Tableau Dashboard Link:
https://public.tableau.com/app/profile/afaq.ahmad.farooq/viz/WeeklyPriceChangeAnomalyDashboard/Dashboard?publish=yes

Case Study Summary: Weekly Price Change & Anomaly Dashboard

The case study focused on analyzing price changes between two consecutive weeks for various luxury brands. The task was to create a dashboard that highlights the price differences across products, identifies any anomalies, and presents insights in a clear and actionable manner. The data for this analysis came from two data extracts, one for the current week (W) and one for the previous week (W-1).

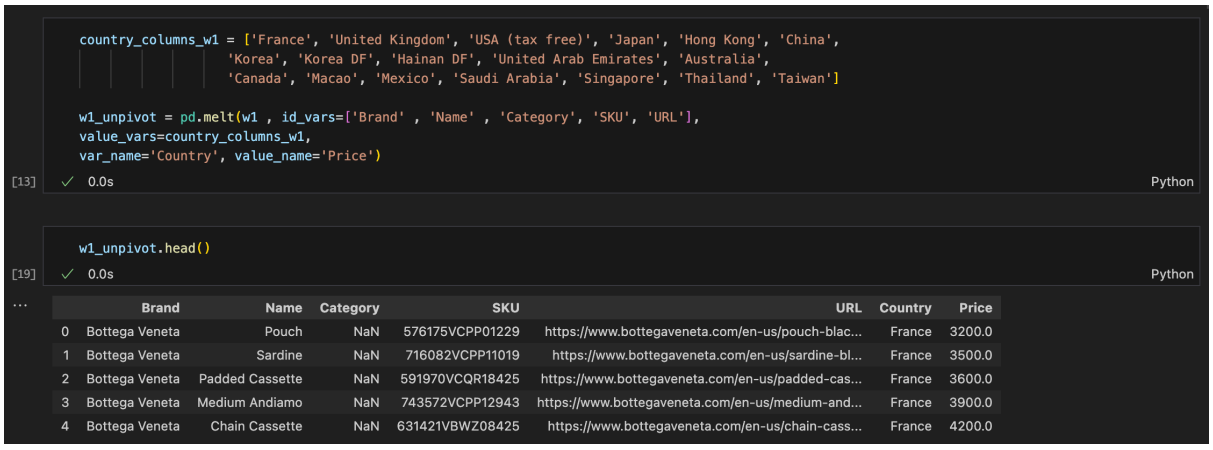
Data Preparation and Transformation Process:

Before proceeding with the visualizations, I performed several essential data preparation steps to ensure the data was structured for effective analysis. The key steps involved unpivoting country-specific price columns into a more usable format and merging two datasets.

- ### Unpivoting Country-Specific Columns

To make the data more manageable and suitable for analysis, I unpivoted the country-specific columns into two new columns:

Country: This column now contains all the country names.
Price: This column contains the corresponding price values for each product in the respective country.



```
country_columns_w1 = ['France', 'United Kingdom', 'USA (tax free)', 'Japan', 'Hong Kong', 'China',
                      'Korea', 'Korea DF', 'Hainan DF', 'United Arab Emirates', 'Australia',
                      'Canada', 'Macao', 'Mexico', 'Saudi Arabia', 'Singapore', 'Thailand', 'Taiwan']

w1_unpivot = pd.melt(w1 , id_vars=['Brand' , 'Name' , 'Category', 'SKU', 'URL'],
value_vars=country_columns_w1,
var_name='Country', value_name='Price')
```

