FOOD DELIVERY COST & PROFITABILITY ANALYSIS

Evaluating financial efficiency and profitability of food delivery services

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PURPOSE OF THIS ANALYSIS

This project aims to evaluate the financial aspects of food delivery services by comparing costs incurred with revenue generated, to assess the overall profitability per order.

Key Focus Areas

- Cost components (Commission, Delivery, Processing fees, Refunds)
- Revenue from orders
- Profit margins per order

KEY METRICS ANALYZED

- **Order Value, Delivery Fee, Commission Fee, Refunds**
- **Total Costs, Revenue per Order, Profit per Order**

DATASET

DataSet was imported from kaggle | LINK

TOOLS USED

- SQL for data extraction
- Python for deeper analysis

Q.1 TOTAL ORDERS AND REVENUE

```sql
1    -- Q1 Write a query to calculate total orders and revenue
2
3    SELECT COUNT(*) AS Total_Orders, SUM(`Order Value`) AS Total_Revenue
4    FROM food_orders;
5
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Total_Orders	Total_Revenue
1000	1053969

Q.2 EXTRACT TOP 10 RESTAURANTS BY ORDER COUNT

```sql
-- Q2 Write a query to extract top 10 Restaurants by order count

select `Restaurant ID`,count(*) as Order_count
from food_orders
group by `Restaurant ID`
order by order_count desc
limit 10
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

Restaurant ID	Order_count
R2317	6
R2016	5
R2804	5
R2726	5
R2523	5
R2083	5
R2028	4
R2348	4
R2933	4
R2520	4

Q.3 AVERAGE DELIVERY TIME AND REVENUE BY MONTH

```sql
-- Q3 Write a query to calculate average delivery time and revenue by month

select date_format(`Order Date and Time`,'%Y-%m') as month,
       avg(timestampdiff(minute,`Order Date and Time`,`Delivery Date and Time`)) as avg_delivery_time,
       sum(`Order Value`) as Monthly_revenue
from food_orders
group by month
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

month	avg_delivery_time	Monthly_revenue
2024-02	73.5590	207291
2024-01	73.5789	846678

Q.4 TOP 3 RESTAURANTS BY PROFIT MARGIN

```sql
-- Q4 Write a query to get top 3 Restaurants by profit margin

select `Restaurant ID`,
      sum(`Order Value`) as Total_Revenue,
      sum(`Order Value` - (`Commission Fee` + `Delivery Fee` + `Payment Processing Fee`+ `Refunds/Chargebacks`)) as Total_Profit,
      (sum(`Order Value` - (`Commission Fee` + `Delivery Fee` + `Payment Processing Fee`+ `Refunds/Chargebacks`))*100.0)/sum(`Order Value`) as Profit_Percentage
from food_orders
group by `Restaurant ID`
order by profit_percentage desc
limit 3
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

Restaurant ID	Total_Revenue	Total_Profit	Profit_Percentage
R2198	1487	1412	94.95629
R2584	1981	1875	94.64917
R2882	1543	1452	94.10240

Q.5 MOST COMMON PAYMENT METHOD

```sql
1    -- Q5 Write a query for the most common payment method
2
3 •  select `Payment Method`,count(*) as total_payments
4    from food_orders
5    group by `Payment Method`
6    order by total_payments desc
7    limit 1
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

Payment Method	total_payments
Cash on Delivery	357

Q.6 COMMISSION TO PROFIT RATIO PER RESTAURANTS

```sql
-- Q6 Write a query to find commission to profit ratio per restaurants

select `Restaurant ID`,
       sum(`Commission Fee`) as Total_commission,
       sum(`Order Value` - (`Commission Fee` + `Payment Processing Fee` + `Refunds/Chargebacks`)) as total_profit,
       ( sum(`Commission Fee`)*100)/sum(`Order Value` - (`Commission Fee` + `Payment Processing Fee` + `Refunds/Chargebacks`)) as commission_profit_ratio
from food_orders
group by `Restaurant ID`
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Restaurant ID	Total_commission	total_profit	commission_profit_ratio
R2924	150	1717	8.7362
R2054	416	3043	13.6707
R2870	392	1189	32.9689
R2642	368	3192	11.5288
R2799	461	3740	12.3262
R2777	179	1462	12.2435
R2457	144	97	148.4536
R2978	55	186	29.5699
R2877	116	1499	7.7385
R2161	357	1646	21.6889
R2379	339	1778	19.0664
R2992	61	1703	3.5819
R2086	309	1850	16.7027
R2475	250	1082	23.1054
R2177	130	336	38.6905
R2390	306	999	30.6306

