
SMDM Project Report

DSBA

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Problem 1

Austo Motor Company is a leading car manufacturer specializing in SUV, Sedan, and Hatchback models. In its recent board meeting, concerns were raised by the members on the efficiency of the marketing campaign currently being used. The board decides to rope in an analytics professional to improve the existing campaign.

1.1 Nature of Data

The Dataset has 1581 entries and 14 Attributes of which, there are 6 numerical data types

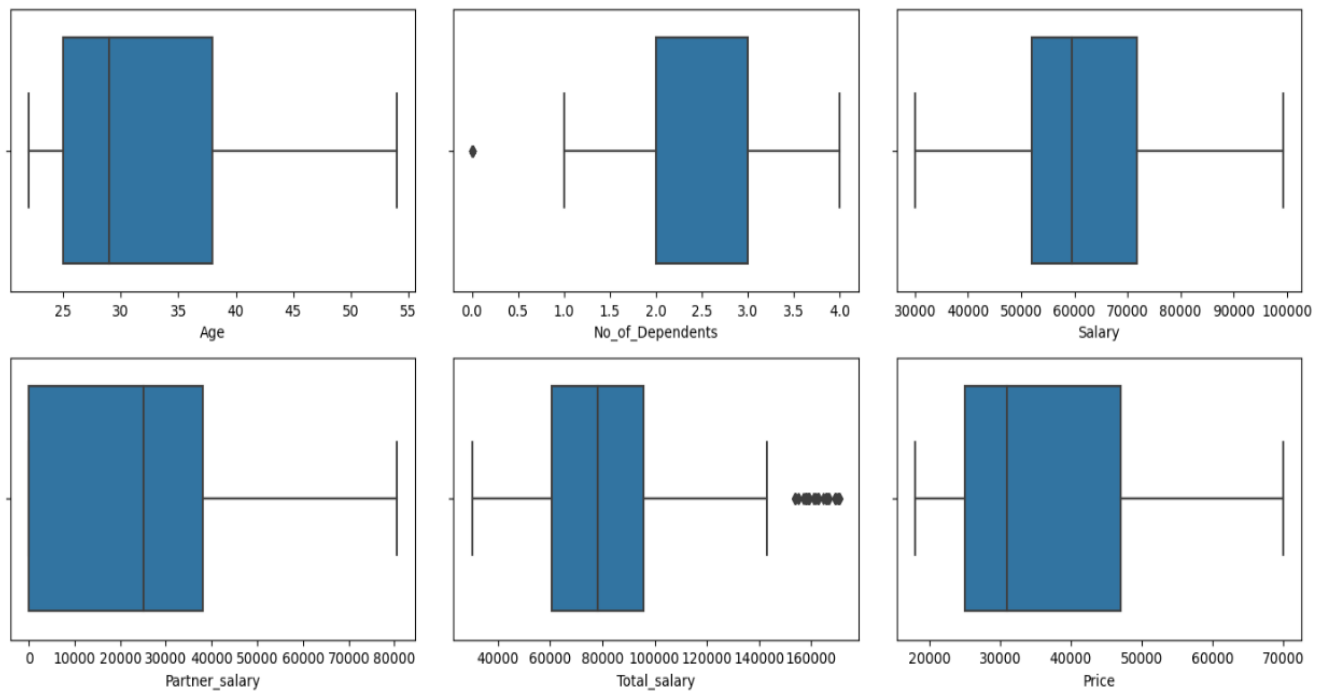
```
num_df
Index(['Age', 'No_of_Dependents', 'Salary', 'Partner_salary', 'Total_salary',
       'Price'],
```

And 8 object data types

```
obj_df
Index(['Gender', 'Profession', 'Marital_status', 'Education', 'Personal_loan',
       'House_loan', 'Partner_working', 'Make'],
      dtype='object')
```

