

# The effect of the canal parade on the Airbnb market in Amsterdam

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2022-10-25

## analysis group 17

### statistical tests

For testing significance of this analysis two statistical tests were executed: ANOVA and a linear regression  
The ANOVA test:

```
## New names:
## Rows: 27775 Columns: 34
## -- Column specification
## ----- Delimiter: "," chr
## (1): neighbourhood_cleansed dbl (30): ...1, X_calendar, listing_id,
## price_calendar, adjusted_price, X_1... lgl (2): available, date_cp date (1):
## date
## i Use 'spec()' to retrieve the full column specification for this data. i
## Specify the column types or set 'show_col_types = FALSE' to quiet this message.
## * ' -> '...1'
```

```
## Analysis of Variance Table
```

```
##
```

```
## Response: adjusted_price
```

```
##
```

```
## 'Centrum-Oost'
```

```
## date_cp
```

```
## Zuid
```

```
## 'Oostelijk Havengebied - Indische Buurt'
```

```
## 'Noord-West'
```

```
## 'De Aker - Nieuw Sloten'
```

```
## Westerpark
```

```
## Watergraafsmeer
```

```
## 'Oud-Noord'
```

```
## 'Bijlmer-Centrum'
```

```
## 'Bos en Lommer'
```

```
## 'Gaasperdam - Driemond'
```

```
## 'De Pijp - Rivierenbuurt'
```

```
## 'Centrum-West'
```

```
## 'Oud-Oost'
```

```
## 'Noord-Oost'
```

```
## 'Buitenveldert - Zuidas'
```

```
## 'IJburg - Zeeburgereiland'
```

	Df	Sum Sq	Mean Sq
1	10140861	10140861	
1	65602	65602	
1	2195605	2195605	
1	417897	417897	
1	1558966	1558966	
1	270811	270811	
1	112800	112800	
1	62730	62730	
1	378626	378626	
1	10573	10573	
1	1497839	1497839	
1	1756881	1756881	
1	626	626	
1	11972927	11972927	
1	41480	41480	
1	329450	329450	
1	118534	118534	
1	303775	303775	

## Osdorp	1	88472	88472
## Slotervaart	1	1202883	1202883
## 'Geuzenveld - Slotermeer'	1	159504	159504
## 'Bijlmer-Oost'	1	129493	129493
## 'Centrum-Oost':date_cp	1	4215	4215
## date_cp:Zuid	1	1723	1723
## date_cp:'Oostelijk Havengebied - Indische Buurt'	1	925	925
## date_cp:'Noord-West'	1	1649	1649
## date_cp:'De Aker - Nieuw Sloten'	1	216	216
## date_cp:Westerpark	1	1527	1527
## date_cp:Watergraafsmeer	1	2034	2034
## date_cp:'Oud-Noord'	1	3262	3262
## date_cp:'Bos en Lommer'	1	2553	2553
## date_cp:'Gaasperdam - Driemond'	1	901	901
## date_cp:'De Pijp - Rivierenbuurt'	1	1892	1892
## date_cp:'Centrum-West'	1	38328	38328
## date_cp:'Oud-Oost'	1	2205	2205
## date_cp:'Noord-Oost'	1	201	201
## date_cp:'Buitenveldert - Zuidas'	1	139	139
## date_cp:'IJburg - Zeeburgereiland'	1	628	628
## date_cp:Osdorp	1	56	56
## date_cp:Slotervaart	1	32	32
## date_cp:'Geuzenveld - Slotermeer'	1	118	118
## date_cp:'Bijlmer-Oost'	1	73	73
## Residuals	27732	905168866	32640
##	F value	Pr(>F)	
## 'Centrum-Oost'	310.6894	< 2.2e-16	***
## date_cp	2.0099	0.1562897	
## Zuid	67.2676	2.472e-16	***
## 'Oostelijk Havengebied - Indische Buurt'	12.8033	0.0003466	***
## 'Noord-West'	47.7626	4.915e-12	***
## 'De Aker - Nieuw Sloten'	8.2969	0.0039742	**
## Westerpark	3.4559	0.0630368	.
## Watergraafsmeer	1.9219	0.1656619	
## 'Oud-Noord'	11.6001	0.0006604	***
## 'Bijlmer-Centrum'	0.3239	0.5692594	
## 'Bos en Lommer'	45.8898	1.276e-11	***
## 'Gaasperdam - Driemond'	53.8262	2.250e-13	***
## 'De Pijp - Rivierenbuurt'	0.0192	0.8898420	
## 'Centrum-West'	366.8191	< 2.2e-16	***
## 'Oud-Oost'	1.2708	0.2596194	
## 'Noord-Oost'	10.0935	0.0014896	**
## 'Buitenveldert - Zuidas'	3.6316	0.0567032	.
## 'IJburg - Zeeburgereiland'	9.3069	0.0022851	**
## Osdorp	2.7106	0.0996976	.
## Slotervaart	36.8532	1.290e-09	***
## 'Geuzenveld - Slotermeer'	4.8868	0.0270713	*
## 'Bijlmer-Oost'	3.9673	0.0464009	*
## 'Centrum-Oost':date_cp	0.1291	0.7193417	
## date_cp:Zuid	0.0528	0.8183067	
## date_cp:'Oostelijk Havengebied - Indische Buurt'	0.0283	0.8663322	
## date_cp:'Noord-West'	0.0505	0.8221741	
## date_cp:'De Aker - Nieuw Sloten'	0.0066	0.9351298	
## date_cp:Westerpark	0.0468	0.8287850	

```

## date_cp:Watergraafsmeer          0.0623 0.8028555
## date_cp:'Oud-Noord'              0.0999 0.7518970
## date_cp:'Bos en Lommer'          0.0782 0.7797308
## date_cp:'Gaasperdam - Driemond'  0.0276 0.8680688
## date_cp:'De Pijp - Rivierenbuurt' 0.0580 0.8097599
## date_cp:'Centrum-West'           1.1743 0.2785331
## date_cp:'Oud-Oost'               0.0676 0.7949241
## date_cp:'Noord-Oost'             0.0062 0.9373917
## date_cp:'Buitenveldert - Zuidas'  0.0042 0.9480343
## date_cp:'IJburg - Zeeburgereiland' 0.0192 0.8896698
## date_cp:Osdorp                   0.0017 0.9668170
## date_cp:Slotervaart              0.0010 0.9750079
## date_cp:'Geuzenveld - Slotermeer' 0.0036 0.9521562
## date_cp:'Bijlmer-Oost'           0.0022 0.9621850
## Residuals
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

The linear regression:

```

##
## Call:
## lm(formula = price_calendar ~ 'Centrum-Oost' * date_cp + Zuid *
##   date_cp + 'Oostelijk Havengebied - Indische Buurt' * date_cp +
##   'Noord-West' * date_cp + 'De Aker - Nieuw Sloten' * date_cp +
##   Westerpark * date_cp + 'De Aker - Nieuw Sloten' * date_cp +
##   Westerpark * date_cp + Watergraafsmeer * date_cp + 'Oud-Noord' *
##   date_cp + 'Bijlmer-Centrum' + 'Bos en Lommer' * date_cp +
##   'Gaasperdam - Driemond' * date_cp + 'De Pijp - Rivierenbuurt' *
##   date_cp + 'Centrum-West' * date_cp + 'Oud-Oost' * date_cp +
##   'Noord-Oost' * date_cp + 'Buitenveldert - Zuidas' * date_cp +
##   'IJburg - Zeeburgereiland' * date_cp + Osdorp * date_cp +
##   Slotervaart * date_cp + 'Geuzenveld - Slotermeer' * date_cp +
##   'Bijlmer-Oost' * date_cp, data = airbnb)
##
## Residuals:
##   Min      1Q  Median      3Q      Max
## -253.3  -79.5  -32.3   33.3  6230.2
##
## Coefficients:
##                                     Estimate Std. Error
## (Intercept)                      175.9445     3.1873
## 'Centrum-Oost'                     70.8164     4.8440
## date_cpTRUE                        2.3322     7.0127
## Zuid                              44.1459     5.7172
## 'Oostelijk Havengebied - Indische Buurt' -11.4640     7.0900
## 'Noord-West'                      -36.7441     8.4035
## 'De Aker - Nieuw Sloten'          -22.1695    13.2140
## Westerpark                        3.3857     5.6852
## Watergraafsmeer                   2.6116     8.1298
## 'Oud-Noord'                      30.1172     6.5512
## 'Bijlmer-Centrum'                 2.5345    14.4057
## 'Bos en Lommer'                  -22.6270     6.5813
## 'Gaasperdam - Driemond'          -74.9331    14.0369

```

## 'De Pijp - Rivierenbuurt'	14.7295	5.0028
## 'Centrum-West'	56.2727	4.4283
## 'Oud-Oost'	-3.6562	6.0356
## 'Noord-Oost'	-34.0816	9.9284
## 'Buitenveldert - Zuidas'	-24.6677	12.5295
## 'IJburg - Zeeburgereiland'	13.4055	7.8453
## Osdorp	-31.0278	15.4454
## Slotervaart	-52.7861	9.5692
## 'Geuzenveld - Slotermeer'	-21.4566	10.4511
## 'Bijlmer-Oost'	-37.2208	21.0457
## 'Centrum-Oost':date_cpTRUE	4.2418	10.7565
## date_cpTRUE:Zuid	-1.1788	12.7206
## date_cpTRUE:'Oostelijk Havengebied - Indische Buurt'	-0.9688	15.8027
## date_cpTRUE:'Noord-West'	-2.3708	18.7477
## date_cpTRUE:'De Aker - Nieuw Sloten'	-0.7272	29.5199
## date_cpTRUE:Westerpark	-0.5411	12.6488
## date_cpTRUE:Watergraafsmeer	-2.2557	18.1343
## date_cpTRUE:'Oud-Noord'	-1.9039	14.5936
## date_cpTRUE:'Bos en Lommer'	-1.1820	14.6613
## date_cpTRUE:'Gaasperdam - Driemond'	-2.4800	31.3616
## date_cpTRUE:'De Pijp - Rivierenbuurt'	0.7405	11.1140
## date_cpTRUE:'Centrum-West'	