```
In [12]:  ▶| def robust(train_data):
              '''

              making robustness predictions
              '''

              for i in range(12, 6, -1):
          #         print(i)
          #         print(train_data.truncate(after=train_data.index[-i]).index)
                  robust_forecast = make_predictions(train_data.truncate(after=train_d
                  submission = make_submission(robust_forecast, train_data)
                  submission.to_csv(f'robust/submission{i-6}.csv', index=False)


In [ ]:   ▶|
```

Main

```
In [13]:  ▶| if __name__ == '__main__':

              print('Reading files')
              full_data, target_data, test_data = read_file()
              smooth(target_data)

              print('Making full forecast')
              full_forecasts = make_predictions(target_data)
```

Maximum Likelihood optimization failed to converge. Check mle_retvals

C:\Users\waynn\.conda\envs\tensorflow_cpu\lib\site-packages\statsmodels
\base\model.py:512: ConvergenceWarning:

Maximum Likelihood optimization failed to converge. Check mle_retvals

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C:\Users\waynn\.conda\envs\tensorflow_cpu\lib\site-packages\statsmodels
\base\model.py:512: ConvergenceWarning:

Maximum Likelihood optimization failed to converge. Check mle_retvals

best params from SARIMAX:(1, 1, 1), seasonal: (1, 1, 0, 12)

```
In [ ]:   ▶| submission = make_submission(full_forecasts, train_data)
              # submission.to_csv('output/prediction.csv', index=False)
```

```
evaluate(full_forecasts, test_data, target_data, plot=True)
```
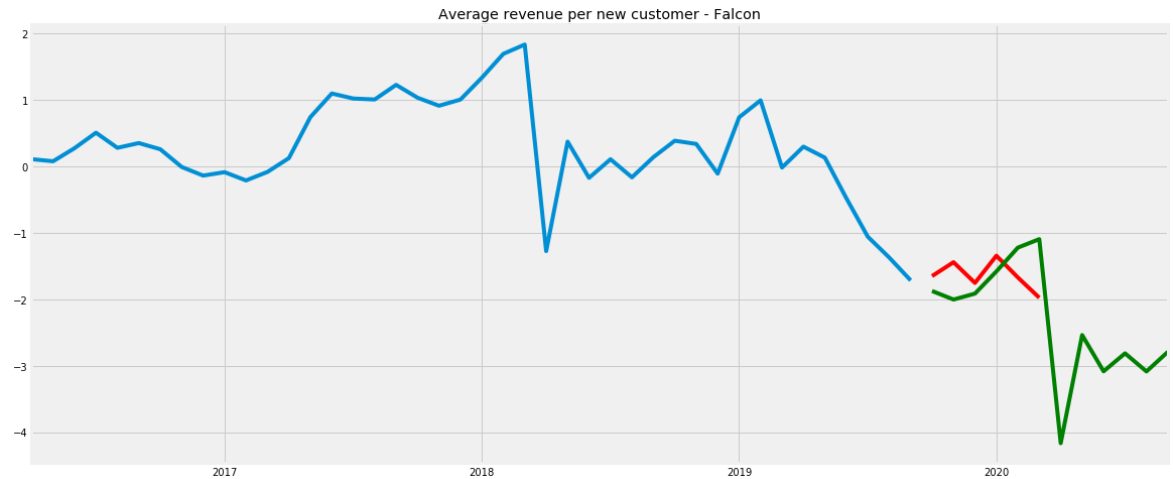
For "desh Brand 2 - Segment 2BroadbandFalconAverage revenue per new custome
r - Falcon" with model "SARIMAX"
MAPE : 0.2510151883767858
Threshold : 0.1, Target: 0.05
Raw score : 0.7489848116232142
Threshold score : 0

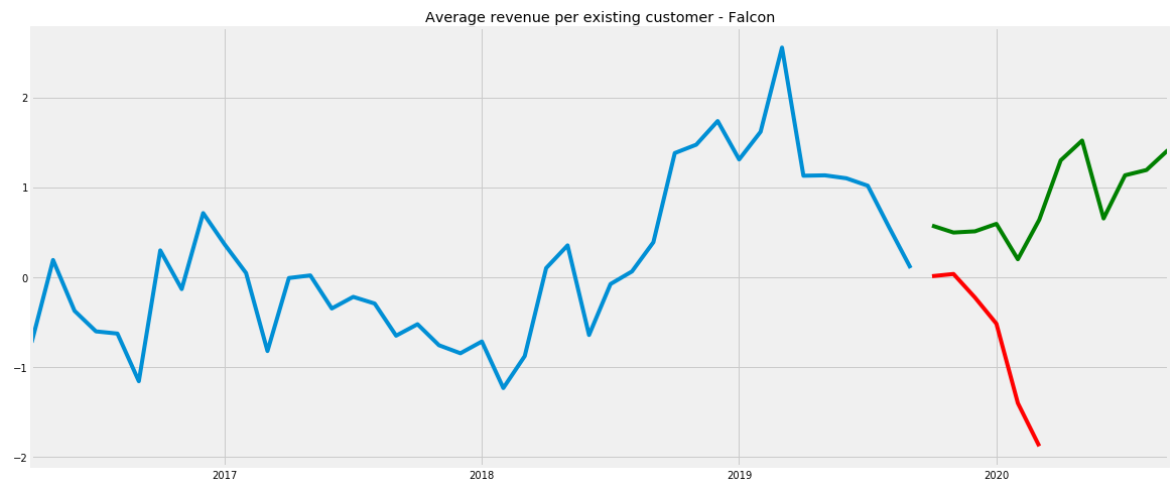Average revenue per new customer - Falcon