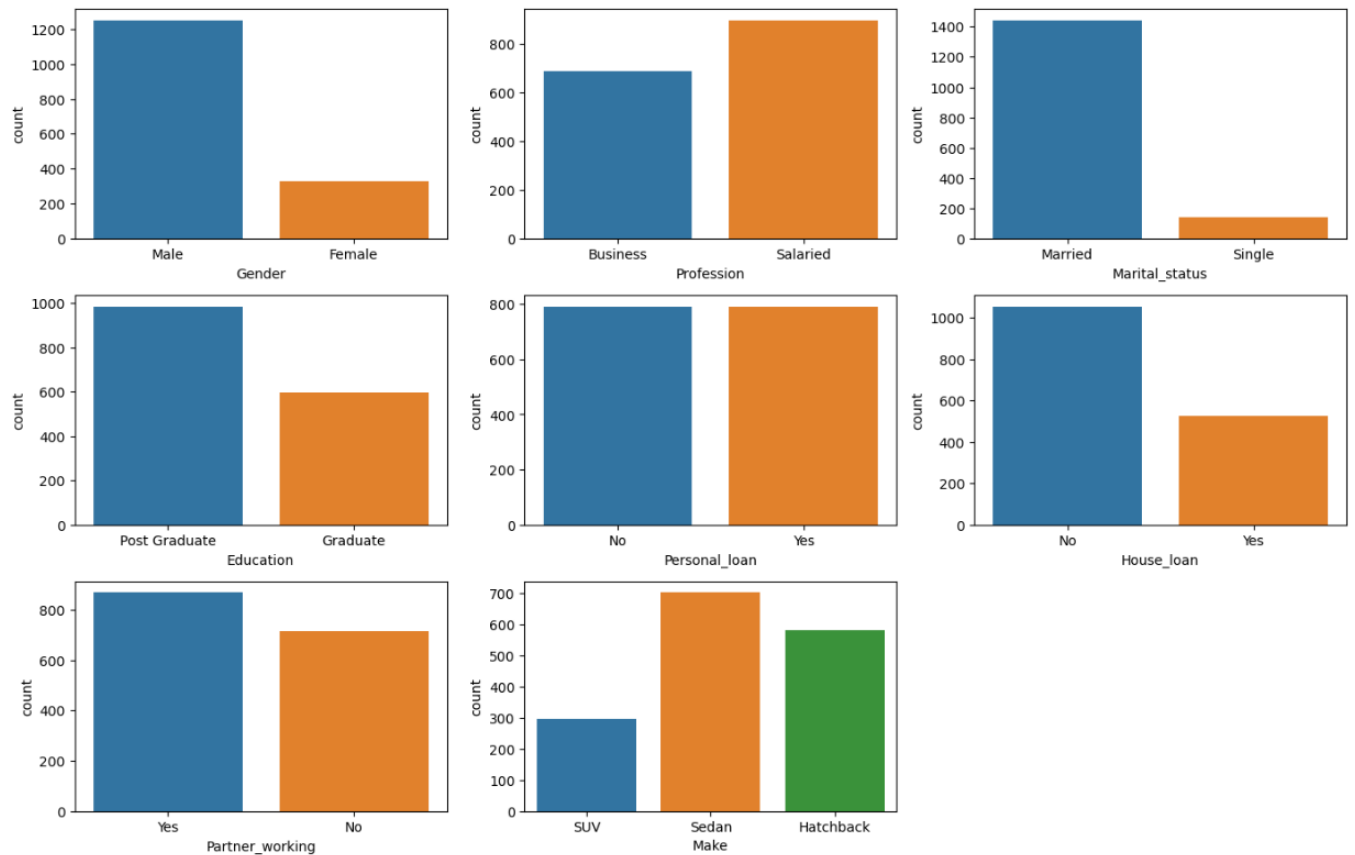
- There are a few misspelled entries in the Gender column, which needs to be fixed
- There are some nulls also, in the Gender column, this shall be imputed using the mode of that column
- There are some missing entries in the Partner_Salary column, as we know $\text{Total_Salary} = \text{Salary} + \text{Partner_Salary}$, we will impute the nulls based on this logic
- There are no Duplicate entries and The existing outliers are genuine outliers

1.2 Univariate Analysis of Numerical Data



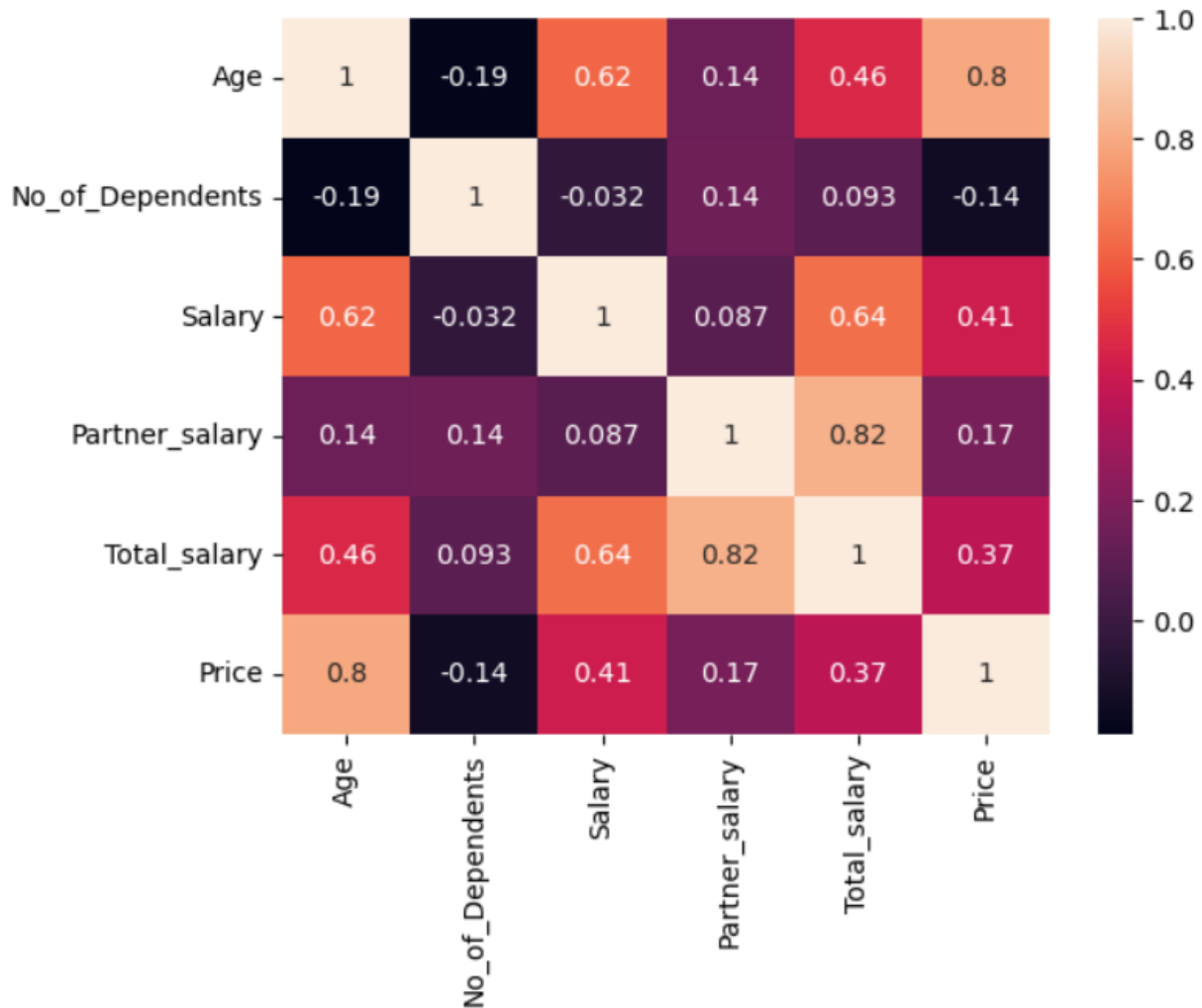
- Upon analyzing the Numerical Data, we find that the age of the customers are between 22 and 54 years, with most of the customers in their late 20s to mid 30s.
- The Prices of the Cars ranges from 18000 to 70000 USD, most of the cars being priced around 30,000 USD.
- The No of Dependents ranges from 0 to 4 with most of the customers having around 2 dependents
- The Salary of the customer is on average higher than their Partner