[13] ✓ 0.0s Python

```
w1_unpivot.head()
```

[19] ✓ 0.0s Python

	Brand	Name	Category	SKU	URL	Country	Price
0	Bottega Veneta	Pouch	NaN	576175VCPP01229	https://www.bottegaveneta.com/en-us/pouch-blac...	France	3200.0
1	Bottega Veneta	Sardine	NaN	716082VCPP11019	https://www.bottegaveneta.com/en-us/sardine-bl...	France	3500.0
2	Bottega Veneta	Padded Cassette	NaN	591970VCQR18425	https://www.bottegaveneta.com/en-us/padded-cas...	France	3600.0
3	Bottega Veneta	Medium Andiamo	NaN	743572VCPP12943	https://www.bottegaveneta.com/en-us/medium-and...	France	3900.0
4	Bottega Veneta	Chain Cassette	NaN	631421VBWZ08425	https://www.bottegaveneta.com/en-us/chain-cass...	France	4200.0

```
country_columns_w = ['France', 'United Kingdom', 'USA (tax free)', 'Japan', 'Hong Kong', 'China',
                     'Korea', 'Korea DF', 'Hainan DF', 'United Arab Emirates', 'Australia',
                     'Canada', 'Macao', 'Mexico', 'Saudi Arabia', 'Singapore', 'Thailand', 'Taiwan']

w_unpivot = pd.melt(w , id_vars=['Brand' , 'Name' , 'Category', 'SKU'],
value_vars=country_columns_w,
var_name='Country', value_name='Price')
```

[16] ✓ 0.0s Python

```
w_unpivot.head()
```

[18] ✓ 0.0s Python

	Brand	Name	Category	SKU	Country	Price
0	Bottega Veneta	Mini Loop Camera Bag	NaN	680254V1G118425	France	1800.0
1	Bottega Veneta	Small Cassette	NaN	730848VMAY18425	France	2000.0
2	Bottega Veneta	Mini Pouch	NaN	585852VCPP18803	France	2200.0
3	Bottega Veneta	Mini Jodie	NaN	651876VCPP58803	France	2200.0
4	Bottega Veneta	Cassette	NaN	578004VMAY11229	France	2200.0

- **Merge Process**:

I then merged the two datasets(w1_unpivot and w_unpivot) using an outer join based on column, SKU and Country.

This merge allowed me to have the current week's prices from W and the previous week's prices from W-1 side by side, enabling the calculation of price differences later on.

```
df_combined = pd.merge(w_unpivot , w1_unpivot , on=['SKU','Country'], how='outer')
```

[32] ✓ 0.0s Python

```
df_combined
```

[33] ✓ 0.0s Python

	Brand_x	Name_x	Category_x	SKU	Country	Price_x	Brand_y	Name_y	Category_y	URL	Price_y
0	Bottega Veneta	Mini Loop Camera Bag	NaN	680254V1G118425	France	1800.0	Bottega Veneta	Mini Loop Camera Bag	NaN	https://www.bottegaveneta.com/en-us/mini-loop-...	1800.0
1	Bottega Veneta	Small Cassette	NaN	730848VMAY18425	France	2000.0	Bottega Veneta	Small Cassette	NaN	https://www.bottegaveneta.com/en-us/small-cass...	2000.0
2	Bottega Veneta	Mini Pouch	NaN	585852VCPP18803	France	2200.0	Bottega Veneta	Mini Pouch	NaN	https://www.bottegaveneta.com/en-us/mini-pouch...	2200.0
3	Bottega Veneta	Mini Jodie	NaN	651876VCPP58803	France	2200.0	Bottega Veneta	Mini Jodie	NaN	https://www.bottegaveneta.com/en-us/mini-jodie...	2200.0

- **Drop Unnecessary Columns**

Droped Category and URL Columns.

```
df = df_combined.drop(columns=['Category_x','Category_y','URL'])

df
```

[34] ✓ 0.0s Python

	Brand_x	Name_x	SKU	Country	Price_x	Brand_y	Name_y	Price_y
0	Bottega Veneta	Mini Loop Camera Bag	680254V1G118425	France	1800.0	Bottega Veneta	Mini Loop Camera Bag	1800.0
1	Bottega Veneta	Small Cassette	730848VMAY18425	France	2000.0	Bottega Veneta	Small Cassette	2000.0
2	Bottega Veneta	Mini Pouch	585852VCPP18803	France	2200.0	Bottega Veneta	Mini Pouch	2200.0
3	Bottega Veneta	Mini Jodie	651876VCPP58803	France	2200.0	Bottega Veneta	Mini Jodie	2200.0
4	Bottega Veneta	Cassette	578004VMAY11229	France	2200.0	Bottega Veneta	Cassette	2200.0
...	...	...	...	...	...	...	...	...

