information\)](#)

View the Live Dashboard: <https://app.powerbi.com/reportEmbed?reportId=8be8e820-fa1e-42c0-828a-11afb976c0e3&autoAuth=true&ctid=216e5950-5a9c-4dc3-96cf-437406f9c7a3>