9.0735	9.8200
## date_cpTRUE:'Oud-Oost'	2.5903	13.4360
## date_cpTRUE:'Noord-Oost'	-2.2704	22.1641
## date_cpTRUE:'Buitenveldert - Zuidas'	-2.2876	27.9880
## date_cpTRUE:'IJburg - Zeeburgereiland'	-2.5072	17.4966
## date_cpTRUE:Osdorp	1.1955	34.5136
## date_cpTRUE:Slotervaart	-0.8273	21.3596
## date_cpTRUE:'Geuzenveld - Slotermeer'	-1.4346	23.3347
## date_cpTRUE:'Bijlmer-Oost'	-2.2138	47.0424
##	t value	Pr(> t )
## (Intercept)	55.202	< 2e-16 ***
## 'Centrum-Oost'	14.620	< 2e-16 ***
## date_cpTRUE	0.333	0.739458
## Zuid	7.722	1.19e-14 ***
## 'Oostelijk Havengebied - Indische Buurt'	-1.617	0.105907
## 'Noord-West'	-4.372	1.23e-05 ***
## 'De Aker - Nieuw Sloten'	-1.678	0.093410 .
## Westerpark	0.596	0.551500
## Watergraafsmeer	0.321	0.748033
## 'Oud-Noord'	4.597	4.30e-06 ***
## 'Bijlmer-Centrum'	0.176	0.860345
## 'Bos en Lommer'	-3.438	0.000587 ***
## 'Gaasperdam - Driemond'	-5.338	9.46e-08 ***
## 'De Pijp - Rivierenbuurt'	2.944	0.003240 **
## 'Centrum-West'	12.707	< 2e-16 ***
## 'Oud-Oost'	-0.606	0.544676
## 'Noord-Oost'	-3.433	0.000598 ***
## 'Buitenveldert - Zuidas'	-1.969	0.048990 *
## 'IJburg - Zeeburgereiland'	1.709	0.087514 .
## Osdorp	-2.009	0.044561 *
## Slotervaart	-5.516	3.49e-08 ***
## 'Geuzenveld - Slotermeer'	-2.053	0.040077 *
## 'Bijlmer-Oost'	-1.769	0.076976 .

```

## 'Centrum-Oost':date_cpTRUE          0.394 0.693328
## date_cpTRUE:Zuid                    -0.093 0.926167
## date_cpTRUE:'Oostelijk Havengebied - Indische Buurt' -0.061 0.951115
## date_cpTRUE:'Noord-West'            -0.126 0.899368
## date_cpTRUE:'De Aker - Nieuw Sloten' -0.025 0.980346
## date_cpTRUE:Westerpark              -0.043 0.965876
## date_cpTRUE:Watergraafsmeer         -0.124 0.901008
## date_cpTRUE:'Oud-Noord'             -0.130 0.896200
## date_cpTRUE:'Bos en Lommer'         -0.081 0.935743
## date_cpTRUE:'Gaasperdam - Driemond' -0.079 0.936972
## date_cpTRUE:'De Pijp - Rivierenbuurt' 0.067 0.946875
## date_cpTRUE:'Centrum-West'          0.924 0.355506
## date_cpTRUE:'Oud-Oost'              0.193 0.847128
## date_cpTRUE:'Noord-Oost'            -0.102 0.918411
## date_cpTRUE:'Buitenveldert - Zuidas' -0.082 0.934858
## date_cpTRUE:'IJburg - Zeeburgereiland' -0.143 0.886055
## date_cpTRUE:Osdorp                  0.035 0.972367
## date_cpTRUE:Slotervaart             -0.039 0.969105
## date_cpTRUE:'Geuzenveld - Slotermeer' -0.061 0.950976
## date_cpTRUE:'Bijlmer-Oost'          -0.047 0.962466
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 181.4 on 27732 degrees of freedom
## Multiple R-squared:  0.0351, Adjusted R-squared:  0.03364
## F-statistic: 24.02 on 42 and 27732 DF, p-value: < 2.2e-16