1.3 Univariate Analysis of Categorical Data

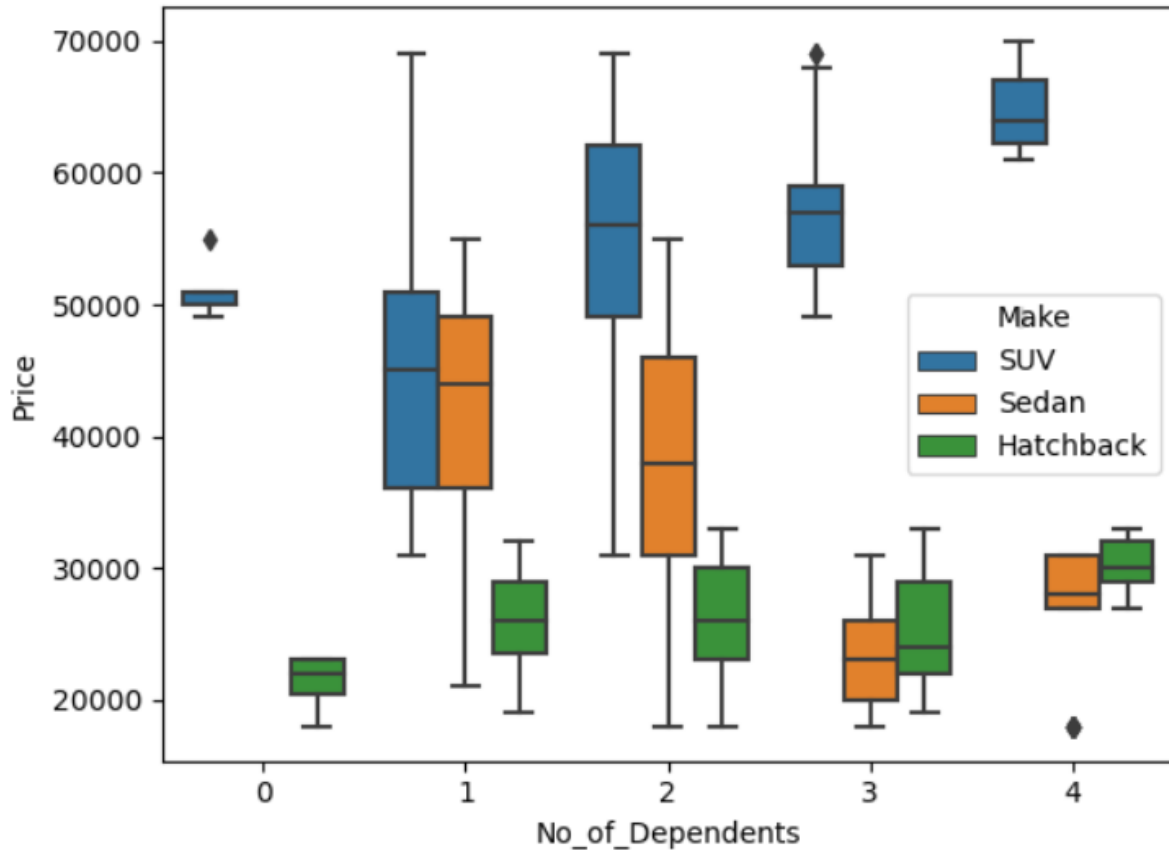


- Upon Analyzing the Categorical fields, it's clear that majority of the Customers are Male, Married and often Post Graduates, with a working partner
- The Austo motor company's best-selling make is the Sedan, followed by Hatchback and SUV in terms of Sale volume
- Most of the customers don't have any house_loan, whereas number of customers with a personal loan and no personal loan are the same

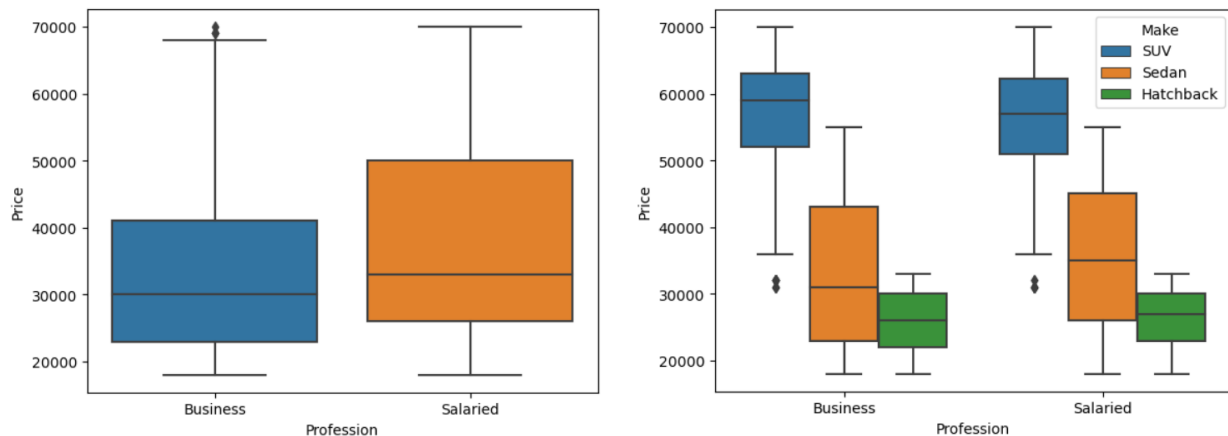
1.4 Multivariate Analysis



- (Age, Price), (Partner Salary, Total Salary) all appear to be Strongly correlated
- (Price, Salary) , (Total Salary, Salary), (Age, Salary) , (Total Salary, Price) and (Age, Total Salary) seems to be Moderately Correlated
- Other numerical Attributes have Weak Correlation