- **Calculating Price Difference and Price Percentage Difference**

Price Difference :
Calculated additional columns to highlight the price changes between the current week and the previous week:

Formula: Price Difference = (Price in Current Period) – (Price in Previous Period)

This value shows the absolute change in price for each product in each country, helping identify any increases or decreases week over week.

Price Percentage Difference :
This column was created by calculating the percentage change between the previous week's price and the current week's price.

Formula: Price Percentage Difference = ((Price in Current Period) – (Price in Previous Period)/ (Price in Previous Period)) * 100

This percentage provides a clearer understanding of the magnitude of the price change relative to the original price, which is particularly useful for comparisons across products with different price ranges.

```
df_new['Price_Diff'] = df_new['Price_y']-df_new['Price_x']

df_new['Price Pct Change']= (df_new['Price_Diff']/df_new['Price_x'])*100

df_new.fillna(0,inplace=True)

df_new
```

[48] ✓ 0.0s Python

	Unnamed: 0	Brand_x	Name_x	SKU	Country	Price_x	Brand_y	Name_y	Price_y	Price_Diff	Price Pct Change
0	0	Bottega Veneta	Mini Loop Camera Bag	680254V1G118425	France	1800.0	Bottega Veneta	Mini Loop Camera Bag	1800.0	0.0	0.0
1	1	Bottega Veneta	Small Cassette	730848VMAY18425	France	2000.0	Bottega Veneta	Small Cassette	2000.0	0.0	0.0
2	2	Bottega Veneta	Mini Pouch	585852VCPP18803	France	2200.0	Bottega Veneta	Mini Pouch	2200.0	0.0	0.0
3	3	Bottega Veneta	Mini Jodie	651876VCPP58803	France	2200.0	Bottega Veneta	Mini Jodie	2200.0	0.0	0.0
4	4	Bottega Veneta	Cassette	578004VMAY11229	France	2200.0	Bottega Veneta	Cassette	2200.0	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...
4837	4837	0	0	nvprod2010013v/M44925	Thailand	0.0	Louis Vuitton	OnTheGo GM	121000.0	0.0	0.0

Data Visualization

Once the data transformation and calculations were completed, I moved on to visualizing the price differences. The goal was to create intuitive and insightful visualizations that would help in understanding price fluctuations and spotting anomalies across different products, brands and countries.

- ## Price Difference Bar Chart

This bar shows the price difference for each product.

Purpose: This chart visualizes the absolute difference in price for each product, color-coded to indicate whether the price increase was positive or negative.

Interactivity: Filters were added to allow users to select specific countries and brands, providing dynamic views based on user selection.

Key Insight: This chart allows easy identification of products with the biggest price increases or decreases.