For "desh Brand 2 - Segment 2BroadbandFalconAverage revenue per existing cu
stomer - Falcon" with model "SARIMAX"
MAPE : 13.809079650544625
Threshold : 4.5, Target: 3.0
Raw score : 0.0
Threshold score : 0
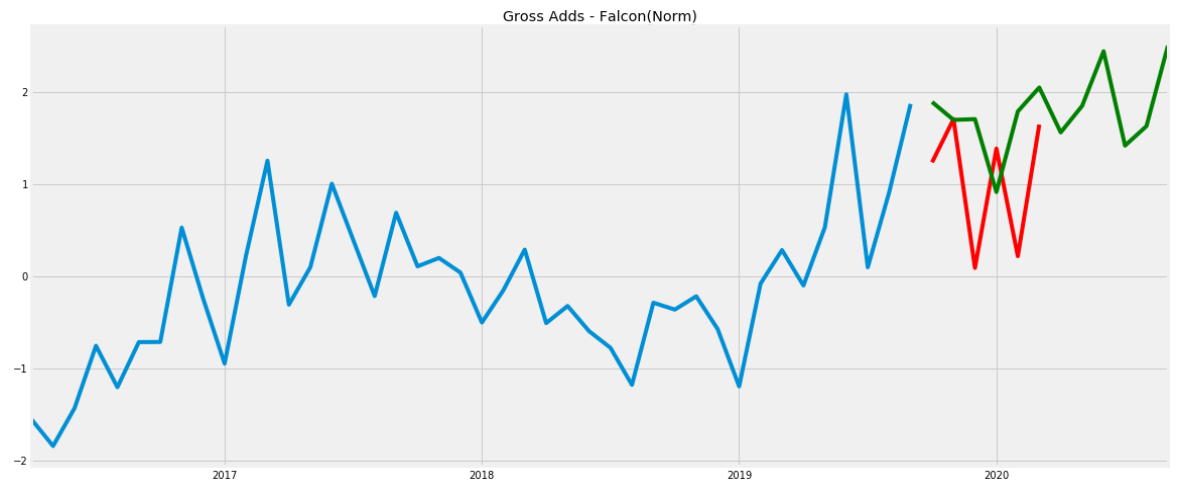

Average revenue per existing customer - Falcon

For "desh Brand 2 - Segment 2BroadbandFalconGross Adds - Falcon(Norm)" with
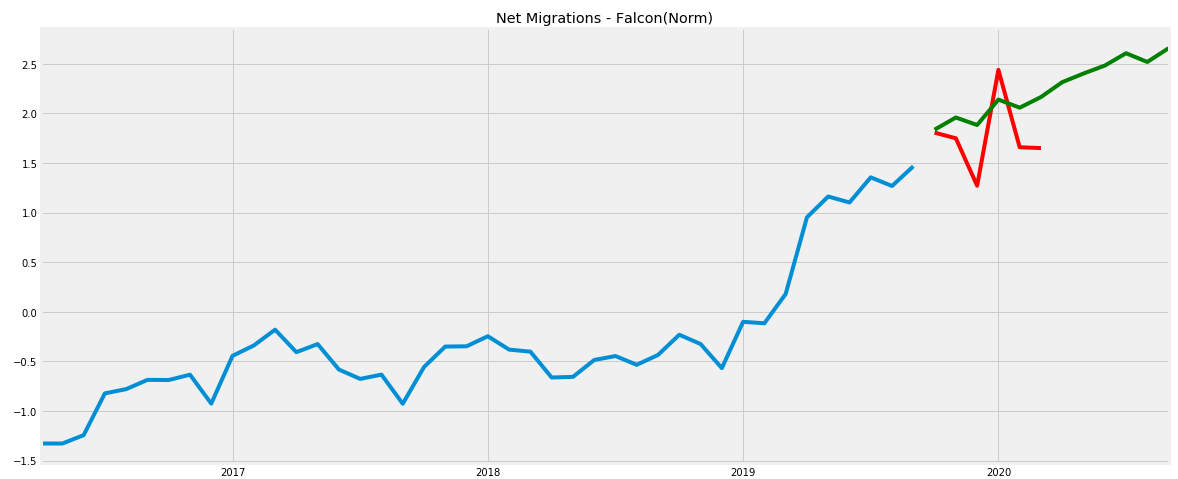model "SARIMAX"
MAPE : 4.467894751085081
Threshold : 5.0, Target: 3.3
Raw score : 0.4797234825269288
Threshold score : 0.03

Gross Adds - Falcon(Norm)

For "desh Brand 2 - Segment 2BroadbandFalconNet Migrations - Falcon(Norm)"
with model "SARIMAX"
MAPE : 0.21548350609085498
Threshold : 0.25, Target: 0.18
Raw score : 0.784516493909145
Threshold score : 0.03

Net Migrations - Falcon(Norm)

Final Raw score : 0.503306197014822
Final Threshold score : 0.06

In [ ]:

In [ ]:

EDA