Q.7 MONTHLY GROWTH OF ORDERS AND PROFIT

```sql
-- Q7 Write a query for monthly growth of orders and profit

with monthly as (
select date_format(`Order Date and Time`,'%Y-%m') as month,
       count(*) as order_count,
       sum(`Order Value` - (`Commission Fee` + `Payment Processing Fee` + `Refunds/Chargebacks`)) as profit
from food_orders
group by month
)
select month,
order_count,(order_count - lag(order_count) over (order by month)) / lag(order_count) over (order by month) * 100 AS Growth_Rate_order,
profit,(profit - lag(profit) over (order by month))/lag(profit) over (order by month) * 100 as Growth_rate_profit
from monthly
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

month	order_count	Growth_Rate_order	profit	Growth_rate_profit
2024-01	805	NULL	697368	NULL
2024-02	195	-75.7764	171479	-75.4105

Q.8 TIME TO DELIVERY PERFORMANCE

```sql
-- Q8 write a query for time to delivery performance

select hour(`Order Date and Time`) as order_hour,
       avg(timestampdiff(minute,`Order Date and Time`,`Delivery Date and Time`)) as average_delivery_time
from food_orders
group by order_hour
order by order_hour
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

order_hour	average_delivery_time
0	75.4571
1	76.2286
2	74.0526
3	68.7209
4	75.6809
5	72.3542
6	67.0417
7	72.8182
8	72.2826
9	69.3778
10	68.0667
11	76.3333
12	81.2903
13	72.8333
14	75.8974
15	78.4750

Q.9 RETENTION ANALYSIS : RETURNING VS NEW CUSTOMERS

```sql
-- Q9 Customer Retention Analysis : Returning Vs New Customers

with customer_order as (
select `Customer ID`,
min(`Order Date and time`) as first_order
from food_orders
group by `Customer ID`
), monthly_orders as(
select `Customer ID`,
date_format(`Order Date and Time`, '%Y-%m') as order_month
from food_orders)
select mo.order_month,
sum(case when mo.order_month = date_format(co.first_order,'%%Y-%m') then 1 else 0 end) as new_customer,
sum(case when mo.order_month > date_format(co.first_order,'%%Y-%m') then 1 else 0 end) as returning_customer
from monthly_orders mo
join customer_order co on mo.`Customer ID` = co.`Customer ID`
group by mo.order_month
order by mo.order_month
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

order_month	new_customer	returning_customer
2024-01	0	805
2024-02	0	195

Q.10 SLIDING 7-DAY WINDOW METRICS

```sql
-- Q10 Write query for  Sliding 7-Day Window Metrics

WITH Daily_Orders AS (
    select DATE(`Order Date and Time`) AS Order_Date,
        SUM(`Order Value`) AS Daily_Revenue,
        SUM(`Order Value` - (`Commission Fee` + `Delivery Fee` + `Payment Processing Fee` + `Refunds/Chargebacks`)) AS Daily_Profit,
        COUNT(*) AS Order_Count
    FROM food_orders
    GROUP BY Order_Date
)
SELECT
    d1.Order_Date,
    SUM(d2.Daily_Revenue) AS Revenue_Last_7_Days,
    SUM(d2.Daily_Profit) AS Profit_Last_7_Days,
    SUM(d2.Order_Count) AS Orders_Last_7_Days
FROM Daily_Orders d1
JOIN Daily_Orders d2
ON d2.Order_Date BETWEEN DATE_SUB(d1.Order_Date, INTERVAL 6 DAY) AND d1.Order_Date
GROUP BY d1.Order_Date
ORDER BY d1.Order_Date;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Order_Date	Revenue_Last_7_Days	Profit_Last_7_Days	Orders_Last_7_Days
2024-01-01	32380	26201	28
2024-01-02	59648	48512	52
2024-01-03	90370	73099	79
2024-01-04	108952	87621	99
2024-01-05	129681	104994	118
2024-01-06	156081	125660	143
2024-01-07	178166	142520	167

PYHTON ANALYSIS

```
import numpy as np
import pandas as pd
from datetime import datetime
import matplotlib.pyplot as plt
```