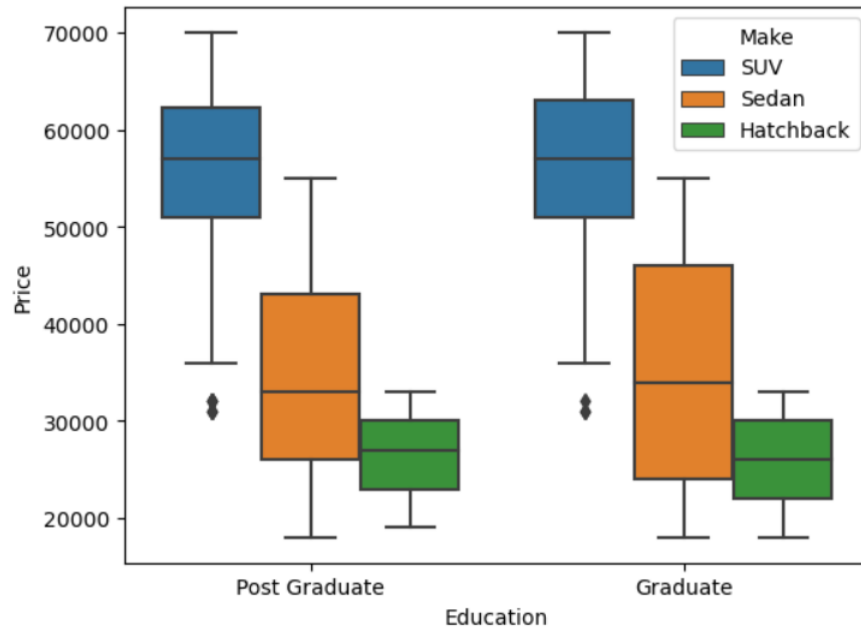


- The Price of SUV, hatchback bought is usually the more when the Number of Dependents is 4
- The price of Sedan bought is usually more when the Number of Dependents is 1
- In case when number of Dependents is 0, there is no Sedan Sale.

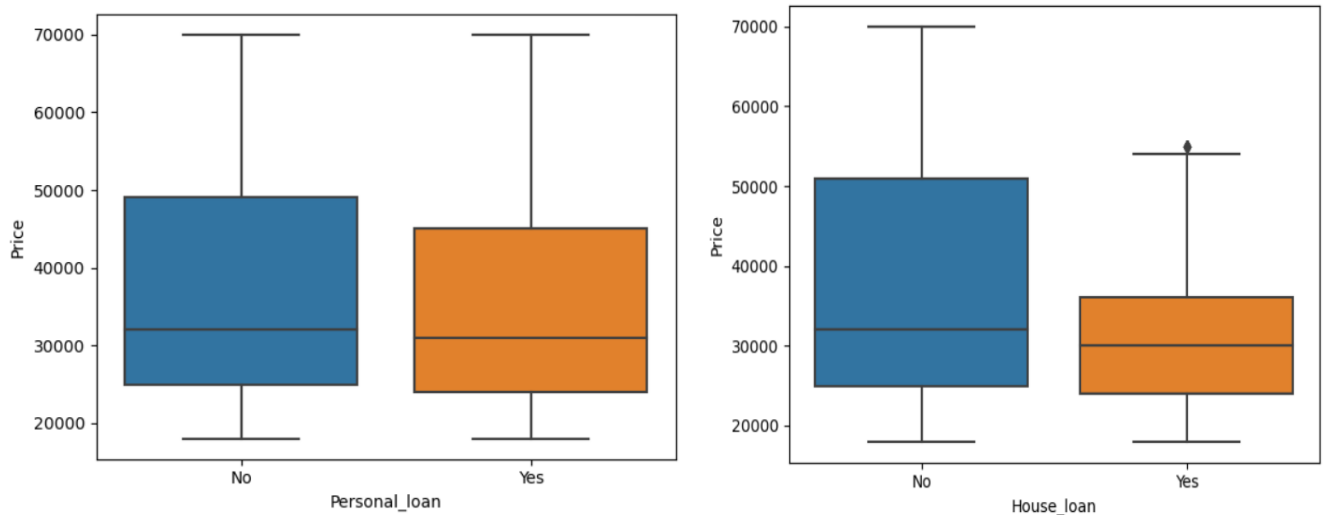


- Salaried customers often buy expensive cars overall

- And the median price of an SUV bought by Business Professionals is higher than their Salaried counterparts, and Salaried Customers buy expensive sedans