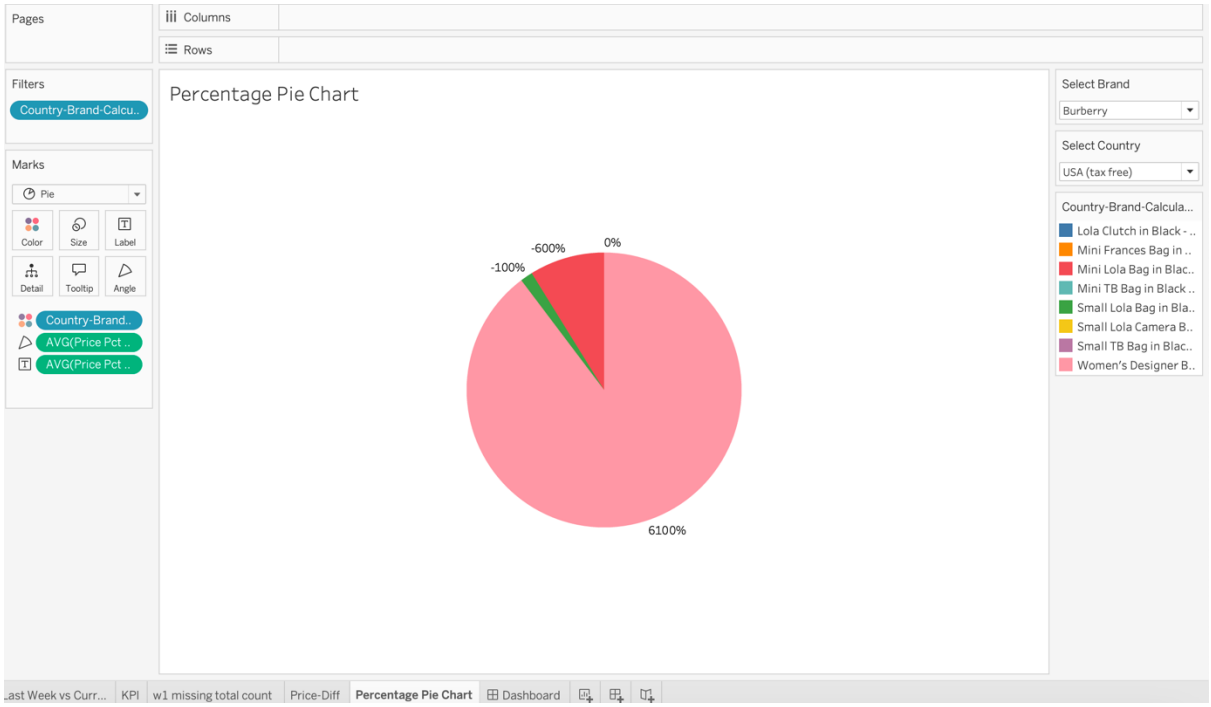
- ## Price Percentage Change Pie Chart

A pie chart was used to visualize the percentage change in price for each product within a selected brand and country.

Purpose: The pie chart segments show the percentage changes for each product within the selected filter conditions, helping to identify how different products have changed in terms of price relative to their previous prices.

Interactivity: Filters were added to allow users to select specific countries and brands, providing dynamic views based on user selection.

Key Insight: This visualization highlights the distribution of percentage changes, enabling a quick understanding of the overall price trends for products in a specific country or brand.



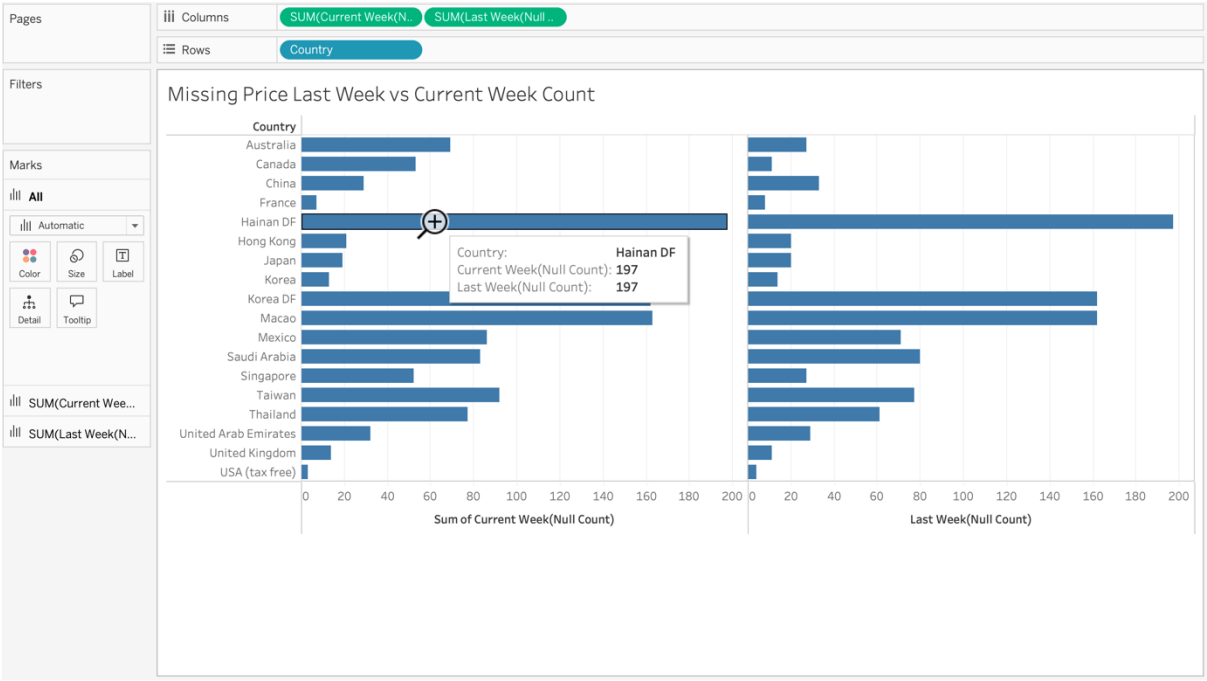
(Note : The percentage values, such as 6100% or -600%, actually represent 61% and -6%. Tableau appears to be multiplying the percentage change values by 100. However, I have validated that the values in the source data are correct.)