[1]

```
food_order = pd.read_csv("food_orders.csv")
```

[2]

```
print(food_order.head())
```

[3]

```
   Order ID Customer ID Restaurant ID  Order Date and Time  \
0         1       C8270         R2924  2024-02-01 01:11:52
1         2       C1860         R2054  2024-02-02 22:11:04
2         3       C6390         R2870  2024-01-31 05:54:35
3         4       C6191         R2642  2024-01-16 22:52:49
4         5       C6734         R2799  2024-01-29 01:19:30

  Delivery Date and Time  Order Value  Delivery Fee    Payment Method  \
0    2024-02-01 02:39:52         1914             0       Credit Card
1    2024-02-02 22:46:04          986            40    Digital Wallet
2    2024-01-31 06:52:35          937            30  Cash on Delivery
3    2024-01-16 23:38:49         1463            50  Cash on Delivery
4    2024-01-29 02:48:30         1992            30  Cash on Delivery

  Discounts and Offers  Commission Fee  Payment Processing Fee  \
0           5% on App             150                      47
1                 10%             198                      23
2        15% New User             195                      45
3                 NaN             146                      27
4        50 off Promo             130                      50

   Refunds/Chargebacks
0                    0
1                    0
2                    0
3                    0
4                    0
```

PYHTON ANALYSIS

```
food_order.info()
```

[4]

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 12 columns):
 #   Column                  Non-Null Count  Dtype
---  ------                  --------------  -----
 0   Order ID                1000 non-null   int64
 1   Customer ID             1000 non-null   object
 2   Restaurant ID           1000 non-null   object
 3   Order Date and Time     1000 non-null   object
 4   Delivery Date and Time  1000 non-null   object
 5   Order Value             1000 non-null   int64
 6   Delivery Fee            1000 non-null   int64
 7   Payment Method          1000 non-null   object
 8   Discounts and Offers    815 non-null    object
 9   Commission Fee          1000 non-null   int64
 10  Payment Processing Fee  1000 non-null   int64
 11  Refunds/Chargebacks     1000 non-null   int64
dtypes: int64(6), object(6)
memory usage: 93.9+ KB
```