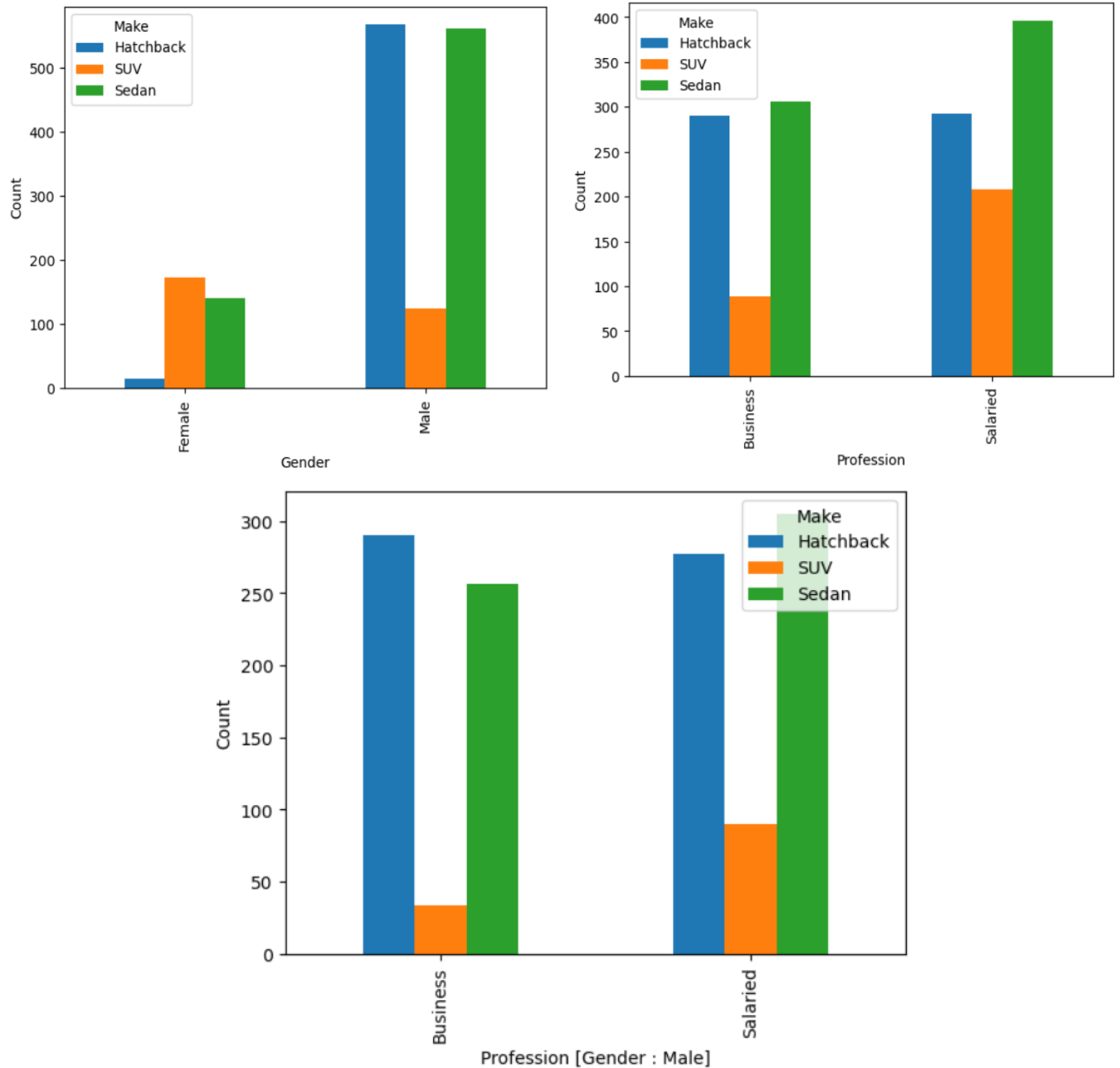


- The Median Price of a car bought by a Post Graduate Customer and a Graduate Customer is same
- Though overall a most graduates spend slightly more than their Post Graduate peers



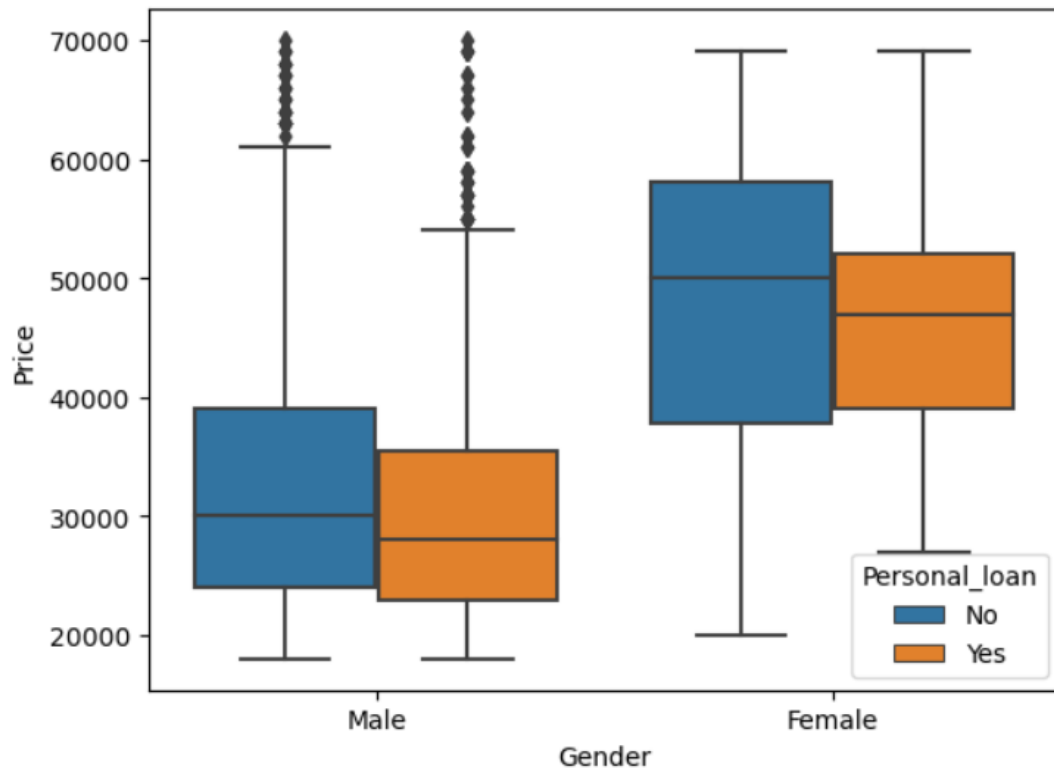
- Customers with No Personal Loans and No House Loans tend to buy expensive cars

1.5 Data Behaviour



- From the above visualization, Steve's remark "Men prefer SUV by a large margin, compared to the women", doesn't hold true, so we disagree
- Whereas I would agree with Ned's remark, "a Salaried person is more likely to buy a Sedan".