- ## Null Values Bar Chart

This bar chart shows the count of null values for both the current week and the last week across countries.

Purpose: This chart helps in identifying any missing or incomplete data for specific products or countries, which could indicate issues with data collection or product availability.

Key Insight: Analyzing null values week by week can help assess data quality and determine areas where further investigation or data cleaning is needed.

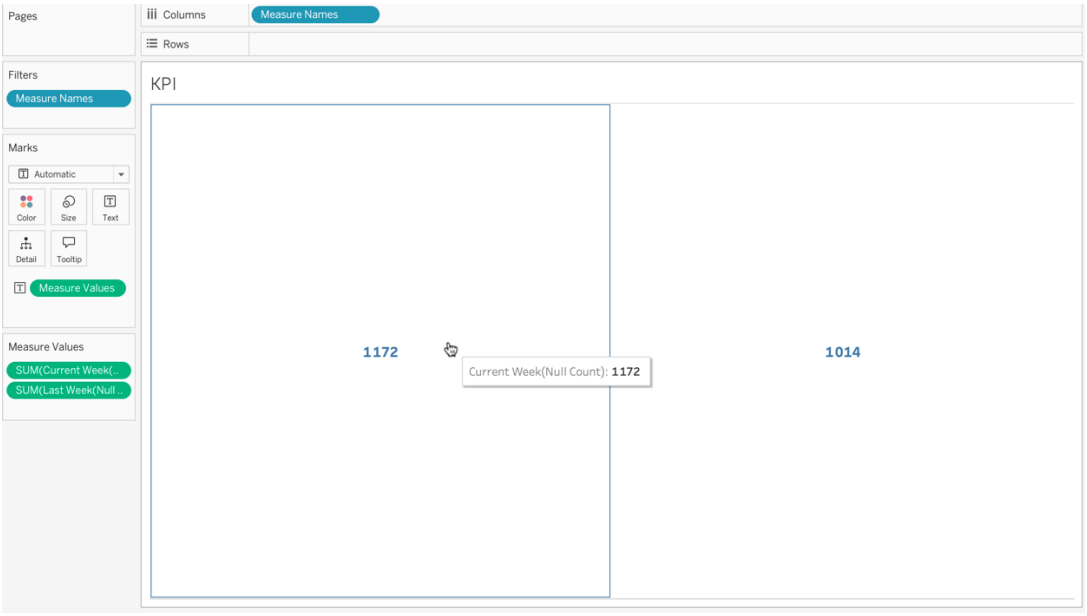


- **KPIs (Key Performance Indicators)**

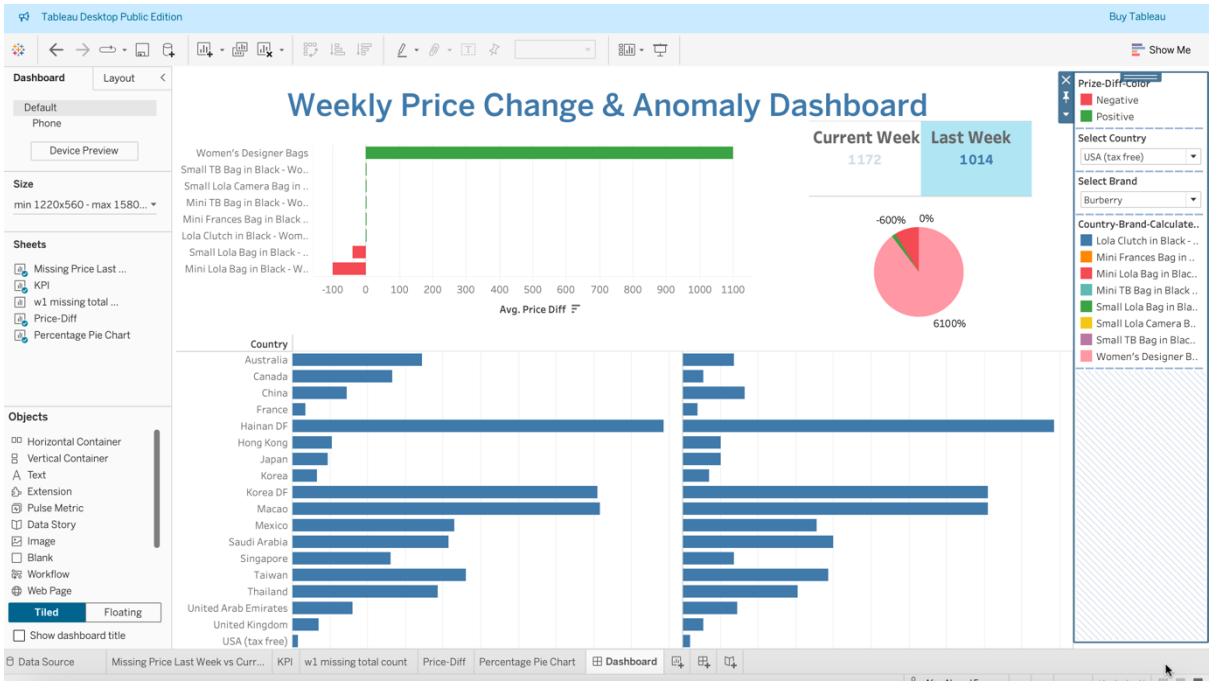
Two KPIs were created to show the total count of null prices for the current and previous weeks.

Purpose: These KPIs provide a quick overview of the number of missing prices for the two weeks.

Key Insight: The KPIs act as key indicators for data health, alerting analysts to potential issues with the data before they impact further analysis.



- **Dashboard**



Anomalies Identification

While creating the visualizations, certain anomalies were identified in the data that required further attention:

- **Null Price Values**

Missing prices for certain products in specific countries were flagged as null values, which could indicate issues with data collection or product availability.

These missing prices could skew the analysis and affect the accuracy of insights drawn from the dataset.

- **High Price Differences Observed**

Significant price discrepancies which need for closer scrutiny. These differences could stem from various factors like incorrect exchange rates, outdated price references or potential data processing errors. Identifying the root cause of these anomalies will help ensure pricing data accuracy across regions.

Next Actions and Recommendations

As the business analyst in charge of data delivery my next steps would involve the following actions:

- ## Data Validation

Ensure all missing prices are properly investigated and validated with the tech team. It's important to understand the root cause of any missing data to prevent issues in future updates.

- ## Data Clean-up

Handle zero price entries or anomalous values carefully, either by excluding them from certain calculations or flagging them for further review.

- ## Team Coordination and Feedback Preparation

If any data inconsistencies or unexpected anomalies are detected. I will send feedback mechanism to communicate these findings back to the Tech and Data teams. Which will ensure that all detected issues are reviewed and corrected before the data is transitioned from draft to client sessions.

Timely feedback will help maintain data integrity and improve future data handling.

- ## Continuous Monitoring

Set up regular data updates and dashboards to continuously monitor price changes over time and ensuring any unexpected anomalies are detected early and addressed promptly.