```
food_order.describe()
```

[5]

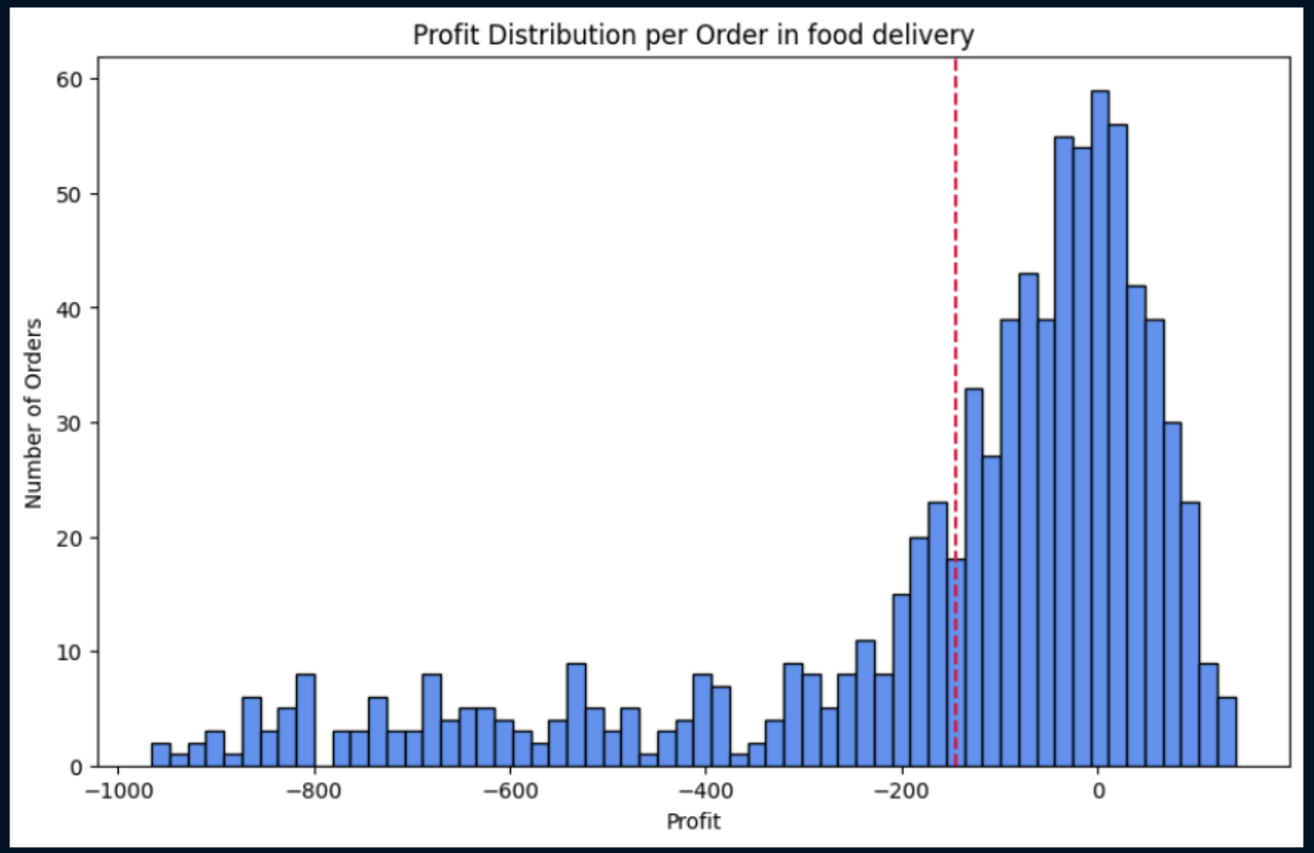
	Order ID	Order Value	Delivery Fee	Commission Fee	Payment Processing Fee	Refunds/Chargebacks
count	1000.000000	1000.000000	1000.000000	1000.00000	1000.000000	1000.000000
mean	500.500000	1053.969000	28.620000	126.99000	29.832000	28.300000
std	288.819436	530.975339	16.958278	43.06405	11.627165	49.614228
min	1.000000	104.000000	0.000000	50.00000	10.000000	0.000000
25%	250.750000	597.750000	20.000000	90.00000	20.000000	0.000000
50%	500.500000	1038.500000	30.000000	127.00000	30.000000	0.000000
75%	750.250000	1494.000000	40.000000	164.00000	40.000000	50.000000
max	1000.000000	1995.000000	50.000000	200.00000	50.000000	150.000000

PYHTON ANALYSIS

```
food_order['Order Date and Time']  = pd.to_datetime(food_order['Order Date and Time'])
food_order['Delivery Date and Time'] = pd.to_datetime(food_order['Delivery Date and Time'])



def extract_discount(discount_str) :
    if isinstance(discount_str,float):
        return float(discount_str)
    elif 'off' in discount_str:
        return float(discount_str.split(' ')[0])
    elif '%' in discount_str:
        return float(discount_str.split('%')[0])
    else:
        return 0.0

food_order['Discount Percentage'] = food_order['Discounts and Offers'].apply(lambda x : extract_discount(x))


food_order['Discount Amount'] = food_order.apply(lambda x: (x['Order Value'] * x['Discount Percentage'] / 100)
                                                 if x['Discount Percentage'] > 1
                                                 else x['Discount Percentage'], axis=1)

food_order['Discount Amount'] = food_order.apply(lambda x: x['Discount Amount'] if x['Discount Percentage'] <= 1
                                                 else x['Order Value'] * x['Discount Percentage'] / 100, axis=1)

print(food_order[['Order Value','Discounts and Offers', 'Discount Percentage','Discount Amount']].head(),food_order.dtypes)
```

PYHTON ANALYSIS