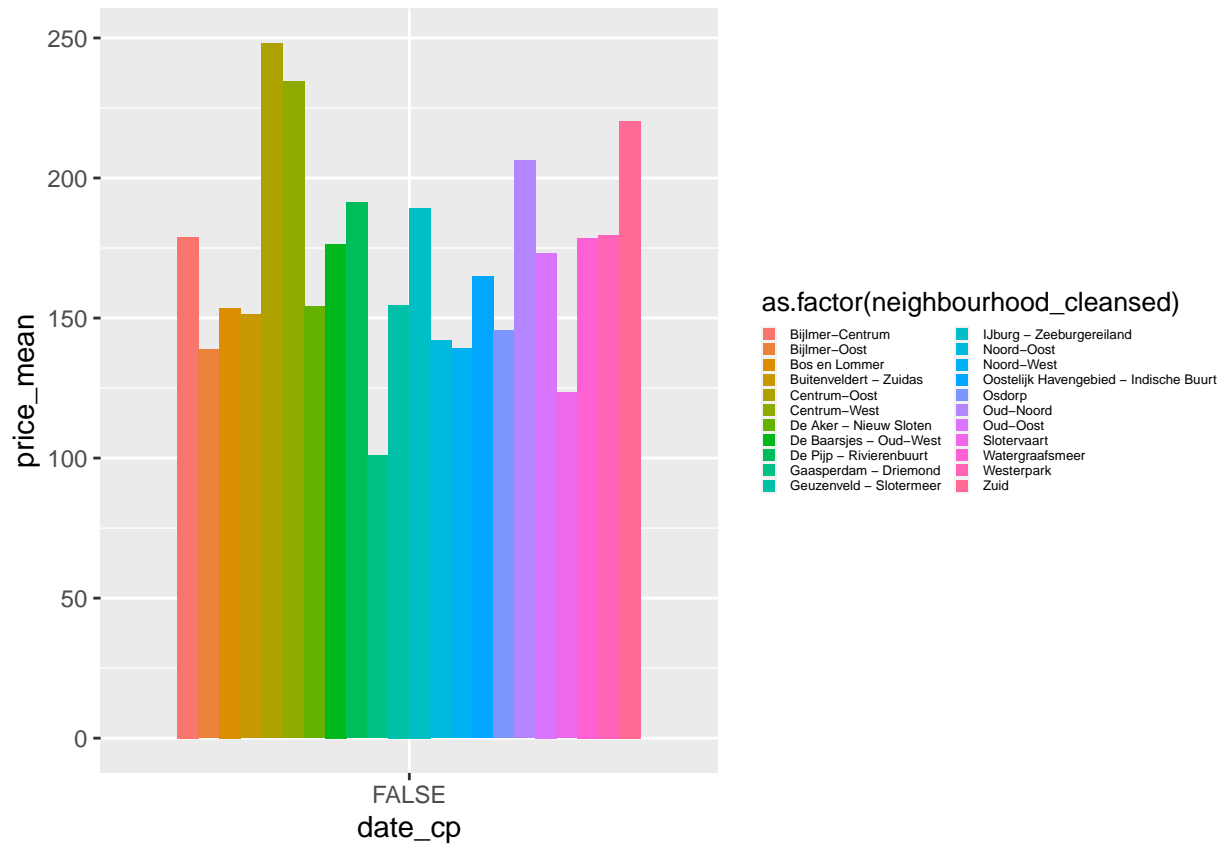
```

From these tests can be seen that there are no significant differences in the prices during 'normal' weekends and the weekends of the canal parade, and that this also does not differ in the different neighbourhoods. This can also be seen in the graphs below:

```

## 'summarise()' has grouped output by 'neighbourhood_cleansed'. You can override
## using the '.groups' argument.

```



```
## 'summarise()' has grouped output by 'neighbourhood_cleansed'. You can override
## using the '.groups' argument.
```