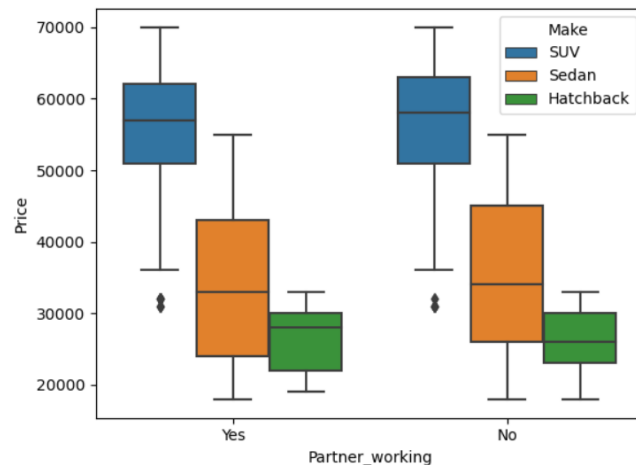
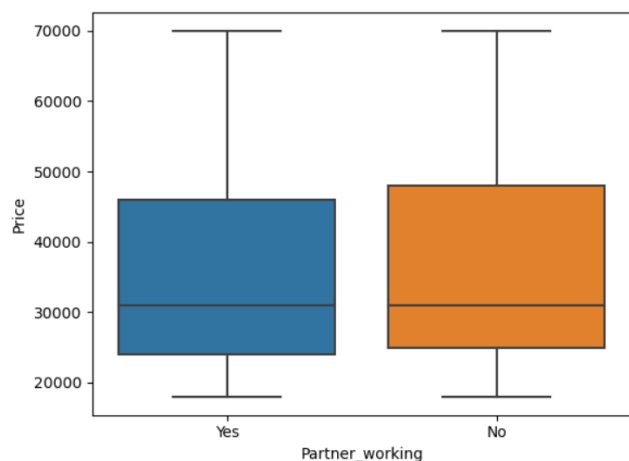
- Further, Sheldon Cooper's claims "that a salaried male is an easier target for an SUV sale over a Sedan Sale." is also not completely just.



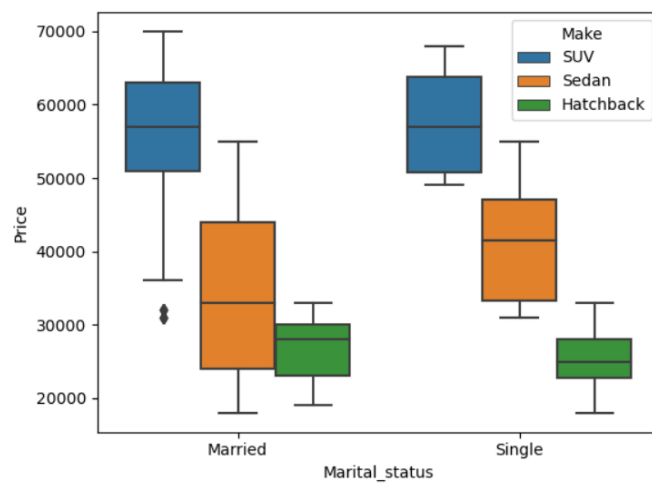
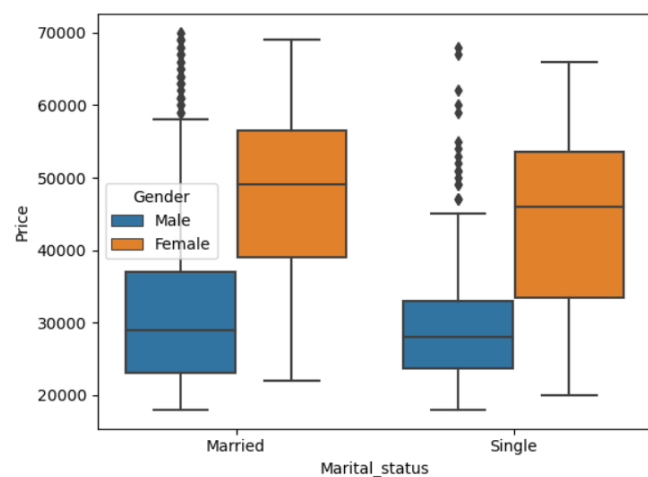
- Female Customers often buy more expensive Cars and amongst them customers who have no Personal Loan tend to buy a higher priced car.

```
Gender
Female    15695000
Male      40585000
Name: Price, dtype: int64
```

-
- But as the Number of Male customers is significantly greater than female customers, the total amount spent by Male customers is higher



- The median price of car price for customers with and without a working partner are identical.
- It's also worth Noting that Price of hatchback purchased is higher when there is a working partner



- Married Customers often buy more expensive cars across both the genders.
- While Single Customers tend to buy more expensive sedans

1.6 Recommendations and Conclusions:

Conclusions:

- The Store's major audience are Married Males with a Post Graduates Degree working a salaried Job
- Though Female customers are less, they tend to buy the more expensive cars
- Sedans are the best-selling make of cars by sales count, Male customers often prefer Sedans and hatchbacks whereas Female customers are keen on SUVs
- The price of the car purchased increases when there are no house loans or personal loans in the picture, and it's also important to note that having a working partner doesn't necessarily lead to an expensive car purchase.