```
plt.figure(figsize=(10,6))
plt.hist(food_order['Profit'],bins = 60,color='cornflowerblue',edgecolor = 'black')
plt.title('Profit Distribution per Order in food delivery')
plt.xlabel('Profit')
plt.ylabel('Number of Orders')
plt.axvline(food_order['Profit'].mean(),color='crimson',linestyle = 'dashed',linewidth='1.5')
plt.show()
```

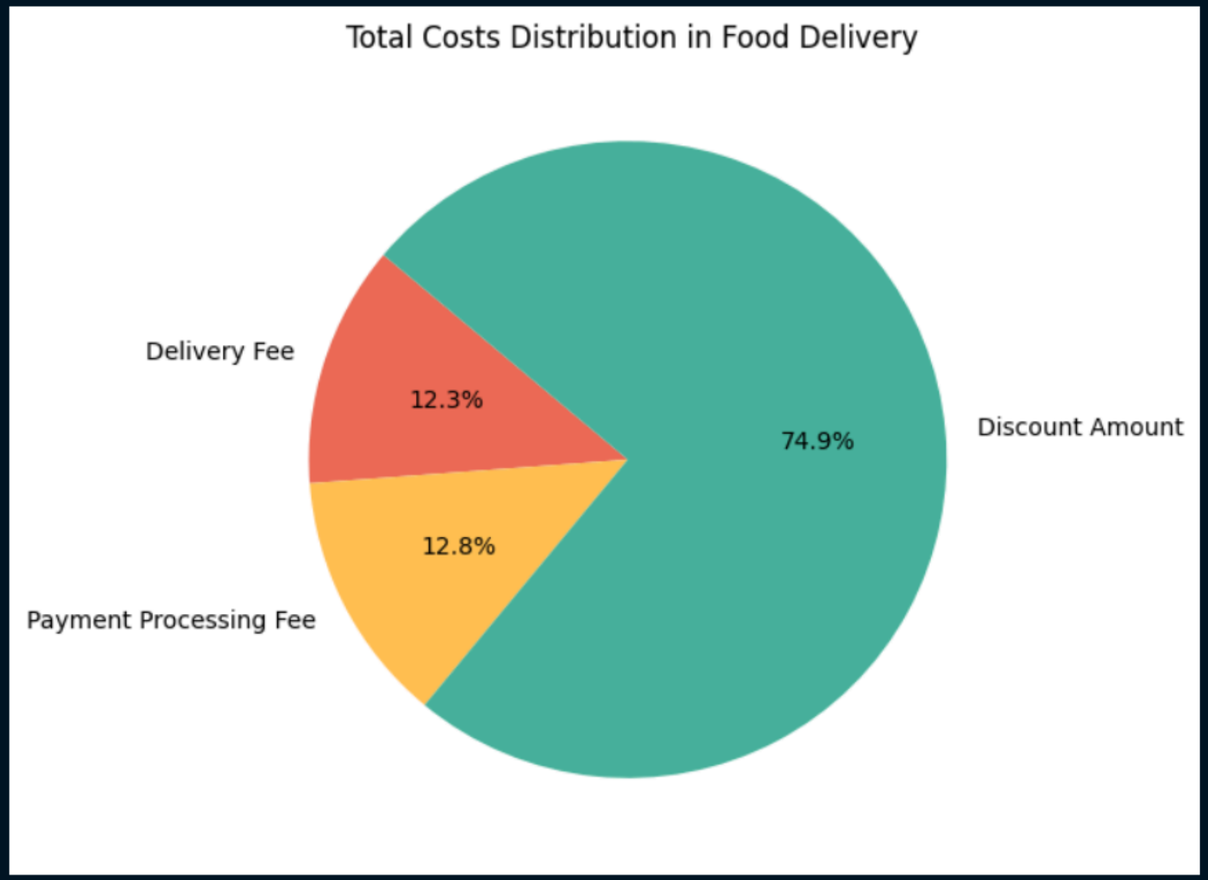


PYHTON ANALYSIS

```
cost_distribution = food_order[['Delivery Fee','Payment Processing Fee','Discount Amount']].sum()
plt.figure(figsize=(6, 6))
plt.pie(cost_distribution,labels = cost_distribution.index,autopct='%1.1f%%',startangle=140,colors=['#EC6B56','#FFC154','#47B39C'])
plt.title(' Total Costs Distribution in Food Delivery')
plt.show()
```

[10]

...



PYHTON ANALYSIS

```
totals = ['Total Cost','Total Revenue','Total Profit']
value = [totalCost,totalRevenue,totalProfit]

plt.figure(figsize=(8,6))
plt.bar(totals,value,color=['blue','green','red'])
plt.title("Total Cost, Revenue and Profit")
plt.ylabel('Amount (INR)')
plt.show()
```

PYHTON ANALYSIS

```
plt.figure(figsize=(12, 6))
sns.kdeplot(food_order['Profit'],label='Actual Profit',fill=True,alpha=0.5,linewidth = 2)
sns.kdeplot(food_order['Simulated Profit'],label='Simulated Porfit',fill=True,alpha=0.5,linewidth=2)

plt.title('Profitability in Food Delivery: Actual vs. Recommended Discounts and Commissions')
plt.xlabel('Profit')
plt.ylabel('Density')
plt.legend(loc='upper left')
plt.show()
```

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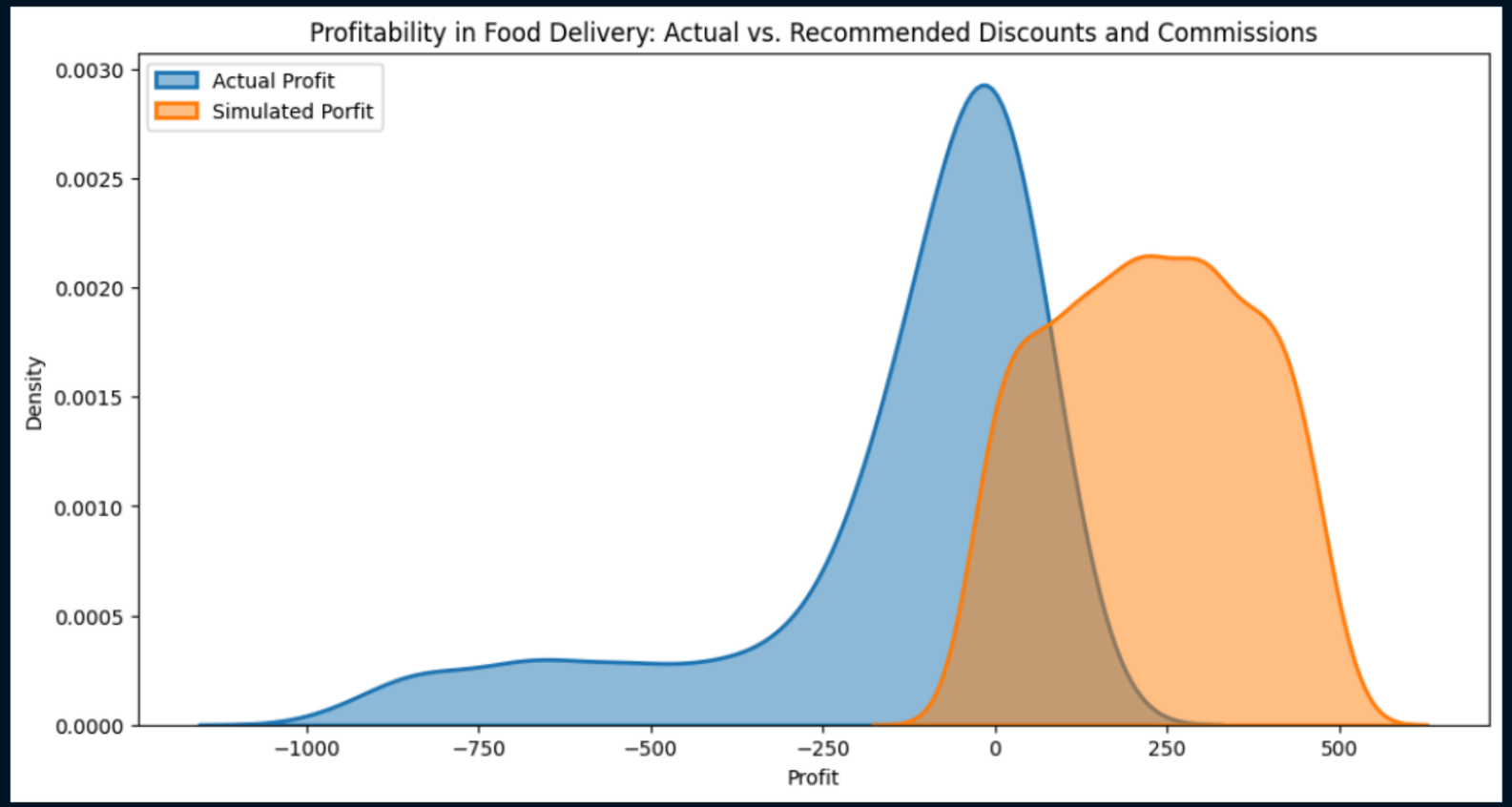

Github Repsitory

THANK YOU

Food Delivery Cost & Profitability Analysis