

Demand and Supply Analysis

Demand and Supply Analysis is a valuable concept used to analyze the relationship between the quantity demanded and the quantity supplied.

The demand for a product or service is the quantity of that product or service the customers are willing to purchase at any given price during a particular period. And the supply for a product or service is the quantity the producers are willing to provide in the market at a particular price and a particular period.

Demand and Supply analysis means analyzing the relationship between the quantity demanded and the quantity supplied. It helps businesses understand the factors influencing consumer demand to maximize profits.

```
In [1]: #Lets us import the necessary Python Libraries and the dataset:
import pandas as pd
import plotly.express as px
import plotly.graph_objects as go
import plotly.io as pio
pio.templates.default = "plotly_white"

data = pd.read_csv('rides.csv')
print(data.head())
```

	Drivers Active Per Hour	Riders Active Per Hour	Rides Completed
0	72	295	202.0
1	50	78	43.0
2	40	250	181.0
3	78	140	124.0
4	74	195	108.0

```
In [2]: #Let's have a look if the dataset has null values or not:
print(data.isnull().sum())
```

```
Drivers Active Per Hour    0
Riders Active Per Hour    0
Rides Completed           54
dtype: int64
```

The dataset has 54 null values in the Rides Completed column.

```
In [3]: #I'll drop these rows and move forward:
data = data.dropna()
```

```
In [4]: #Let's analyze the relationship between the number of drivers active per hour and
demand = data["Riders Active Per Hour"]
supply = data["Drivers Active Per Hour"]

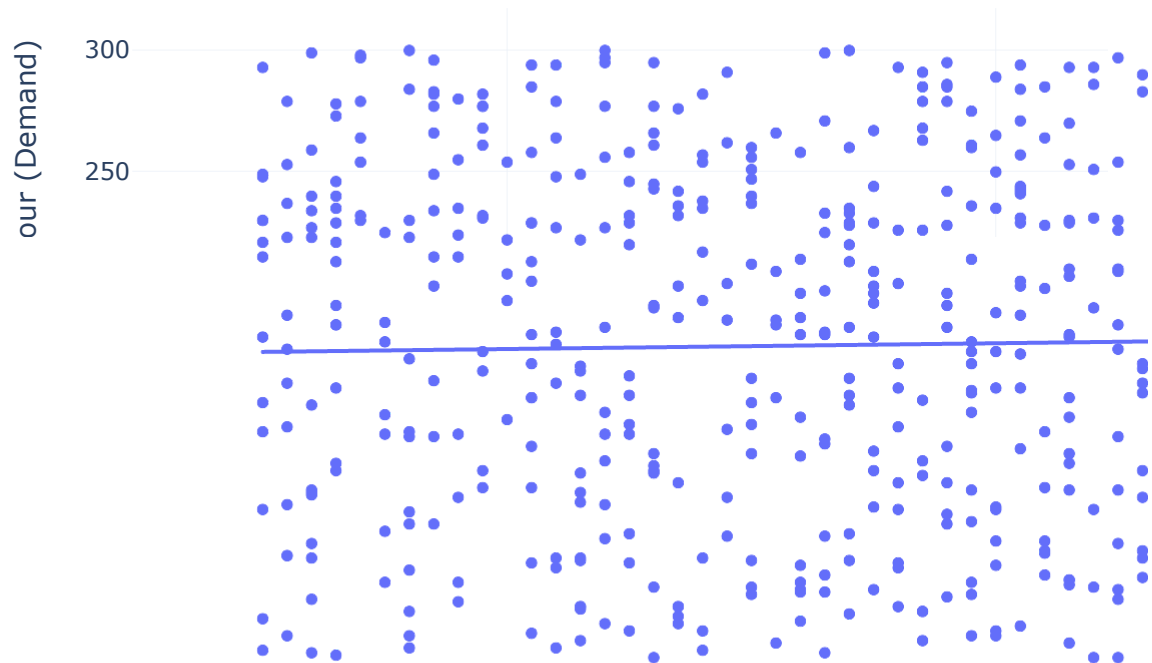
figure = px.scatter(data, x = "Drivers Active Per Hour",
                    y = "Riders Active Per Hour", trendline="ols",
                    title="Demand and Supply Analysis")
figure.update_layout()
```

```

axis_title="Number of Drivers Active per Hour (Supply)",
axis_title="Number of Riders Active per Hour (Demand)",
)
figure.show()

```

Demand and Supply Analysis



There is a constant relationship between the number of drivers active per hour and the number of riders active per hour.

