GROUPON
Q4 2013 PROJECTIONS

We used web-scraped data from Groupon's North American website between Oct 1st – Dec 31st 2013 to predict fourth quarter gross billings in Groupon's three business segments, Local, Goods, and Travel. Deals with start dates between Oct 20-Oct 30 are missing in the data set due to a web-scraping system outage, and two different analytical techniques were used to fill in the missing data (simple mean and ARIMA model). A final "buy" or "sell" recommendation was given by comparing our gross billing estimate to estimates given by buy side analysts at Deutsche Bank, J.P. Morgan, and Morgan Stanley.

CONCLUSION

According to web-scraped data from Groupon's North American website in 4Q2013, the total gross billings in each segment, Local, Goods and Travel, is estimated to be $444.6 M, $282.2 M, and $70.3 M respectively. The strongest growth in gross billings this quarter is seen in Goods, which increased by 45% since 3Q2013, followed by Local (10%) and Travel (4%). The total North American gross billings from all 3 segments is estimated to be $797.2M, a 20% increase since 3Q2013, and an 11% increase y/y.

Analysts from Deutsche Bank, J.P. Morgan, and Morgan Stanley expect gross billings for 4Q2013 to be $803.2M, $836.9M, and $870.1M respectively. Historically, using web-scraping data to predict quarterly gross billing estimates have been accurate within 0.6-3.4% of the reported results (see Appendix C). When accounting for a 3.4% error, the quarterly gross billings may be as high as $824.3M, which is still $12.4M below the average consensus of $836.7M estimated by the three analysts. This suggests that Groupon may not beat the EPS expectation in 4Q2013, and we give the stock a "sell" rating.

The gross billing estimate falls short from analysts' expectations; however, there is very strong growth seen in the Goods segment and strong overall performance y/y. The data also suggests that the number of new deals launched in 4Q increased by 42% to 68,283 (Fig 1). This may indicate that management's effort in attracting new merchant partners and retaining existing partners to expand the number of deals offered on Groupon has been successful this quarter. Additionally, the company is currently trading at an EBITDA multiple of 14.6x, instead of the industry expected multiple of 25x, suggesting that even with the lower than expected gross billings this quarter, the stock may be undervalued.

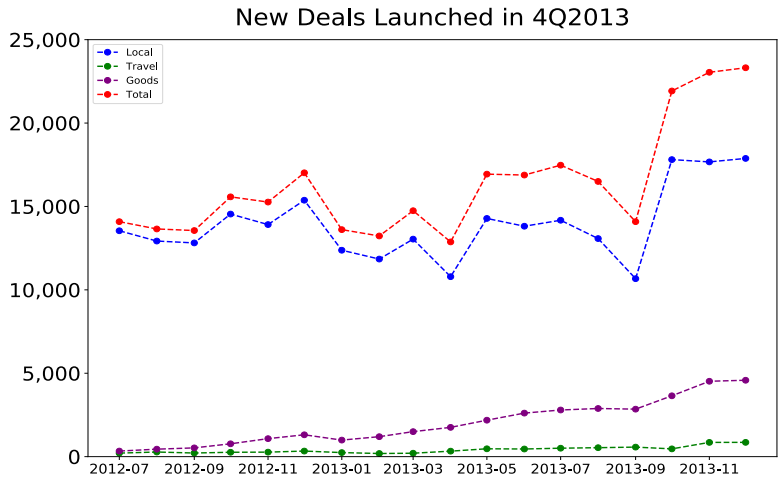


Fig 1

DATA CLEANSING

Any new deals with start dates between Oct 20 – Oct 30 (inclusive) in the local segment were not captured in the data set due to a system outage that occurred during web-scraping, resulting in an incomplete gross billing estimate. To account for the missing data, two different techniques were used to estimate missing gross billings, and the average of the results was used in the final reported gross billings for the local segment.

Method 1: Simple Average

Figure 2 depicts the gross billings in the local segment for deals with start dates between Oct 1 – Dec 7th. The average gross billings over this time range was found to be $3.26 M per day, which was substituted in the data to fill in the missing gross billings, as seen in the highlighted region in Figure 2. The average gross billing was calculated from deals which started within this time range because the data showed the most consistent patterns. For example, deals between Dec 7- 15 had unusually large gross billings, possibly due to the holiday season, and deals after Dec 15, had very low gross billings since these deals were newer and not active for as long (see appendix A for full quarter gross billings in local segment). By applying the simple average method, the total gross billing in the local segment was determined to be $445.8 M.

Similarly, the gross billing can also be determined by taking the average of the unit sales and multiplying the result by the average unit price; however, this method may not be as accurate because there is an added uncertainty in the average unit price which increases the overall error.

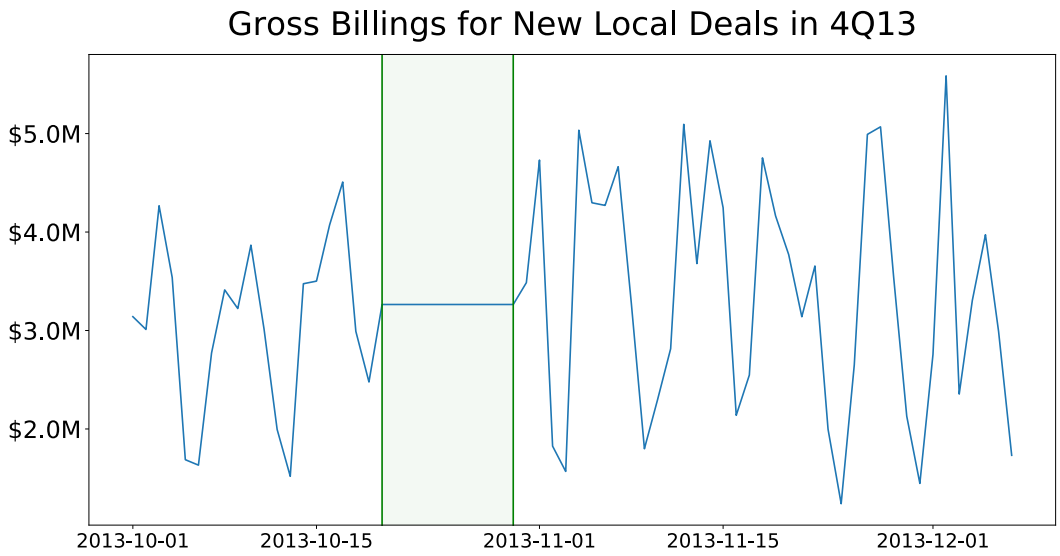


Fig 2

Method 2: ARIMA Model

Rather than taking the simple average and summing over the missing 11 days, as in the previous method, the ARIMA model applies a moving average to forecast the missing data. Figure 3 shows the gross billing prediction by the ARIMA model (in red) and the simple average method (in blue). The ARIMA model trains on data from deals with start dates between Sept 27-Oct 19 to forecast the gross

billings from deals starting between Oct 20-30. The data between Sept27 – Oct 19 was selected because the data in this range appeared stationary, and resulted in the lowest loss of the error metric (i.e. the model traces the true values most accurately). The (p,d,q) parameters of the ARIMA model are (6,0,2), which was found by iterating through a grid search to achieve the lowest root-mean-square error (RMSE). The RMSE of $0.51M applied across the 11-day summation of the missing gross billings results in ±$2M of uncertainty. By applying method 2, the missing gross billings is estimated to be $33.0M (± $2M), and therefore, the total gross billings in the local segment using method 2 is estimated to be $443.4M.

