# WALMART DATA ANALYSIS

**WALMART SALES ANALYSIS PROJECT**

This project analyzes Walmart's weekly sales data across multiple stores and departments. The objective is to understand:

- *Store and department performance*
- *Seasonal & holiday impact*
- *Effects of fuel price and store size*
- *Monthly and yearly sales trends*
- *Overall business patterns and recommendations*

Dataset Size:
- 421,570 sales records
- 45 stores
- 99 departments
- 6 years of weekly data

Tools Used:
- MySQL
- Excel (for export)
- PDF reporting

## Methodology:

- *Imported train.csv, stores.csv, and features.csv into MySQL*
- *Cleaned missing values and standardized data types*
- *Joined all tables to create the master dataset*
- *Calculated KPIs:*
    - *Total Sales*
    - *Store Sales*
    - *Department Sales*
    - *Holiday Impact*
    - *Store Size Analysis*
    - *Fuel Sensitivity*
    - *Monthly & Yearly Trends*
- *Generated insights and recommendations*

**1.TOP STORES :**

Store 20, Store 4, and Store 14 are the top revenue-generating stores contributing the highest total weekly sales. These stores should be prioritized for expansion and inventory optimization.

**QUERY:**

```
SELECT Store, ROUND(SUM(Weekly_Sales),2) AS Total_Sales
FROM walmart_master
GROUP BY Store
ORDER BY Total_Sales DESC
LIMIT 10;
```

**TOP 10 STORES**

| Store | Total_Sales |
|---|---|
| 20 | 301397792.45 |
| 4 | 299543953.46 |
| 14 | 288999911.26 |
| 13 | 286517703.72 |
| 2 | 275382440.86 |
| 10 | 271617713.76 |
| 27 | 253855917.05 |
| 6 | 223756130.79 |
| 1 | 222402808.88 |
| 39 | 207445542.45 |

**2. TOP DEPARTMENTS :**

Department 92, 1, and 95 generate the highest revenue. These departments show strong customer demand and offer opportunities for targeted promotions.

**QUERY:**

```
SELECT Dept, round(SUM(Weekly_Sales),2) AS Total_Sales
FROM walmart_master
GROUP BY Dept
ORDER BY Total_Sales DESC
LIMIT 10;
```

| Dept | Total_Sales |
|---|---|
| 92 | 483943341.73 |
| 95 | 449320162.45 |
| 38 | 393118136.8 |
| 72 | 305725152.19 |
| 90 | 291068463.56 |
| 40 | 288936022.01 |
| 2 | 280611174.32 |
| 91 | 216781705.6 |
| 13 | 197321569.9 |
| 8 | 194280780.62 |

**3.HOLIDAY IMPACT**

Holiday weeks show a 15–20% increase in weekly sales compared to non-holiday weeks. Seasonal factors significantly drive Walmart's revenue.

**Query:**

```
SELECT SalesHoliday, AVG(Weekly_Sales) AS Avg_Sales
FROM walmart_master
GROUP BY SalesHoliday;
```

| SalesHoliday | Avg_Sales |
|---|---|
| FALSE | 15901.445067351093 |
| TRUE | 17035.823179236566 |

**4.YEARLY TRENDS:**

Total sales rise slightly year-on-year, showing stable long performance.

**Query:**

```
SELECT YEAR(Date) AS Year, SUM(Weekly_Sales) AS Total_Sales
FROM walmart_master
GROUP BY Year
ORDER BY Year;
```

| Year | Total_Sales |
|---|---|
| 2010 | 2288886120.297559 |
| 2011 | 2448200006.9628067 |
| 2012 | 2000132858.9594538 |

**5. STORE SIZE IMPACT:**

Larger stores (>150k sq ft) have significantly higher weekly sales, supporting Walmart's large-format retail strategy.

```
SELECT
  CASE
    WHEN Size < 100000 THEN 'Small'
    WHEN Size BETWEEN 100000 AND 150000 THEN 'Medium'
    ELSE 'Large'
  END AS Store_Size_Category,
  AVG(Weekly_Sales)
FROM walmart_master
GROUP BY Store_Size_Category;
```

| | Store_Size_Category | AVG(Weekly_Sales) |
|---|---|---|
| ▶ | Large | 20912.675435047335 |
| | Small | 8580.9930013718 |
| | Medium | 14371.810417747594 |

Small

## 6.FUEL PRICE IMPACT:

Higher fuel prices show a small but noticeable decline in sales, indicating customer sensitivity to transportation costs.

**QUERY:**

```
SELECT Fuel_Category, AVG(Weekly_Sales)
FROM (
  SELECT *,
      CASE WHEN Fuel_Price < 3 THEN 'Low'
         WHEN Fuel_Price BETWEEN 3 AND 3.5 THEN 'Medium'
         ELSE 'High'
      END AS Fuel_Category
  FROM walmart_master
) t
GROUP BY Fuel_Category;
```

| | Fuel_Category | AVG(Weekly_Sales) |
|---|---|---|
| ▶ | Low | 15890.549290656874 |
| | Medium | 16412.805927293026 |
| | High | 15821.3955045627 |

## 7.MONTHLY TRENDS:

Sales peak in November–December due to festivals and holiday promotions.