Recommendations:

- The Profits can be improved by targeting Married, Female customers with no Personal or Home Loans with 4 Dependents for an SUV Sale, as Female Customers and customers with 4 dependents tend to prefer SUVs and Married customers buy expensive cars, and with SUV's having a high starting price, profit per sale is going to be significantly higher
- For Sedan Sales, Single Male Customers, with No Personal or Home Loans and 1 dependent, could be a viable option to improve profits

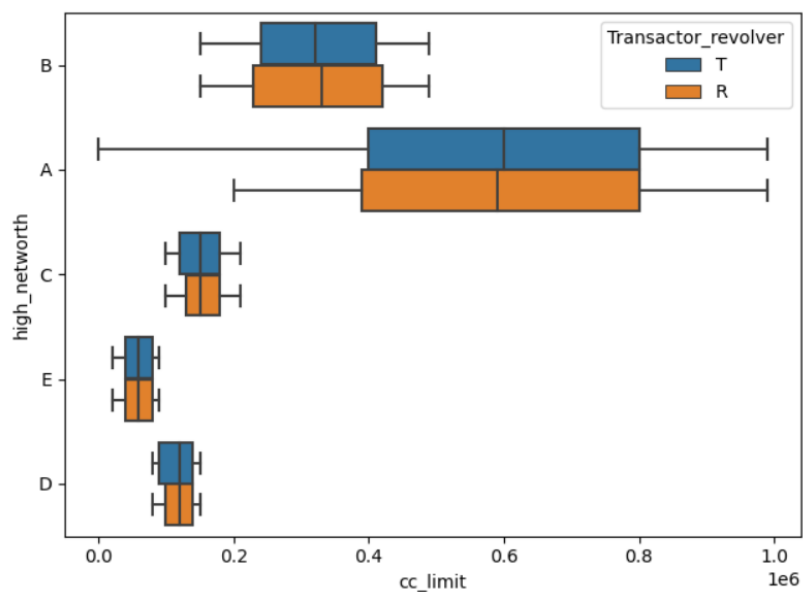
Problem 2

GODIGT Bank also has a set of customers who were given credit cards based on risk policy and customer category class, but due to huge competition in the credit card market, the bank is observing high attrition in credit card spending. The bank makes money only if customers spend more on credit cards. Given the attrition, the Bank wants to revisit its credit card policy and make sure that the card given to the customer is the right credit card. The bank will make a profit only through the customers that show higher intent towards a recommended credit card. (Higher intent means consumers would want to use the card and hence not be attrite.)

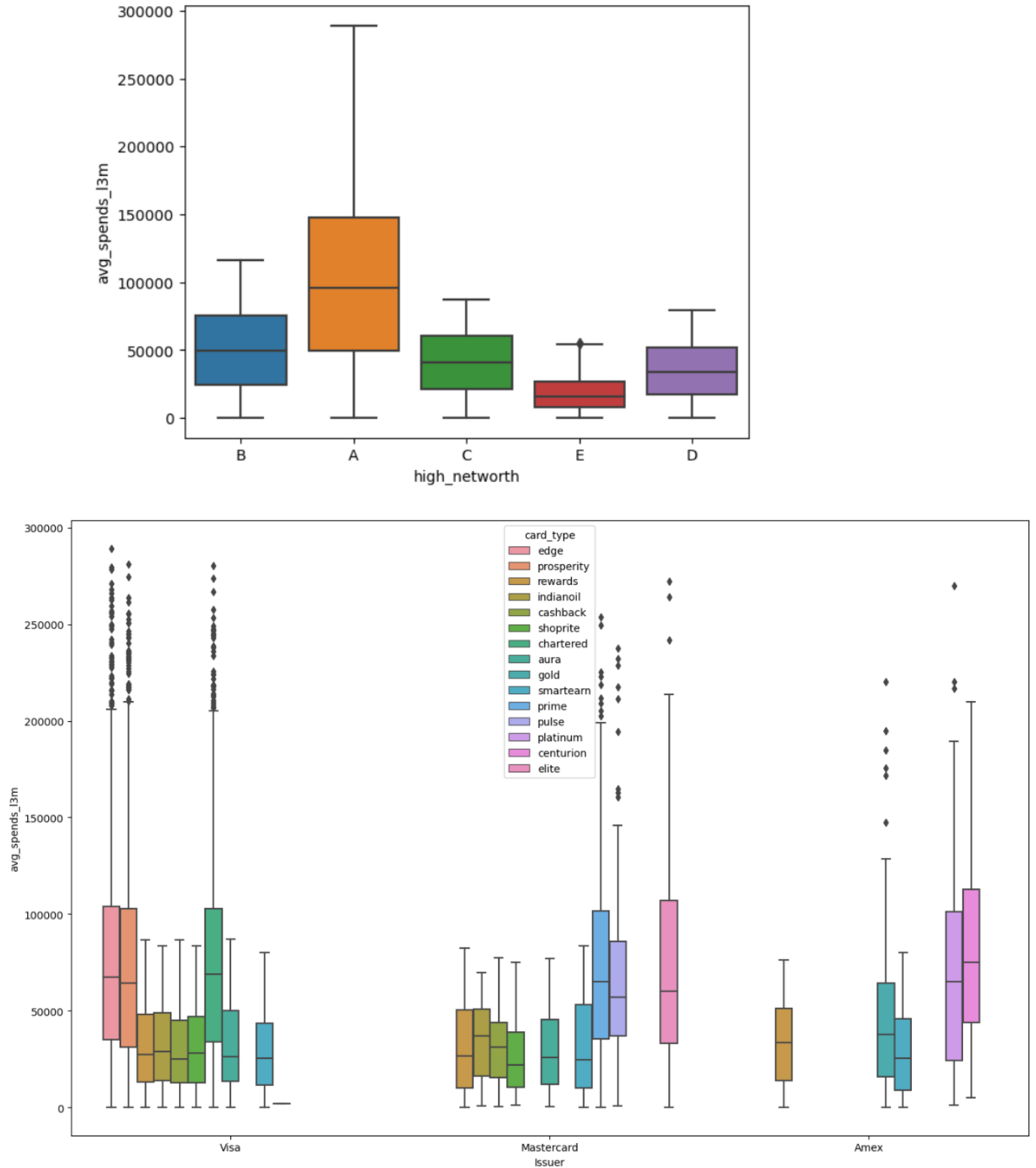
2.1 Important Attributes

- High Network
- Card_Type
- Issuer
- CC_Limit
- Hot Listed Flag

2.2 Business Justification:



- Customers with High Network, are often given higher CC Limit, and based on the Transactor Resolver segregation it's clear that most customers are transactors, i.e. they pay their dues each month on time, which is good case for good credit, also with increase CC their Credit card use is also highly relevant from the below graph

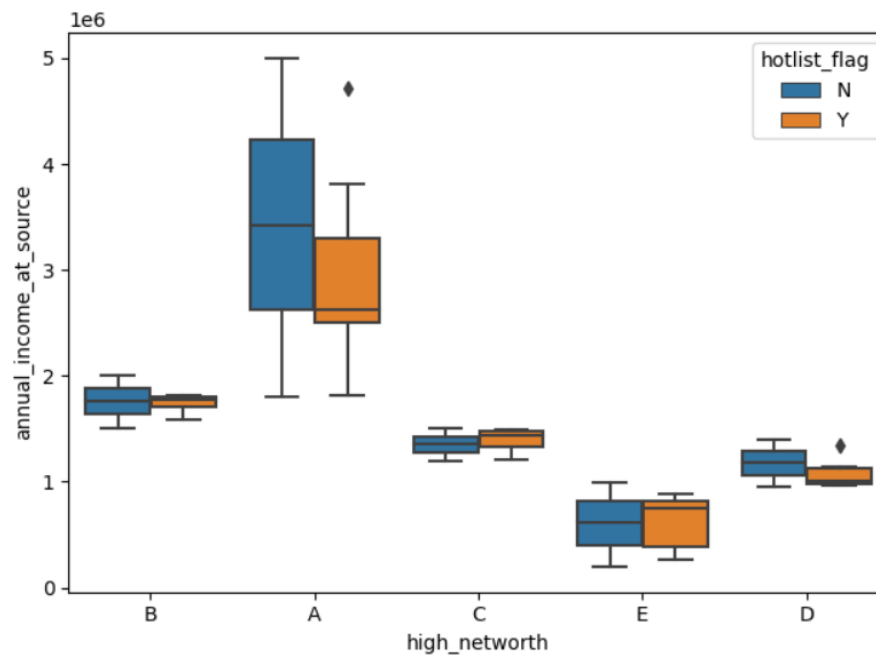
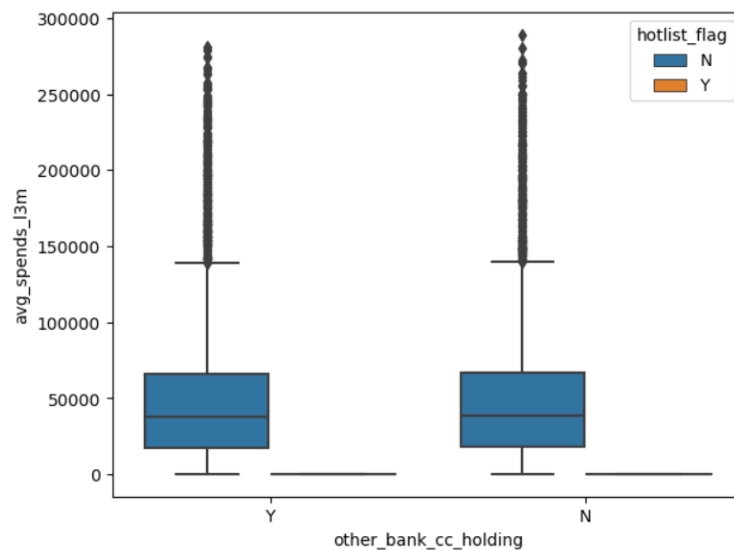


The above graph to dissect card and issuer details across average Credit Card spends in last 3 months, shows certain cards and issuers are better performing, than the others with Centurion type card under Amex performing the best in

terms of average spends and there is variation based on the high_network category

	card_type	aura	cashback	centurion	chartered	edge	elite	gold	indianoil	platinum	prime	prosperity	pulse	rewards	shoprite	smartearn
high_network																
A	0	0	33	488	514	48	29	0	27	52	498	51	0	0	0	0
B	0	0	29	435	466	48	32	0	32	59	509	50	0	0	0	0
C	218	201	0	0	0	0	26	225	0	0	0	0	518	229	242	0
D	214	255	0	0	0	0	34	221	0	0	0	0	516	221	235	0
E	220	220	0	0	0	0	24	234	0	1	0	0	468	238	288	0

- Being hot listed, leads to no credit card spends, and this is hot listed flag varies across different income categories



2.3 Conclusions:

- The company profits when the cards are used frequently, hence hot listed flag set to N is highly preferred, and high income groups often have high average CC spends across 3 months , as their CC Limit is also higher
- The Card and Issuer, targeted to different income groups can have significant impact as demonstrated above, in terms of Transactor - Revolver distribution amongst customers there is no significant difference, that is people who make timely payment and those who carry forward their dues to next month.

GLOSSARY

Term	Meaning
CC	Credit Card
Transactor_revolver	Revolver: Customer who carries balances over from one month to the next. Transactor: Customer who pays off their balances in full every month
hot list	A hot list is a list of credit cards that are reported stolen, canceled or compromised in some way.