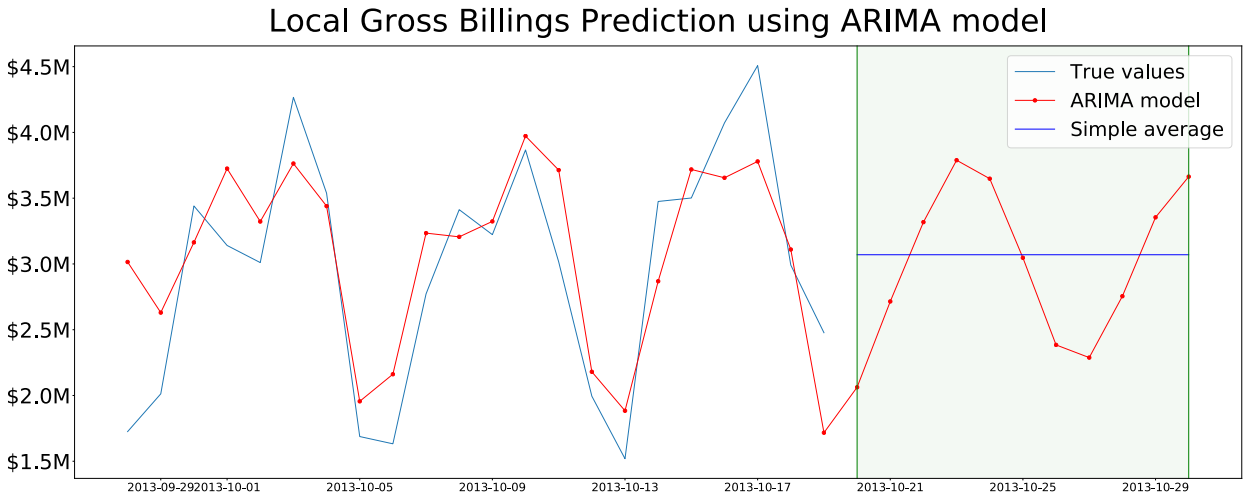


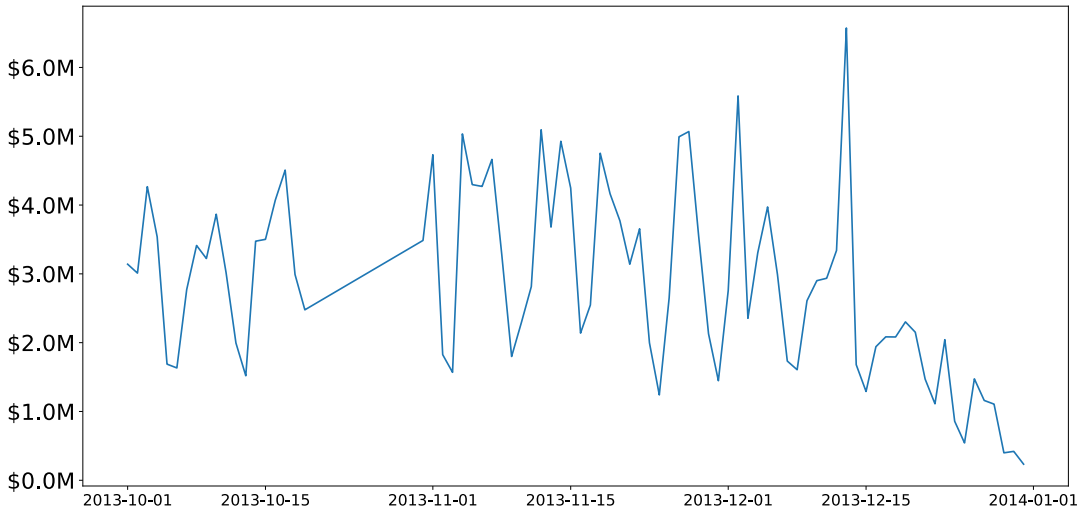
Fig 3

Other irregularities found in the data:

The web-scraped data contained a few irregularities which were removed from the analysis. One such irregularity occurred in deals with unusually high prices as high as 10^{17} (price was determined by dividing gross billings by number of units sold). A careful observation of the data showed that all deals with prices over $10K did not seem reasonable, and were therefore removed. Additionally, deals from Icon Parking ($5455) and Via Downer pizzeria ($4077) was also removed from the dataset. A second irregularity occurred in deals with very low prices (under $1). These deals were not removed because the total gross billings summed over all these deals did not affect the total gross billings significantly.

APPENDIX

Appendix A - Gross Billings for New Local Deals in 4Q13



Appendix A – the graph depicts gross billings in the local segment during 4Q2013. The x-axis represents the start dates of the deals. There is a spike in gross billings around Dec 13, possibly due to the holiday, and the newer deals after Dec 15 have very low gross billings. Gross billings from deals after Dec 7 were omitted from the average gross billing calculation.

Appendix B – Calculations for mean gross billings, total gross billings and ARIMA modeling

```
# Gross billing prediction using the simple average method

avg_gross_billings = (

    local_df.loc[(local_df['Start Date']>='2013-10-01') & (local_df['Start Date']<='2013-12-07'),['Billings','Start Date']]
    .groupby('Start Date')
    .sum()
    ['Billings'].mean()

                      )


avg_gross_billings

```

```
3264173.250631576
```

```
#to find the missing gross billing, we can multiply the average gross billing by 11 days
missing_gross_billings = avg_gross_billings*11
#the gross billing estimate is then the old estimate + missing billings
local_gross_billings = 4.096224e+08 + missing_gross_billings

print(missing_gross_billings)
print(local_gross_billings)
```

```
35905905.75694734
445528305.75694734
```

```python
# Gross billing predition using ARIMA model

tmpdf = (
    local_df.loc[(local_df['Start Date']>='2013-09-27') & (local_df['Start Date']<'2013-12-01'),['Billings','Start Date']]
    .groupby('Start Date')
    .sum()
    .sort_values(by='Start Date',ascending=False)
    .reset_index(drop=True)
         )

mod = sm.tsa.statespace.SARIMAX(tmpdf['Billings'], trend='ct', order=(6,0,2), enforce_invertibility=False)
res = mod.fit(disp=False)

res.predict(0)

```

Appendix C –Groupon gross billing estimations from previous quarters

The web-scraped data as well as the historical gross billing estimates from Q3 2012 to Q3 2013 were provided by YipitData. By comparing gross billing estimates from YipitData's web-scraped data to the actual gross billings reported by Groupon, we get a gross billing prediction accuracy between 0.6-3.4%.

	Q3 2012			Q4 2012			Q1 2013			Q2 2013			Q3 2013		
	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
Billings ($ million)															
Local	$133.4	$137.3	$138.2	$126.8	$139.9	$164.4	$162.7	$143.0	$163.4	$143.8	$162.2	$153.2	$140.0	$136.7	$133.8
Goods	$26.7	$33.0	$50.8	$64.3	$85.1	$64.3	$47.3	$46.0	$51.0	$62.8	$71.7	$67.1	$61.3	$67.0	$63.2
Travel	$16.8	$15.4	$14.3	$16.6	$14.6	$18.5	$22.6	$13.6	$20.3	$18.9	$22.9	$22.8	$22.4	$22.7	$21.7
Total	**$176.9**	**$185.8**	**$203.3**	**$207.7**	**$239.6**	**$247.2**	**$232.6**	**$202.6**	**$234.7**	**$225.5**	**$256.8**	**$243.1**	**$223.6**	**$226.4**	**$218.7**

	Q3 2012			Q4 2012			Q1 2013			Q2 2013			Q3 2013		
	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
Units Sold															
Local	4,400,800	4,233,715	4,991,815	5,177,436	4,920,379	5,502,182	5,330,316	4,823,772	5,530,983	4,807,697	5,592,799	5,755,798	4,996,243	4,902,361	4,967,461
Goods	855,156	1,162,884	1,629,823	1,879,697	2,583,172	1,915,784	1,596,738	1,491,286	1,685,055	2,470,161	2,726,326	2,651,338	2,267,943	2,471,564	2,346,842
Travel	61,283	84,985	60,253	74,358	87,333	93,703	84,821	55,030	84,686	102,091	144,592	142,509	103,021	108,412	105,752
Total	**5,317,240**	**5,481,583**	**6,681,891**	**7,131,491**	**7,590,883**	**7,511,668**	**7,011,876**	**6,370,088**	**7,300,724**	**7,379,948**	**8,463,717**	**8,549,645**	**7,367,207**	**7,482,337**	**7,420,054**

	Q3 2012			Q4 2012			Q1 2013			Q2 2013			Q3 2013		
	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
New Deals Started															
Local	13,543	12,926	12,814	14,544	13,914	15,374	12,375	11,846	13,041	10,790	14,281	13,815	14,173	13,075	10,670
Goods	334	448	525	770	1,079	1,310	992	1,197	1,499	1,755	2,185	2,610	2,796	2,887	2,847
Travel	211	277	217	262	270	334	243	188	205	329	471	458	506	537	571
Total	**14,088**	**13,651**	**13,556**	**15,576**	**15,263**	**17,018**	**13,610**	**13,231**	**14,745**	**12,874**	**16,937**	**16,883**	**17,475**	**16,499**	**14,088**