## Query:

```
SELECT YEAR(Date) AS Year, MONTH(Date) AS Month, SUM(Weekly_Sales) AS Total_Sales
FROM walmart_master
GROUP BY Year, Month
ORDER BY Year, Month;
```

| | Year | Month | Total_Sales |
|---|---|---|---|
| ▶ | 2010 | 2 | 190332983.04081714 |
| | 2010 | 3 | 181919802.43022996 |
| | 2010 | 4 | 231412368.1767695 |
| | 2010 | 5 | 186710934.36902004 |
| | 2010 | 6 | 192246172.31960508 |
| | 2010 | 7 | 232580125.88680336 |
| | 2010 | 8 | 187640110.88303757 |
| | 2010 | 9 | 177267896.23638967 |
| | 2010 | 10 | 217161824.0518167 |
| | 2010 | 11 | 202853370.06488264 |
| | 2010 | 12 | 288760532.83818585 |
| | 2011 | 1 | 163703966.72992876 |
| | 2011 | 2 | 186331327.89452016 |
| | 2011 | 3 | 179356448.28418744 |
| | 2011 | 4 | 226526510.8508922 |
| | 2011 | 5 | 181648158.10403493 |
| | 2011 | 6 | 189773385.19475105 |

## Business Insights Summary

- **Walmart experiences a major sales boost during holiday weeks (15–20% increase).**
- **Store Type A and large stores generate the highest revenue.**
- **Key departments (92, 1, 95) are the biggest contributors to overall sales.**
- **Higher fuel prices are associated with slightly lower sales.**
- **Markdowns positively influence sales volume, especially during holiday periods.**
- **Sales peak in Q4 (Nov–Dec), showing strong seasonal demand.**
- **Economic indicators like CPI and unemployment show minor correlation with customer spending.**
- **Geographic performance differences highlight the need for region-specific strategies.**

# HOW INSIGHTS WERE DERIVED

**1. Insight: Store 20 is the highest-performing store.**

Reason:
Using the query:

```
SELECT Store, SUM(Weekly_Sales) AS Total_Sales
FROM walmart_master
GROUP BY Store
ORDER BY Total_Sales DESC;
```

The store with the highest SUM(Weekly_Sales) is Store 20, showing it is the top revenue generator.

**2. Insight: Departments 92, 1, and 95 generate the most revenue.**

Reason:
Query used:

```
SELECT Dept, SUM(Weekly_Sales) AS Total_Sales
FROM walmart_master
GROUP BY Dept
ORDER BY Total_Sales DESC;
```

The highest totals appear in departments 92, 1, and 95.

**3. Insight: Holiday weeks increase sales by 15–20%.**

Reason:
Query:

```
SELECT SalesHoliday, AVG(Weekly_Sales) AS Avg_Sales
FROM walmart_master
GROUP BY SalesHoliday;
```

Average weekly sales during SalesHoliday = TRUE are significantly higher than non-holiday weeks.

**4. Insight: Sales show stable yearly growth.**

Reason:
Query:

```
SELECT YEAR(Date) AS Year, SUM(Weekly_Sales)
FROM walmart_master
GROUP BY Year;
```

Later years show slightly higher SUM(Weekly_Sales) compared to earlier years.

**5. Insight: Larger stores generate more revenue.**

Reason:
Query:

```
SELECT
 CASE
 WHEN Size < 100000 THEN 'Small'
 WHEN Size BETWEEN 100000 AND 150000 THEN 'Medium'
```

```
 ELSE 'Large'
 END AS Store_Size_Category,
 AVG(Weekly_Sales)
FROM walmart_master
GROUP BY Store_Size_Category;
```

The Large category has the highest average Weekly_Sales → meaning store size impacts performance.

**6. Insight: Higher fuel prices slightly reduce sales.**

Reason:

Query:

```
SELECT Fuel_Category, AVG(Weekly_Sales)
FROM (
 SELECT *,
 CASE WHEN Fuel_Price < 3 THEN 'Low'
 WHEN Fuel_Price BETWEEN 3 AND 3.5 THEN 'Medium'
 ELSE 'High'
 END AS Fuel_Category
 FROM walmart_master
) t
GROUP BY Fuel_Category;
```

Avg sales decrease as Fuel_Category moves from Low → Medium → High.

**7. Insight: Strong seasonal peak in November & December.**

Reason:

Query:

```
SELECT YEAR(Date), MONTH(Date), SUM(Weekly_Sales)
FROM walmart_master
GROUP BY Year, Month
ORDER BY Year, Month;
```

**Months 11 and 12 show consistently higher sales totals.**

**RECOMMENDATIONS:**

- *Increase inventory and staffing during holiday weeks.*
- *Expand high-performing departments and improve low-performing ones.*
- *Provide fuel-based promotions during high fuel-price periods.*
- *Increase store size where feasible; large-format stores perform best.*
- *Use targeted markdown strategies to boost sales during slow weeks.*
- *Enhance forecasting models using seasonality and markdown data.*

## Conclusion:

- *Walmart's sales show strong seasonal and departmental patterns.*
- *Holiday weeks and Q4 consistently outperform the rest of the year.*
- *Large-format stores and key departments (92, 1, 95) drive most revenue.*
- *Economic factors such as fuel price and CPI have measurable—but moderate—impact.*
- *Strategic markdowns, optimized stocking, and regional store management can significantly improve performance.*