A constant relationship between the number of drivers active per hour and the number of riders active per hour means that for every X number of drivers, there is a consistent and predictable Y number of riders, and this ratio remains constant over time.

```

In [5]: #let's calculate the elasticity of demand for rides concerning the number of act
# Calculate elasticity
avg_demand = data['Riders Active Per Hour'].mean()
avg_supply = data['Drivers Active Per Hour'].mean()
pct_change_demand = (max(data['Riders Active Per Hour']) - min(data['Riders Acti
pct_change_supply = (max(data['Drivers Active Per Hour']) - min(data['Drivers Ac
elasticity = pct_change_demand / pct_change_supply

print("Elasticity of demand with respect to the number of active drivers per hou

```

Elasticity of demand with respect to the number of active drivers per hour: 0.82

It signifies a moderately responsive relationship between the demand for rides and the number of active drivers per hour. Specifically, this means that a 1% increase in the number of active drivers per hour would lead to a 0.82% decrease in the demand for rides, while a 1% decrease in the number of active drivers per hour would lead to a 0.82% increase in the demand for rides.

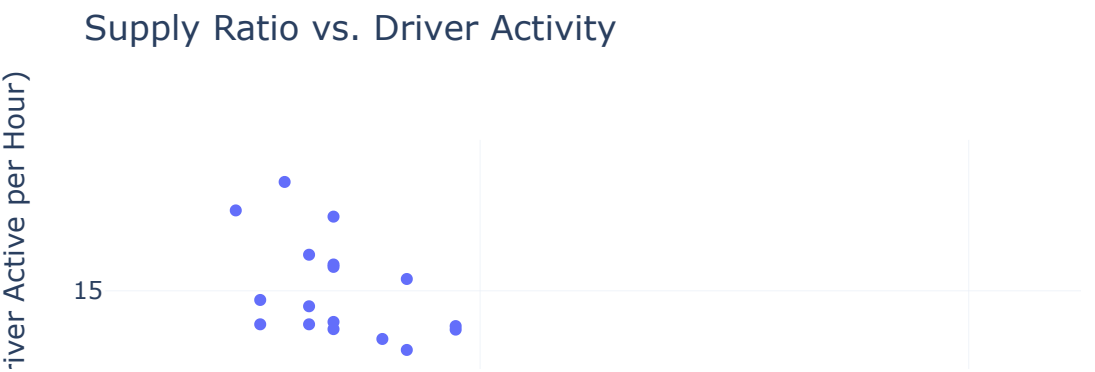
This level of elasticity suggests that the demand for rides is somewhat sensitive to changes in the number of active drivers per hour.

```
In [6]: #Let's add a new column in the dataset by calculating the supply ratio:
# Calculate the supply ratio for each level of driver activity
data['Supply Ratio'] = data['Rides Completed'] / data['Drivers Active Per Hour']
print(data.head())
```

	Drivers Active Per Hour	Riders Active Per Hour	Rides Completed \
0	72	295	202.0
1	50	78	43.0
2	40	250	181.0
3	78	140	124.0
4	74	195	108.0

	Supply Ratio
0	2.805556
1	0.860000
2	4.525000
3	1.589744
4	1.459459

```
In [7]: #Let's visualize the supply ratio:
fig = go.Figure()
fig.add_trace(go.Scatter(x=data['Drivers Active Per Hour'],
                        y=data['Supply Ratio'], mode='markers'))
fig.update_layout(
    title='Supply Ratio vs. Driver Activity',
    xaxis_title='Driver Activity (Drivers Active Per Hour)',
    yaxis_title='Supply Ratio (Rides Completed per Driver Active per Hour)'
)
fig.show()
```



The ratio of the number of drivers active per hour and the number of rides completed in an hour.

In []: