Regression Models MA data analysis

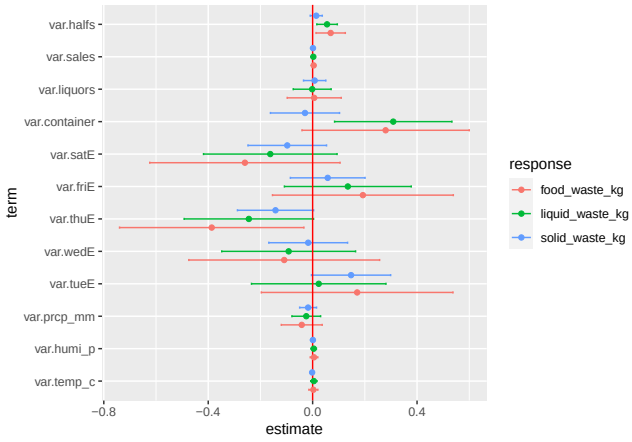
Additive Multiple Linear Model

solid and liquid food waste

```
## Response food_waste_kg :
##
## Call:
## lm(formula = food_waste_kg ~ var., data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.9444 -0.6870 -0.1213  0.5307  3.2825
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -1.4487861  0.7001179  -2.069   0.0403 *
## var.temp_c     0.0028126  0.0086899   0.324   0.7466
## var.humi_p     0.0053388  0.0073629   0.725   0.4695
## var.prcp_mm   -0.0417248  0.0396404  -1.053   0.2942
## var.tueE       0.1706132  0.1857893   0.918   0.3599
## var.wedE      -0.1088752  0.1849244  -0.589   0.5569
## var.thuE      -0.3865671  0.1787284  -2.163   0.0322 *
## var.friE       0.1925727  0.1752651   1.099   0.2737
## var.satE      -0.2594445  0.1845003  -1.406   0.1618
## var.container  0.2795788  0.1621429   1.724   0.0867 .
## var.liquors    0.0060825  0.0523540   0.116   0.9077
## var.sales      0.0039416  0.0005678   6.942 1.13e-10 ***
## var.halfs      0.0691157  0.0283383   2.439   0.0159 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9858 on 148 degrees of freedom
## Multiple R-squared:  0.543,  Adjusted R-squared:  0.506
## F-statistic: 14.66 on 12 and 148 DF,  p-value: < 2.2e-16
##
##
## Response solid_waste_kg :
##
## Call:
## lm(formula = solid_waste_kg ~ var., data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.77317 -0.26285 -0.08542  0.17375  2.23890
##
```

```
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -0.3393464  0.2891174  -1.174   0.2424
## var.temp_c    -0.0018981  0.0035885  -0.529   0.5976
## var.humi_p     0.0010506  0.0030406   0.346   0.7302
## var.prcp_mm   -0.0173666  0.0163697  -1.061   0.2905
## var.tueE       0.1472586  0.0767227   1.919   0.0569 .
## var.wedE      -0.0170184  0.0763655  -0.223   0.8240
## var.thuE      -0.1422127  0.0738068  -1.927   0.0559 .
## var.friE       0.0577250  0.0723767   0.798   0.4264
## var.satE      -0.0972288  0.0761904  -1.276   0.2039
## var.container -0.0292830  0.0669578  -0.437   0.6625
## var.liquors    0.0078168  0.0216199   0.362   0.7182
## var.sales      0.0012807  0.0002345   5.462 1.94e-07 ***
## var.halfs      0.0138583  0.0117024   1.184   0.2382
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4071 on 148 degrees of freedom
## Multiple R-squared:  0.3845, Adjusted R-squared:  0.3346
## F-statistic: 7.704 on 12 and 148 DF,  p-value: 5.36e-11
##
##
## Response liquid_waste_kg :
##
## Call:
## lm(formula = liquid_waste_kg ~ var., data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.42750 -0.48344 -0.07879  0.44523  1.80789
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -1.1094396  0.4911865  -2.259  0.02536 *
## var.temp_c     0.0047107  0.0060966   0.773  0.44095
## var.humi_p     0.0042882  0.0051656   0.830  0.40780
## var.prcp_mm   -0.0243582  0.0278108  -0.876  0.38253
## var.tueE       0.0233546  0.1303455   0.179  0.85805
## var.wedE      -0.0918567  0.1297387  -0.708  0.48005
## var.thuE      -0.2443544  0.1253917  -1.949  0.05322 .
## var.friE       0.1348477  0.1229620   1.097  0.27457
## var.satE      -0.1622157  0.1294412  -1.253  0.21211
## var.container  0.3088618  0.1137557   2.715  0.00741 **
## var.liquors   -0.0017344  0.0367304  -0.047  0.96240
## var.sales      0.0026609  0.0003983   6.680 4.52e-10 ***
## var.halfs      0.0552573  0.0198815   2.779  0.00615 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6916 on 148 degrees of freedom
## Multiple R-squared:  0.5535, Adjusted R-squared:  0.5173
## F-statistic: 15.29 on 12 and 148 DF,  p-value: < 2.2e-16
```

Coefficients Visualization



Per Customer

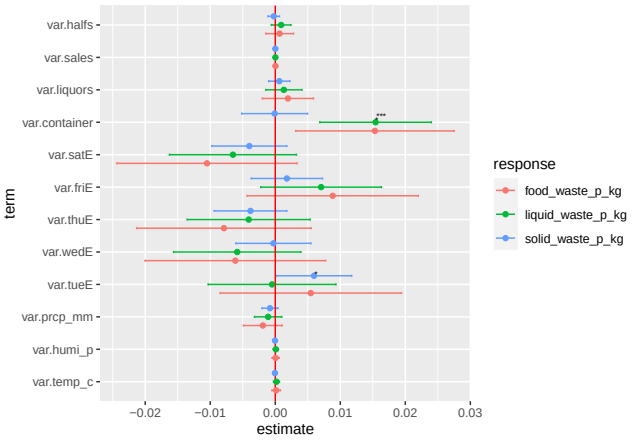
```
## Response food_waste_p_kg :
##
## Call:
## lm(formula = food_waste_p_kg ~ var., data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.070808 -0.025440 -0.002235  0.020112  0.146466
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.970e-02  2.660e-02   1.492    0.138
## var.temp_c     1.395e-04  3.301e-04   0.423    0.673
## var.humi_p     5.093e-05  2.797e-04   0.182    0.856
## var.prcp_mm   -1.914e-03  1.506e-03  -1.271    0.206
## var.tueE       5.465e-03  7.058e-03   0.774    0.440
## var.wedE      -6.143e-03  7.025e-03  -0.874    0.383
## var.thuE      -7.898e-03  6.790e-03  -1.163    0.247
## var.friE       8.833e-03  6.658e-03   1.327    0.187
## var.satE      -1.050e-02  7.009e-03  -1.499    0.136
## var.container  1.533e-02  6.160e-03   2.488    0.014 *
## var.liquors    1.945e-03  1.989e-03   0.978    0.330
## var.sales      3.475e-05  2.157e-05   1.611    0.109
## var.halfs      6.672e-04  1.077e-03   0.620    0.536
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03745 on 148 degrees of freedom
## Multiple R-squared:  0.1602, Adjusted R-squared:  0.09214
## F-statistic: 2.353 on 12 and 148 DF,  p-value: 0.008537
##
##
## Response solid_waste_p_kg :
##
## Call:
```

```
## lm(formula = solid_waste_p_kg ~ var., data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.027111 -0.009757 -0.001349  0.007366  0.101048
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    2.035e-02  1.107e-02   1.838   0.0680 .
## var.temp_c    -4.721e-05  1.374e-04  -0.344   0.7316
## var.humi_p    -3.825e-05  1.164e-04  -0.329   0.7430
## var.prcp_mm   -8.164e-04  6.267e-04  -1.303   0.1947
## var.tueE       5.960e-03  2.937e-03   2.029   0.0442 *
## var.wedE      -2.923e-04  2.924e-03  -0.100   0.9205
## var.thuE      -3.814e-03  2.826e-03  -1.350   0.1792
## var.friE       1.786e-03  2.771e-03   0.645   0.5202
## var.satE      -3.992e-03  2.917e-03  -1.368   0.1732
## var.container -9.782e-05  2.563e-03  -0.038   0.9696
## var.liquors    6.219e-04  8.277e-04   0.751   0.4537
## var.sales      1.336e-05  8.976e-06   1.489   0.1387
## var.halfs     -2.354e-04  4.480e-04  -0.525   0.6001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01559 on 148 degrees of freedom
## Multiple R-squared:  0.09039,    Adjusted R-squared:  0.01664
## F-statistic: 1.226 on 12 and 148 DF,  p-value: 0.2707
##
##
## Response liquid_waste_p_kg :
##
## Call:
## lm(formula = liquid_waste_p_kg ~ var., data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.04658 -0.01829 -0.00111  0.01530  0.07904
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.935e-02  1.875e-02   1.032 0.303893
## var.temp_c     1.867e-04  2.328e-04   0.802 0.423722
## var.humi_p     8.918e-05  1.972e-04   0.452 0.651806
## var.prcp_mm   -1.098e-03  1.062e-03  -1.034 0.302856
## var.tueE      -4.951e-04  4.977e-03  -0.099 0.920881
## var.wedE      -5.851e-03  4.953e-03  -1.181 0.239422
## var.thuE      -4.084e-03  4.787e-03  -0.853 0.394946
## var.friE       7.047e-03  4.695e-03   1.501 0.135461
## var.satE      -6.512e-03  4.942e-03  -1.318 0.189633
## var.container  1.542e-02  4.343e-03   3.551 0.000515 ***
## var.liquors    1.323e-03  1.402e-03   0.943 0.347015
## var.sales      2.139e-05  1.521e-05   1.406 0.161732
## var.halfs      9.026e-04  7.591e-04   1.189 0.236315
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02641 on 148 degrees of freedom
## Multiple R-squared:  0.209,  Adjusted R-squared:  0.1449
## F-statistic:  3.26 on 12 and 148 DF,  p-value: 0.0003427
```

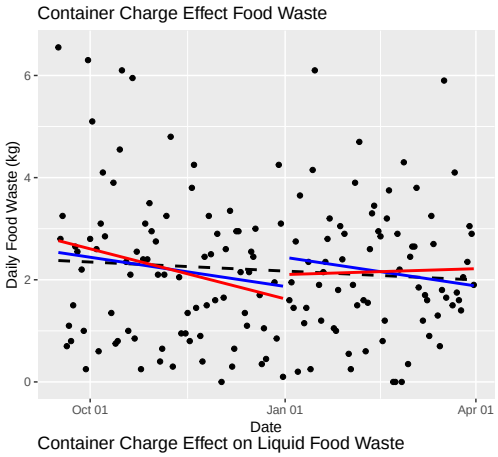
Coefficients Visualization

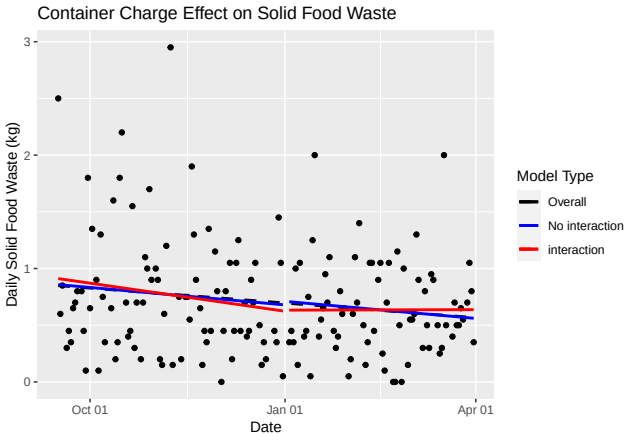
```
## Warning: `aes_string()` was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with `aes()`.
## i See also `vignette("ggplot2-in-packages")` for more information.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

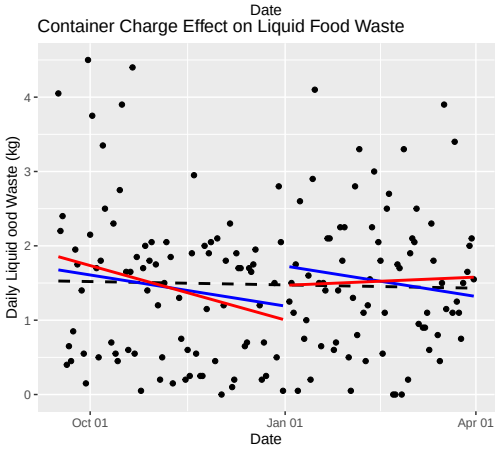


RDiT

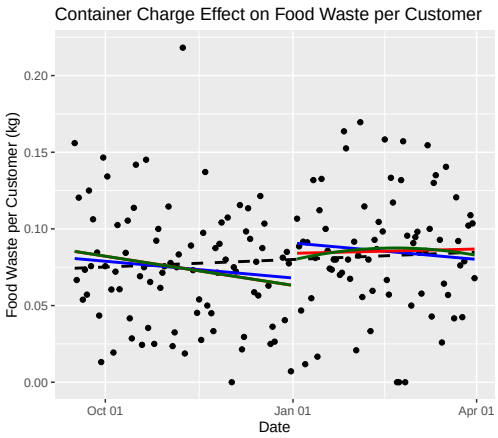
Scatter plot

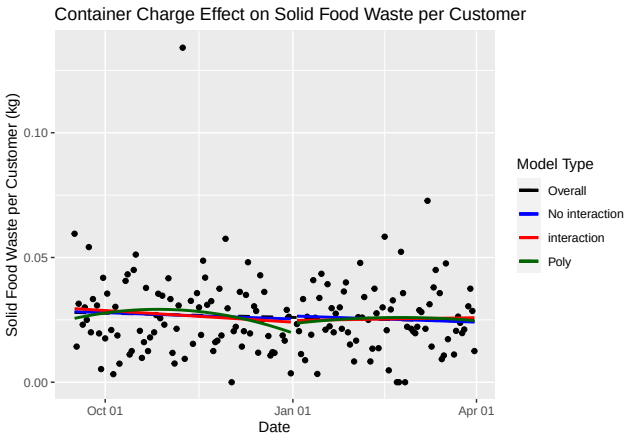


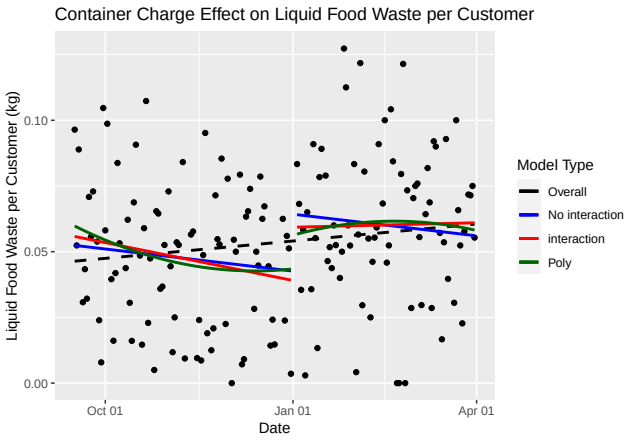




Scatter plot per Customer







RDinT Analysis

Interaction

```
## Response food_waste_kg :
##
## Call:
## lm(formula = food_waste_kg ~ var., data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.3728 -1.0750 -0.1146  0.7660  3.9877
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.640999   0.303450   5.408 2.34e-07 ***
## var.container  0.451440   0.440216   1.025   0.3067
## var.time      -0.013091   0.006059  -2.161   0.0322 *
## var.           0.014899   0.009594   1.553   0.1225
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.395 on 157 degrees of freedom
## Multiple R-squared:  0.02956,    Adjusted R-squared:  0.01101
## F-statistic: 1.594 on 3 and 157 DF,  p-value: 0.1931
##
##
## Response solid_waste_kg :
##
## Call:
## lm(formula = solid_waste_kg ~ var., data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.7752 -0.3082 -0.1020  0.2648  2.1840
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)    0.627004   0.107778   5.818 3.25e-08 ***
## var.container  0.002645   0.156354   0.017    0.987
## var.time      -0.003309   0.002152  -1.538    0.126
## var.           0.003462   0.003408   1.016    0.311
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4954 on 157 degrees of freedom
## Multiple R-squared:  0.03307,    Adjusted R-squared:  0.01459
## F-statistic:  1.79 on 3 and 157 DF,  p-value: 0.1514
##
##
## Response liquid_waste_kg :
##
## Call:
## lm(formula = liquid_waste_kg ~ var., data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.59768 -0.82269 -0.00855  0.56427  2.82840
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.013995   0.214848   4.720 5.19e-06 ***
## var.container  0.448795   0.311680   1.440   0.1519
## var.time      -0.009783   0.004290  -2.280   0.0239 *
## var.           0.011437   0.006793   1.684   0.0942 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9875 on 157 degrees of freedom
## Multiple R-squared:  0.03439,    Adjusted R-squared:  0.01594
## F-statistic: 1.864 on 3 and 157 DF,  p-value: 0.1379


##
## Call:
## lm(formula = rdt_int_fw, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.3728 -1.0750 -0.1146  0.7660  3.9877
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     1.640999   0.303450   5.408 2.34e-07 ***
## container       0.451440   0.440216   1.025   0.3067
## time           -0.013091   0.006059  -2.161   0.0322 *
## container:time  0.014899   0.009594   1.553   0.1225
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.395 on 157 degrees of freedom
## Multiple R-squared:  0.02956,    Adjusted R-squared:  0.01101
## F-statistic: 1.594 on 3 and 157 DF,  p-value: 0.1931
```

```
##
## Call:
## lm(formula = rdt_int_sfw, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.7752 -0.3082 -0.1020  0.2648  2.1840
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.627004   0.107778   5.818 3.25e-08 ***
## container       0.002645   0.156354   0.017    0.987
## time           -0.003309   0.002152  -1.538    0.126
## container:time  0.003462   0.003408   1.016    0.311
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4954 on 157 degrees of freedom
## Multiple R-squared:  0.03307,    Adjusted R-squared:  0.01459
## F-statistic:  1.79 on 3 and 157 DF,  p-value: 0.1514
```

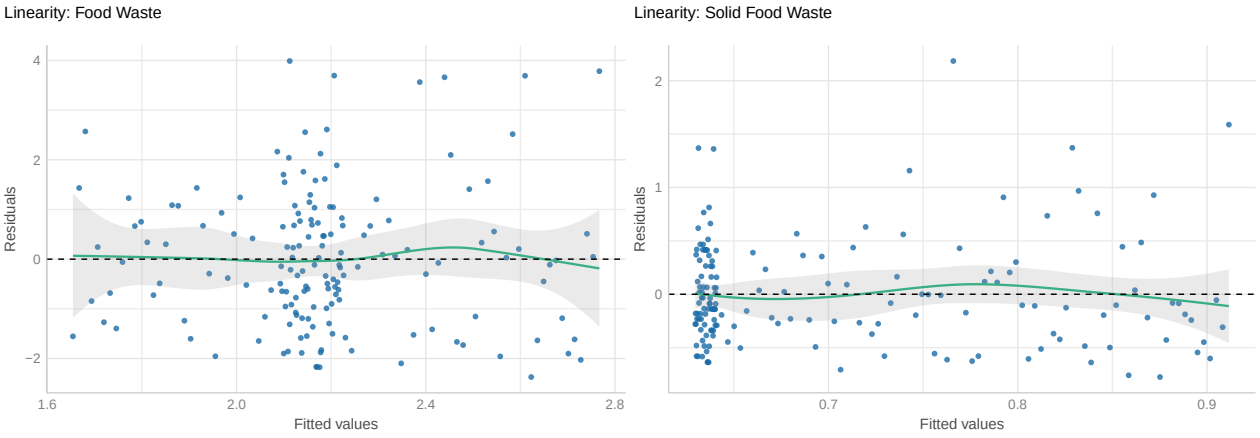
```
##
## Call:
## lm(formula = rdt_int_lfw, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.59768 -0.82269 -0.00855  0.56427  2.82840
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     1.013995   0.214848   4.720 5.19e-06 ***
## container       0.448795   0.311680   1.440   0.1519
## time           -0.009783   0.004290  -2.280   0.0239 *
## container:time  0.011437   0.006793   1.684   0.0942 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9875 on 157 degrees of freedom
## Multiple R-squared:  0.03439,    Adjusted R-squared:  0.01594
## F-statistic: 1.864 on 3 and 157 DF,  p-value: 0.1379
```

Ass-Interaction

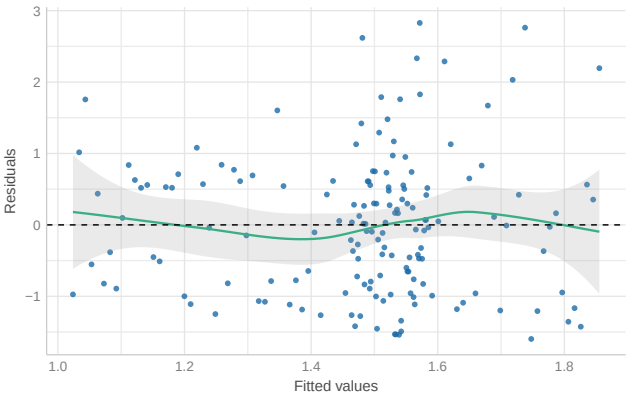
1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals
3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

```
## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.006).
```

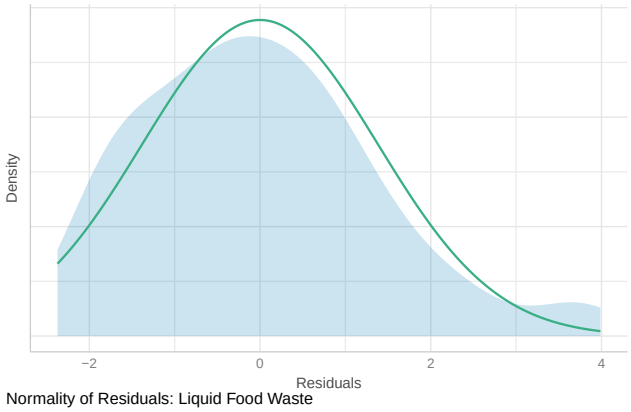
```
## Warning: Heteroscedasticity (non-constant error variance) detected (p < .001).

## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.023).

## Warning: Non-normality of residuals detected (p < .001).

## Warning: Non-normality of residuals detected (p < .001).

## Warning: Non-normality of residuals detected (p < .001).

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_fw
## BP = 7.8124, df = 3, p-value = 0.05005

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_sfw
## BP = 5.4746, df = 3, p-value = 0.1402

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_lfw
## BP = 7.3214, df = 3, p-value = 0.06233

## OK: Residuals appear to be independent and not autocorrelated (p = 0.486).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.522).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.560).
```



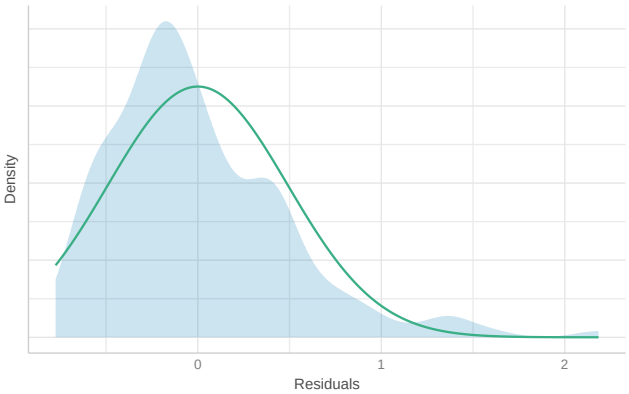
Linearity: Liquid Food Waste



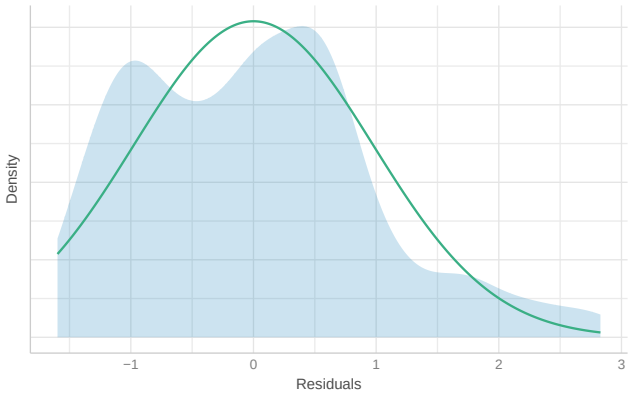
Normality of Residuals: Food Waste



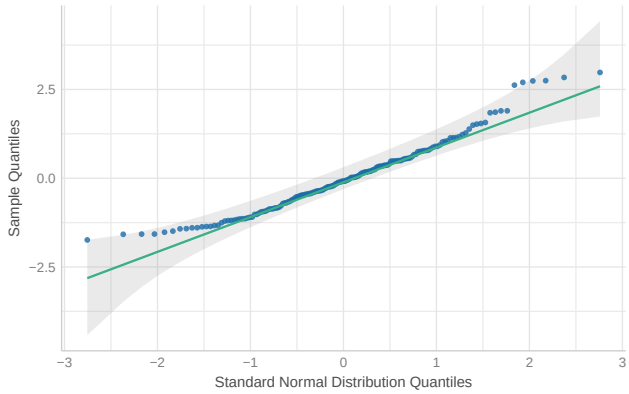
Normality of Residuals: Solid Food Waste



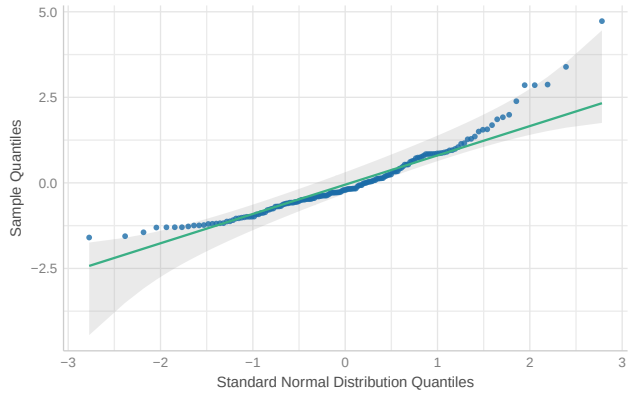
Normality of Residuals: Liquid Food Waste



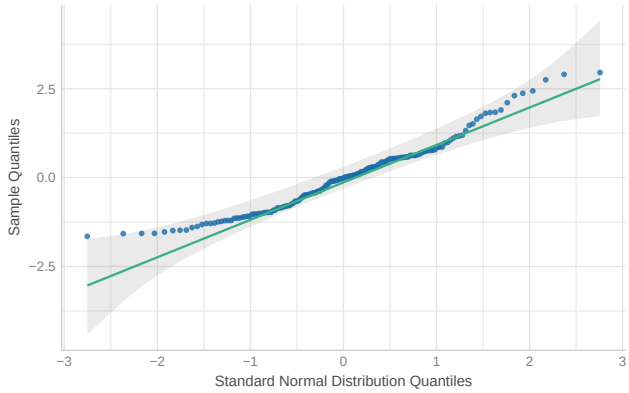
QQ Plot of Residuals: Food Waste



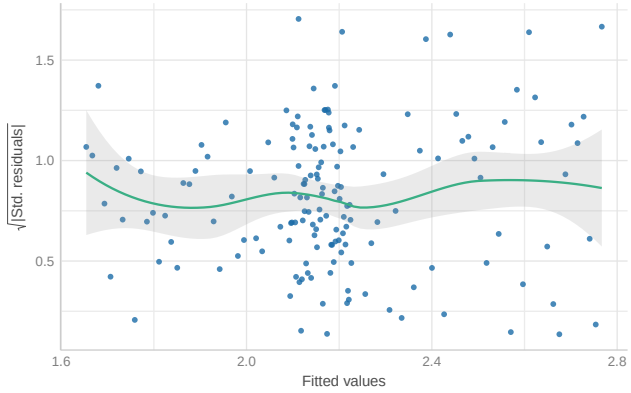
QQ Plot of Residuals: Solid Food Waste



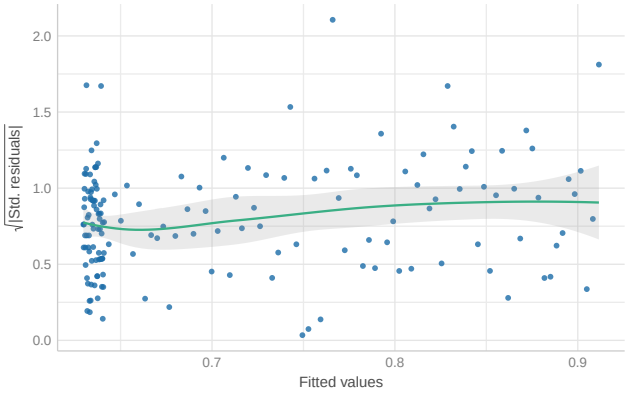
QQ Plot of Residuals: Liquid Food Waste



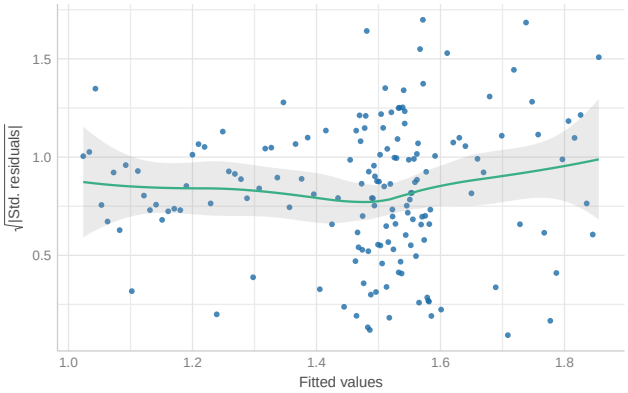
Homoscedasticity: Food Waste



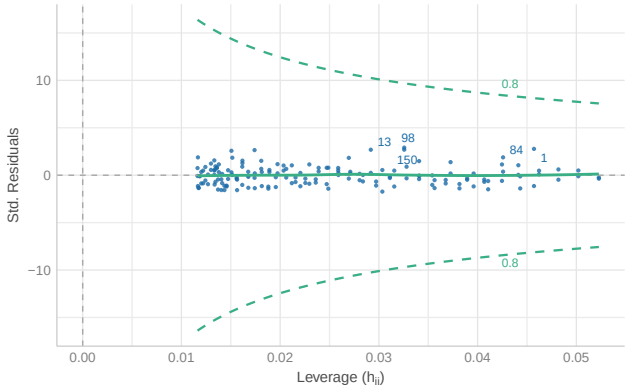
Homoscedasticity: Solid Food Waste



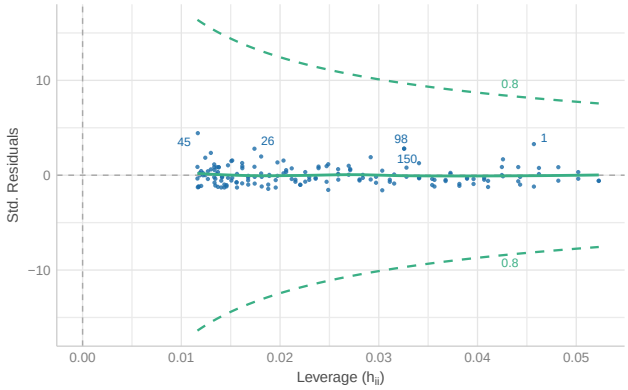
Homoscedasticity: Liquid Food Waste



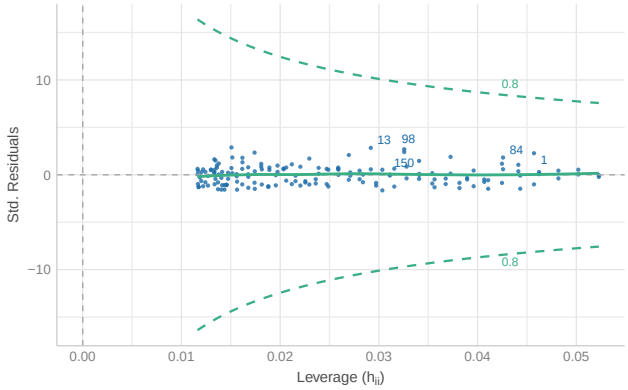
Outliers: Food Waste



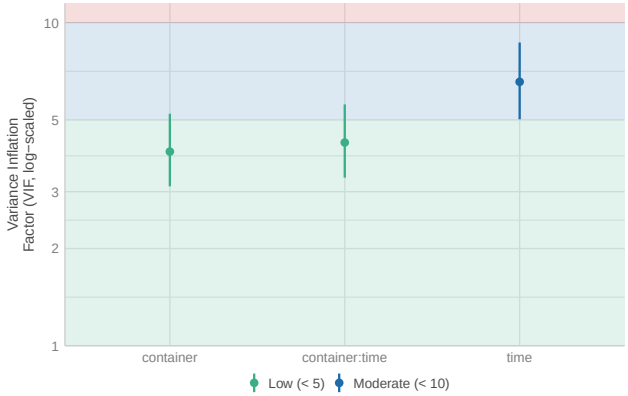
Outliers: Solid Food Waste



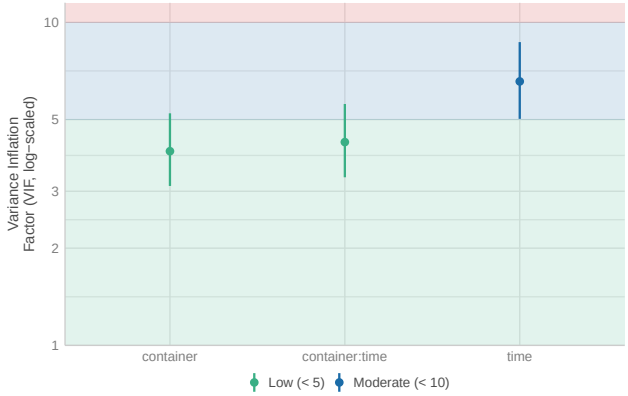
Outliers: Liquid Food Waste



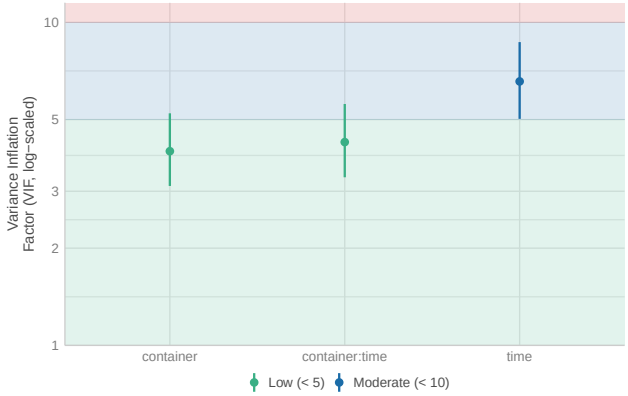
VIF: Food Waste



VIF: Solid Food Waste



VIF: Liquid Food Waste



Multiple model

```
##
## Call:
## lm(formula = rdt_multi_fw, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0485 -0.6500 -0.0912  0.4476  3.3391
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -2.2312704  0.9452769  -2.360   0.0195 *
## container       0.5782882  0.3674976   1.574   0.1177
## time           -0.0083069  0.0065926  -1.260   0.2096
## temp_c         -0.0105319  0.0126725  -0.831   0.4072
## humi_p          0.0091364  0.0093094   0.981   0.3280
## prcp_mm        -0.0393178  0.0405061  -0.971   0.3333
## liquors        -0.0103638  0.0509853  -0.203   0.8392
## sales           0.0040949  0.0005081   8.059 2.17e-13 ***
## halfs           0.0715002  0.0294293   2.430   0.0163 *
## container:time  0.0093167  0.0100585   0.926   0.3558
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.008 on 151 degrees of freedom
## Multiple R-squared:  0.5122, Adjusted R-squared:  0.4832
## F-statistic: 17.62 on 9 and 151 DF,  p-value: < 2.2e-16
```

```
##
## Call:
## lm(formula = rdt_multi_sfw, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.67954 -0.25736 -0.07937  0.18700  2.32548
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -0.4376693  0.3876971  -1.129    0.261
## container       0.1019002  0.1507259   0.676    0.500
## time           -0.0025510  0.0027039  -0.943    0.347
## temp_c         -0.0056240  0.0051975  -1.082    0.281
## humi_p          0.0014782  0.0038182   0.387    0.699
## prcp_mm        -0.0154605  0.0166132  -0.931    0.354
## liquors         0.0080184  0.0209112   0.383    0.702
## sales           0.0012142  0.0002084   5.826 3.31e-08 ***
## halfs           0.0130254  0.0120702   1.079    0.282
## container:time  0.0016192  0.0041254   0.392    0.695
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4135 on 151 degrees of freedom
## Multiple R-squared:  0.3519, Adjusted R-squared:  0.3133
```

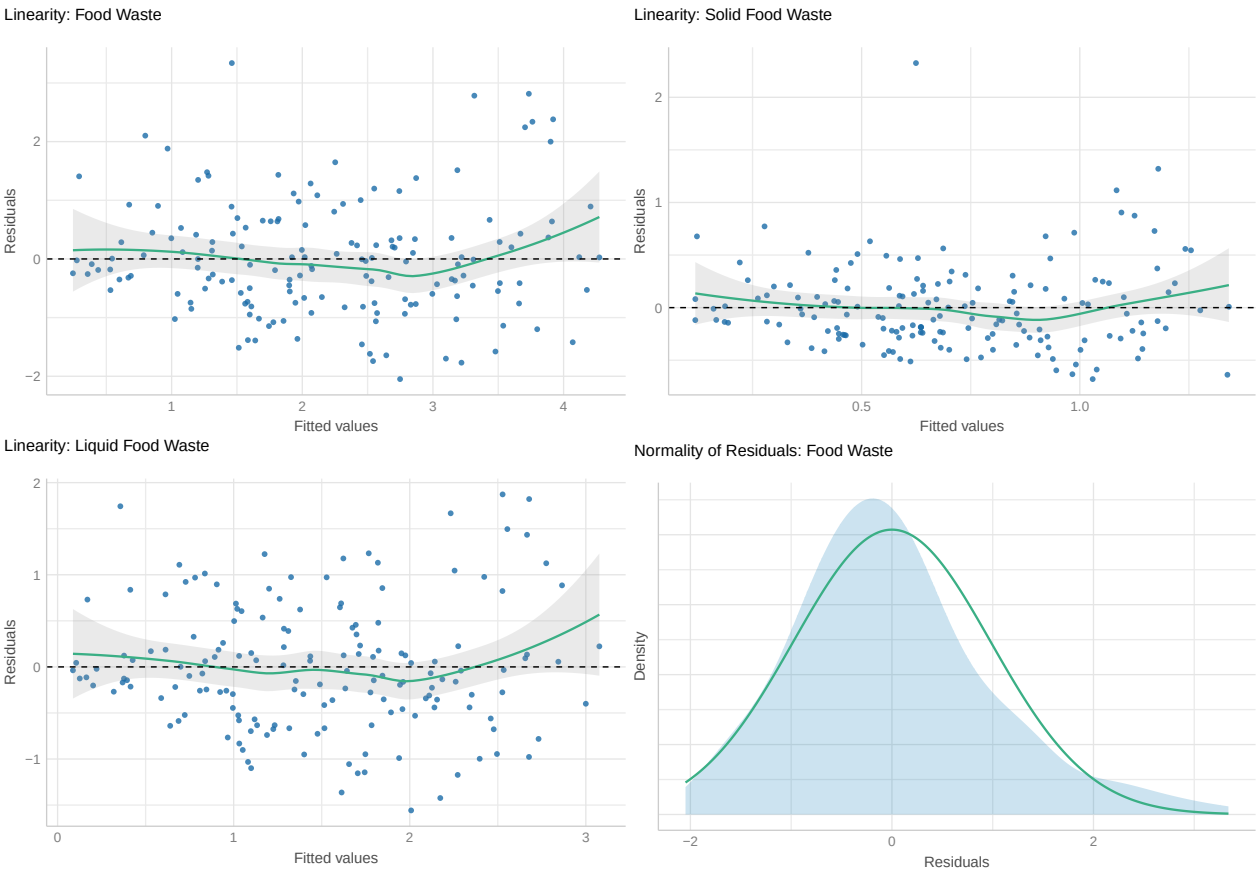
```
## F-statistic: 9.112 on 9 and 151 DF,  p-value: 5.999e-11

##
## Call:
## lm(formula = rdt_multi_lfw, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.55792 -0.44014 -0.07213  0.38966  1.87255
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -1.7936011  0.6627069  -2.706  0.00758 **
## container       0.4763880  0.2576422   1.849  0.06641 .
## time           -0.0057559  0.0046219  -1.245  0.21493
## temp_c         -0.0049079  0.0088843  -0.552  0.58148
## humi_p          0.0076581  0.0065265   1.173  0.24249
## prcp_mm        -0.0238573  0.0283977  -0.840  0.40217
## liquors        -0.0183822  0.0357444  -0.514  0.60782
## sales           0.0028807  0.0003562   8.086 1.85e-13 ***
## halfs           0.0584748  0.0206321   2.834  0.00522 **
## container:time  0.0076975  0.0070517   1.092  0.27676
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7069 on 151 degrees of freedom
## Multiple R-squared:  0.5242, Adjusted R-squared:  0.4958
## F-statistic: 18.48 on 9 and 151 DF,  p-value: < 2.2e-16
```

Ass-Multiple

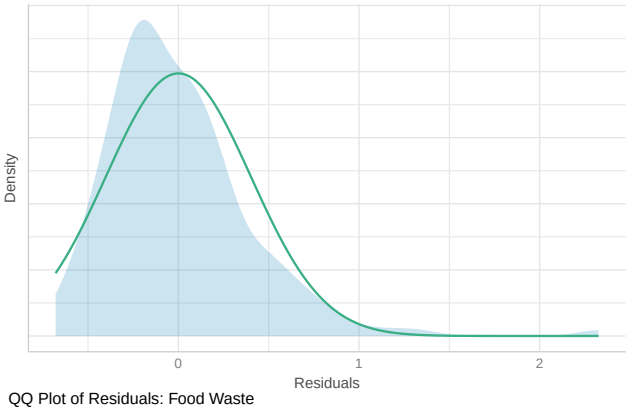
1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals
3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

```
## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.008).

## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.006).

## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.003).

## Warning: Non-normality of residuals detected (p = 0.001).

## Warning: Non-normality of residuals detected (p < .001).

## Warning: Non-normality of residuals detected (p = 0.023).
```

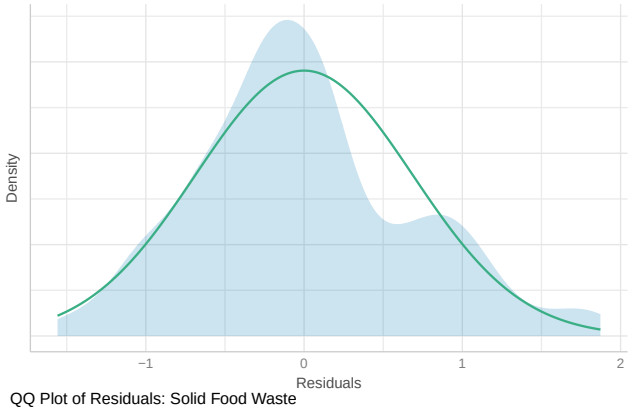
```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_fw
## BP = 14.705, df = 9, p-value = 0.09935

##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_sfw
## BP = 10.062, df = 9, p-value = 0.3455

##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_lfw
## BP = 15.294, df = 9, p-value = 0.08316

## OK: Residuals appear to be independent and not autocorrelated (p = 0.476).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.522).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.526).
```



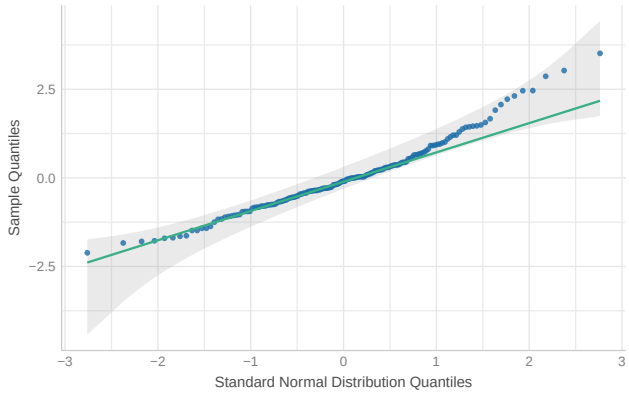
Normality of Residuals: Solid Food Waste



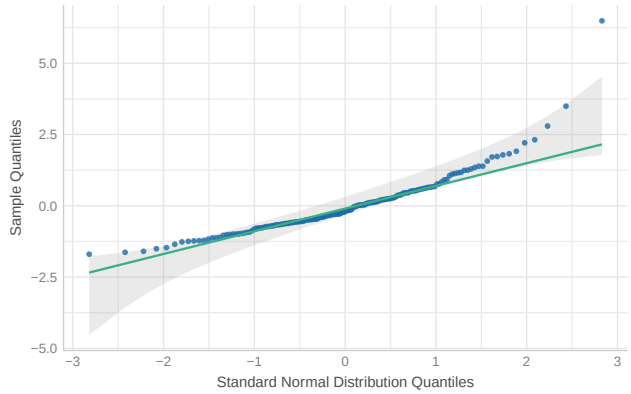
Normality of Residuals: Liquid Food Waste



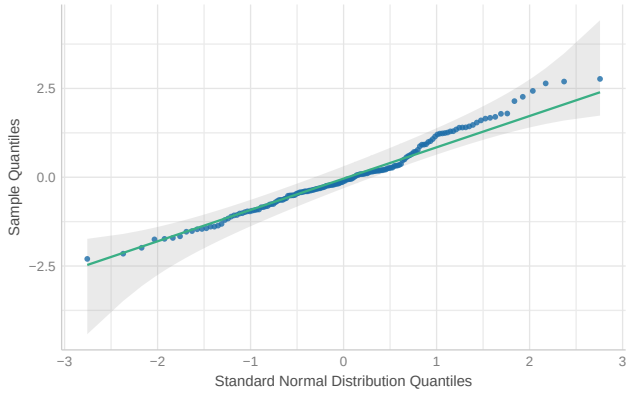
QQ Plot of Residuals: Food Waste



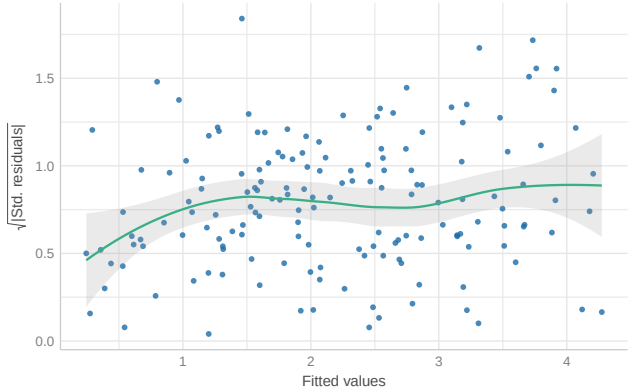
QQ Plot of Residuals: Solid Food Waste



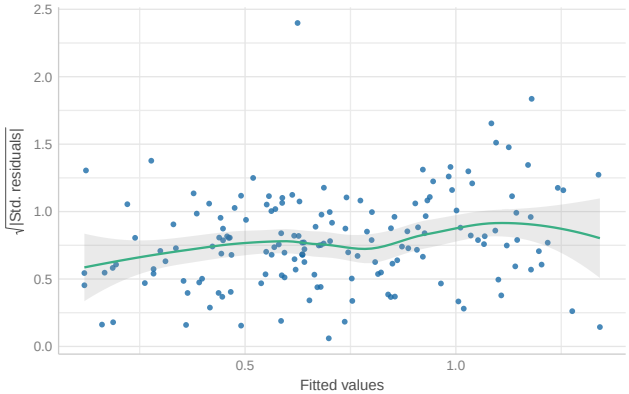
QQ Plot of Residuals: Liquid Food Waste



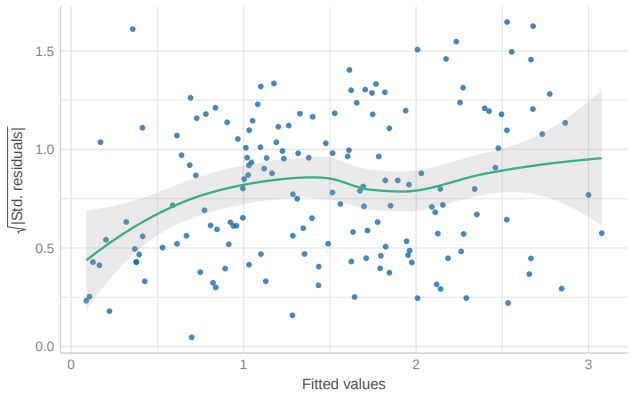
Homoscedasticity: Food Waste



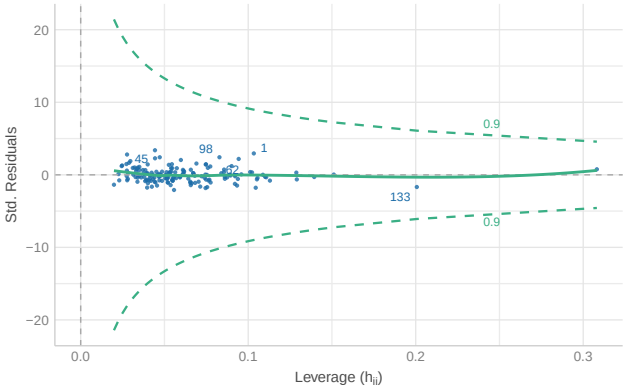
Homoscedasticity: Solid Food Waste



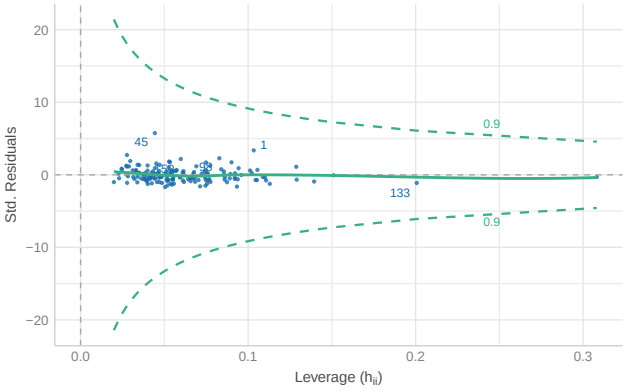
Homoscedasticity: Liquid Food Waste



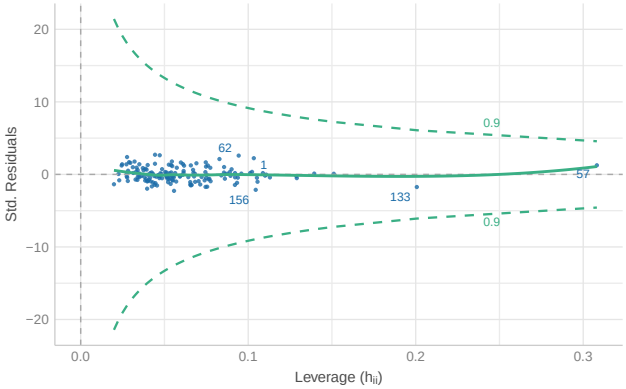
Outliers: Food Waste



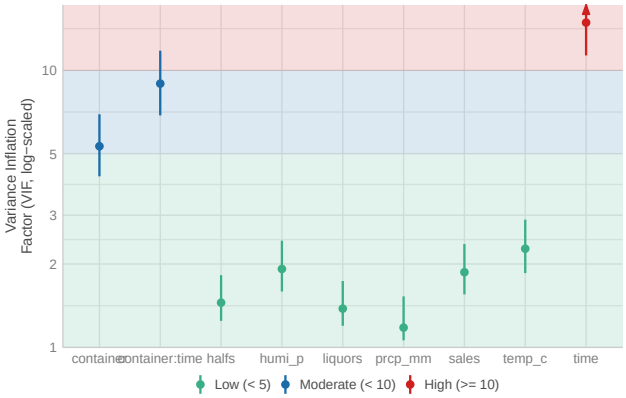
Outliers: Solid Food Waste



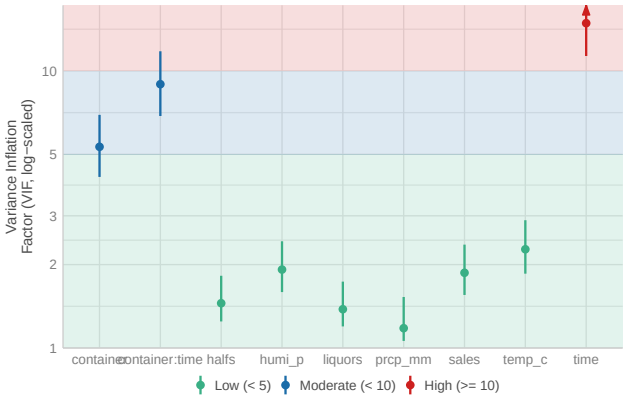
Outliers: Liquid Food Waste



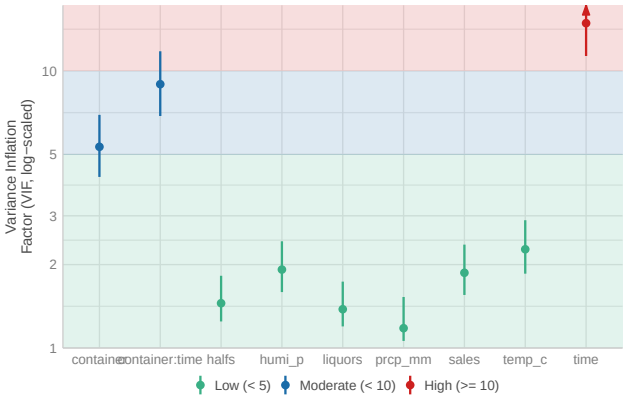
VIF: Food Waste



VIF: Solid Food Waste



VIF: Liquid Food Waste



Polynomial model

```
##
## Call:
## lm(formula = rdt_poly_fw, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0072 -0.6418 -0.1261  0.4642  3.2952
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)         -2.4671604  1.0125798  -2.437   0.0160 *
## container            0.3838594  0.5208439   0.737   0.4623
## time                -0.0189069  0.0186297  -1.015   0.3118
## I(time^2)           -0.0001330  0.0002020  -0.658   0.5114
## temp_c              -0.0083476  0.0127768  -0.653   0.5145
## humi_p               0.0103180  0.0093920   1.099   0.2737
## prcp_mm             -0.0513615  0.0414043  -1.240   0.2167
## liquors             -0.0068301  0.0510638  -0.134   0.8938
## sales                0.0041346  0.0005102   8.104 1.78e-13 ***
## halfs                0.0703055  0.0296094   2.374   0.0188 *
## container:time       0.0469042  0.0293172   1.600   0.1117
## container:I(time^2) -0.0002283  0.0003461  -0.660   0.5106
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.008 on 149 degrees of freedom
## Multiple R-squared:  0.5186, Adjusted R-squared:  0.4831
## F-statistic: 14.59 on 11 and 149 DF,  p-value: < 2.2e-16

##
## Call:
## lm(formula = rdt_poly_sfw, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.69124 -0.24652 -0.06983  0.18138  2.25175
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)         -7.004e-01  4.129e-01  -1.696   0.0919 .
## container            1.862e-01  2.124e-01   0.877   0.3821
## time                -1.498e-02  7.596e-03  -1.971   0.0505 .
## I(time^2)           -1.467e-04  8.237e-05  -1.781   0.0770 .
## temp_c              -4.899e-03  5.210e-03  -0.940   0.3486
## humi_p               2.446e-03  3.830e-03   0.639   0.5240
## prcp_mm             -2.077e-02  1.688e-02  -1.230   0.2206
## liquors              1.013e-02  2.082e-02   0.487   0.6272
## sales                1.249e-03  2.080e-04   6.005  1.4e-08 ***
## halfs                1.095e-02  1.207e-02   0.907   0.3658
## container:time       2.138e-02  1.195e-02   1.788   0.0758 .
## container:I(time^2)  5.136e-05  1.411e-04   0.364   0.7164
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4112 on 149 degrees of freedom
## Multiple R-squared:  0.3679, Adjusted R-squared:  0.3212
## F-statistic: 7.884 on 11 and 149 DF,  p-value: 1.063e-10

##
## Call:
## lm(formula = rdt_poly_lfw, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
```

```
## -1.53737 -0.42153 -0.08896  0.35757  1.87042
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)         -1.7668065  0.7103879  -2.487  0.01398 *
## container            0.1976864  0.3654045   0.541  0.58931
## time                -0.0039315  0.0130699  -0.301  0.76398
## I(time^2)            0.0000137  0.0001417   0.097  0.92311
## temp_c              -0.0034488  0.0089637  -0.385  0.70097
## humi_p               0.0078720  0.0065890   1.195  0.23410
## prcp_mm             -0.0305946  0.0290477  -1.053  0.29393
## liquors             -0.0169643  0.0358244  -0.474  0.63652
## sales                0.0028854  0.0003579   8.061 2.27e-13 ***
## halfs                0.0593525  0.0207728   2.857  0.00489 **
## container:time       0.0255287  0.0205679   1.241  0.21649
## container:I(time^2) -0.0002796  0.0002428  -1.152  0.25130
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7074 on 149 degrees of freedom
## Multiple R-squared:  0.5297, Adjusted R-squared:  0.495
## F-statistic: 15.26 on 11 and 149 DF,  p-value: < 2.2e-16
```

Ass-Poly

1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals
3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

```
## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.013).
```

```
## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.003).
```

```
## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.007).
```

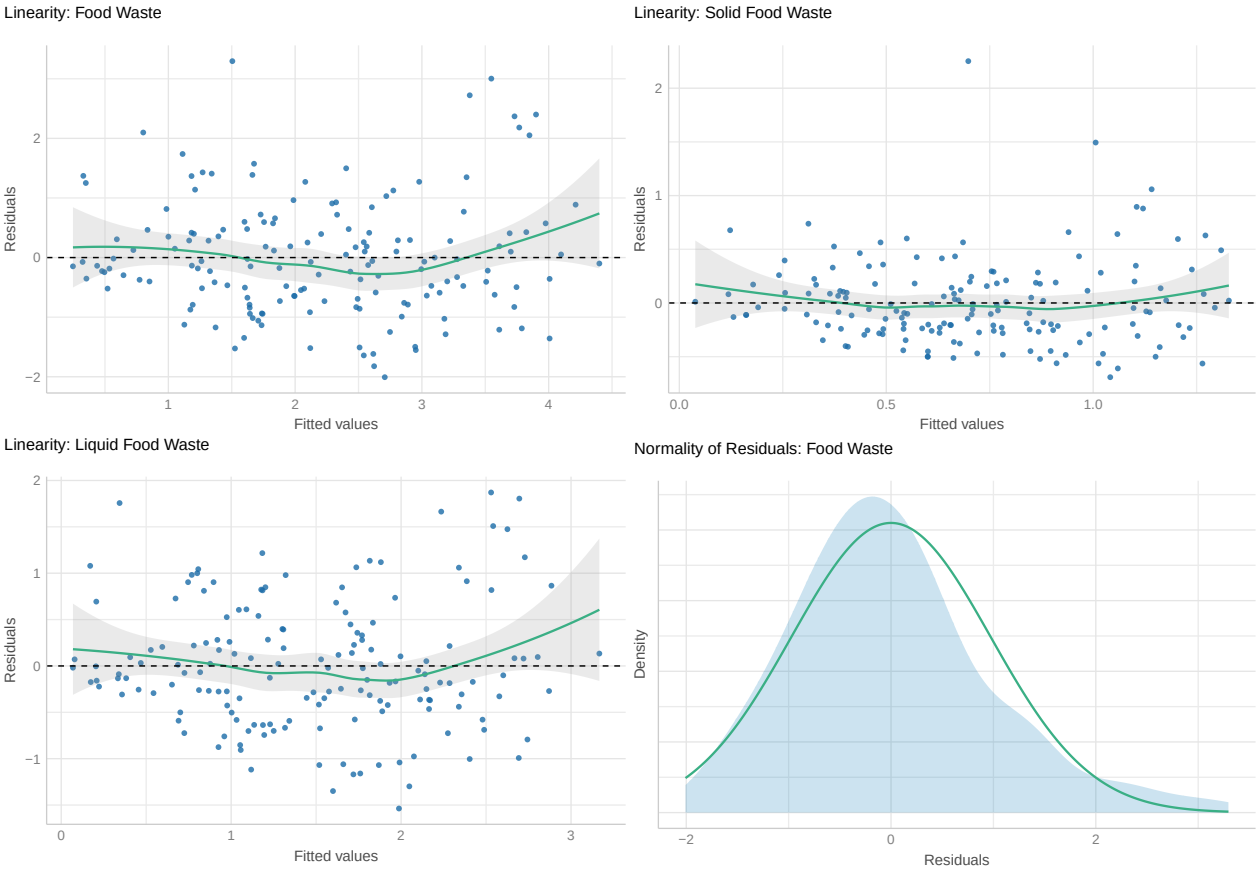
```
## Warning: Non-normality of residuals detected (p < .001).
```

```
## Warning: Non-normality of residuals detected (p < .001).
```

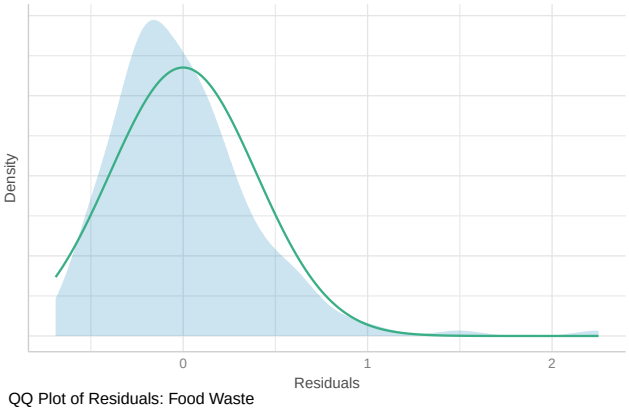
```
## Warning: Non-normality of residuals detected (p = 0.013).
```

```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_fw
## BP = 16.435, df = 11, p-value = 0.1257
```

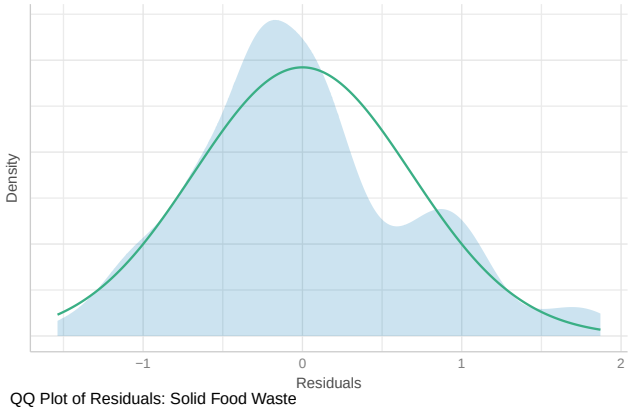
```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_sfw
## BP = 11.26, df = 11, p-value = 0.4218

##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_lfw
## BP = 16.008, df = 11, p-value = 0.1408

## OK: Residuals appear to be independent and not autocorrelated (p = 0.464).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.672).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.478).
```



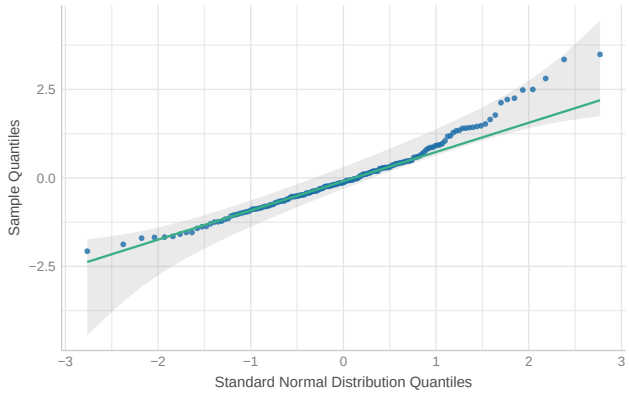
Normality of Residuals: Solid Food Waste



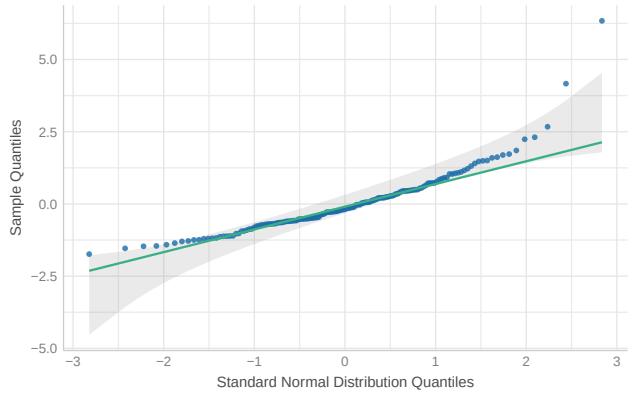
Normality of Residuals: Liquid Food Waste



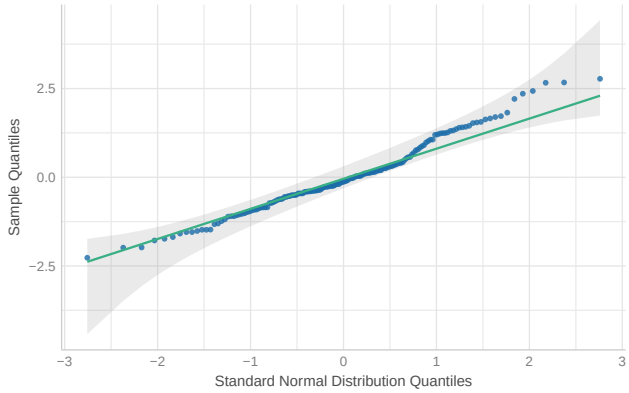
QQ Plot of Residuals: Food Waste



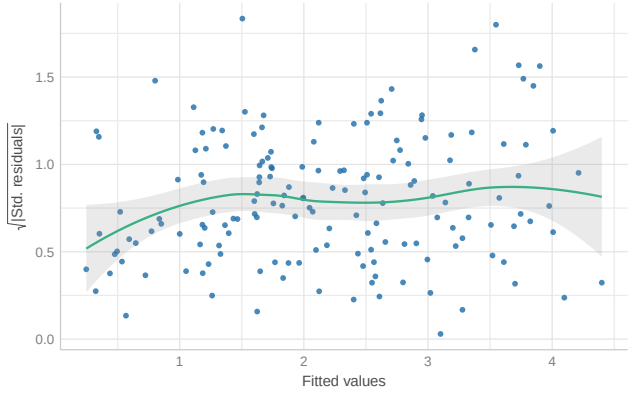
QQ Plot of Residuals: Solid Food Waste



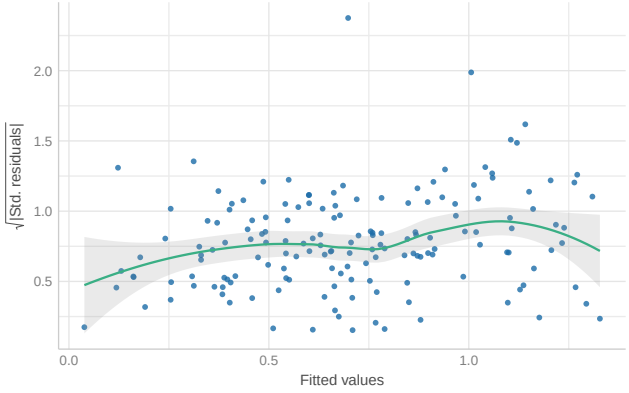
QQ Plot of Residuals: Liquid Food Waste



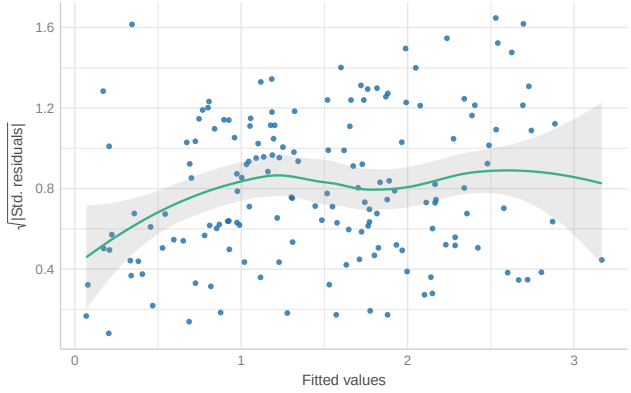
Homoscedasticity: Food Waste



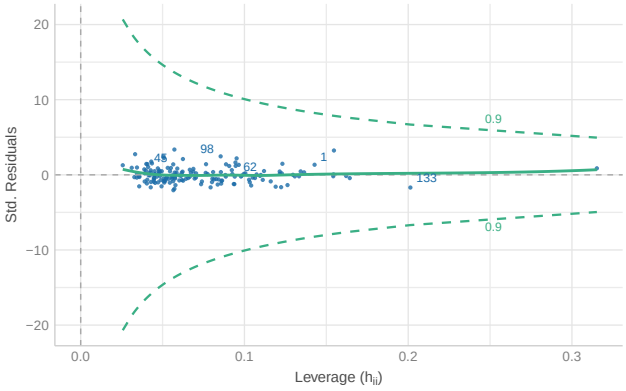
Homoscedasticity: Solid Food Waste



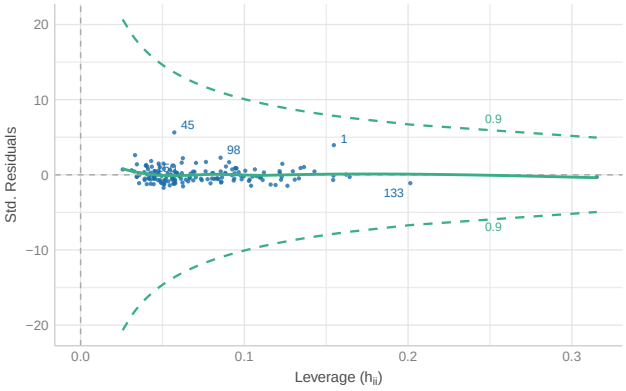
Homoscedasticity: Liquid Food Waste



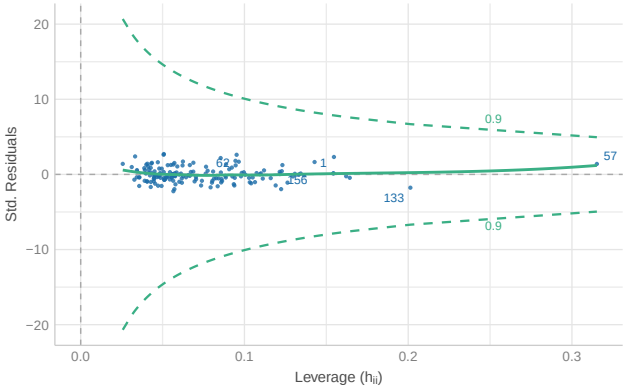
Outliers: Food Waste



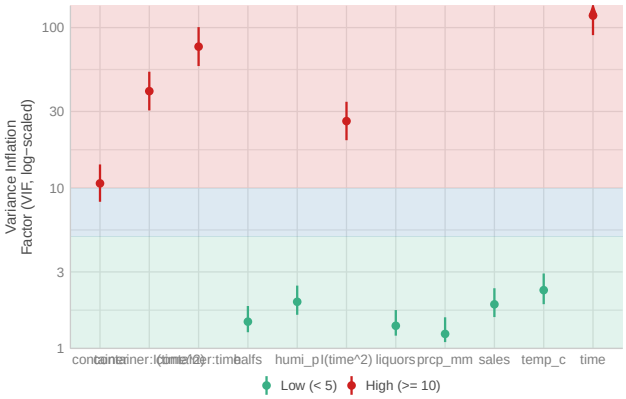
Outliers: Solid Food Waste



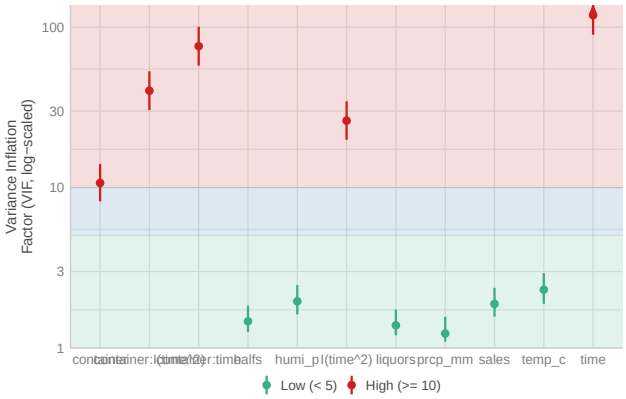
Outliers: Liquid Food Waste



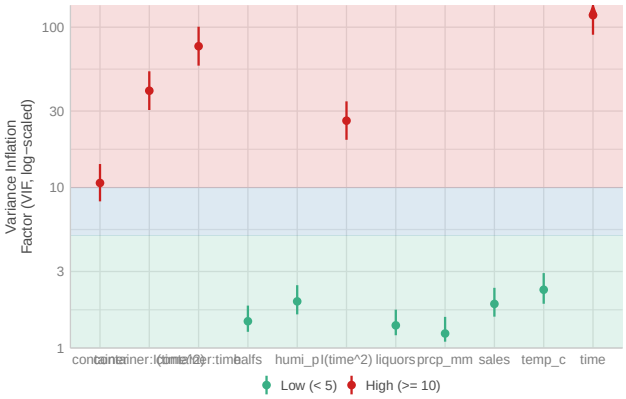
VIF: Food Waste



VIF: Solid Food Waste



VIF: Liquid Food Waste



Per Customer

Interaction

```
##
## Call:
## lm(formula = rdt_int_fw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.085830 -0.026913 -0.000256  0.022668  0.144070
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.0634025  0.0084860   7.471 5.19e-12 ***
## container       0.0205965  0.0123107   1.673   0.0963 .
## time           -0.0002550  0.0001694  -1.505   0.1344
## container:time  0.0002948  0.0002683   1.099   0.2736
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03901 on 157 degrees of freedom
## Multiple R-squared:  0.03369,    Adjusted R-squared:  0.01523
## F-statistic: 1.825 on 3 and 157 DF,  p-value: 0.1449
```

```
##
## Call:
## lm(formula = rdt_int_sfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.025637 -0.009649 -0.001998  0.007429  0.107324
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     2.413e-02  3.438e-03   7.018 6.35e-11 ***
## container       6.087e-04  4.988e-03   0.122    0.903
## time           -6.278e-05  6.865e-05  -0.914    0.362
## container:time  7.849e-05  1.087e-04   0.722    0.471
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0158 on 157 degrees of freedom
## Multiple R-squared:  0.00791,    Adjusted R-squared:  -0.01105
## F-statistic: 0.4173 on 3 and 157 DF,  p-value: 0.7408
```

```
##
## Call:
## lm(formula = rdt_int_lfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.060368 -0.021770  0.000354  0.019225  0.067531
```

```
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.0392726  0.0060700   6.470 1.19e-09 ***
## container       0.0199878  0.0088058   2.270   0.0246 *
## time           -0.0001922  0.0001212  -1.586   0.1148
## container:time  0.0002163  0.0001919   1.127   0.2615
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0279 on 157 degrees of freedom
## Multiple R-squared:  0.06328,    Adjusted R-squared:  0.04538
## F-statistic: 3.535 on 3 and 157 DF,  p-value: 0.01621
```

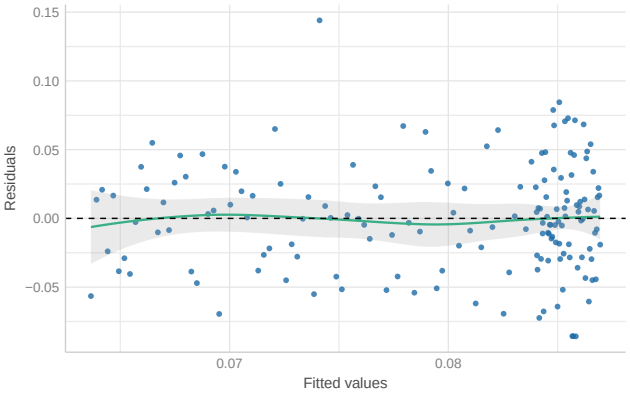
Ass-Interaction

1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals
3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

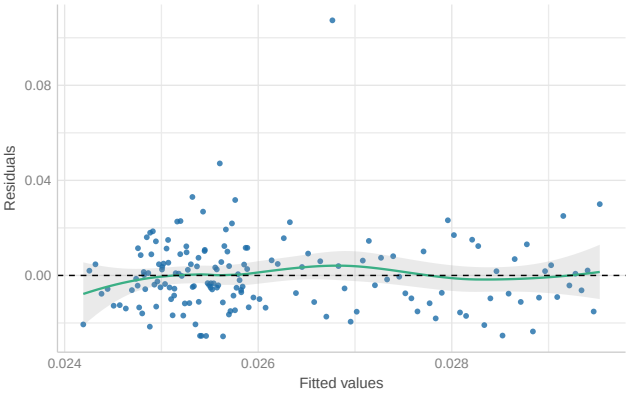
```
## OK: Error variance appears to be homoscedastic (p = 0.560).

## OK: Error variance appears to be homoscedastic (p = 0.085).

## OK: Error variance appears to be homoscedastic (p = 0.357).

## OK: residuals appear as normally distributed (p = 0.310).

## Warning: Non-normality of residuals detected (p < .001).

## OK: residuals appear as normally distributed (p = 0.506).

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_fw_p
## BP = 0.39927, df = 3, p-value = 0.9404

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_sfw_p
## BP = 0.78557, df = 3, p-value = 0.8529

##
##  studentized Breusch-Pagan test
##
## data:  rdt_int_lfw_p
## BP = 1.5608, df = 3, p-value = 0.6683
```

```
## OK: Residuals appear to be independent and not autocorrelated (p = 0.672).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.862).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.582).
```

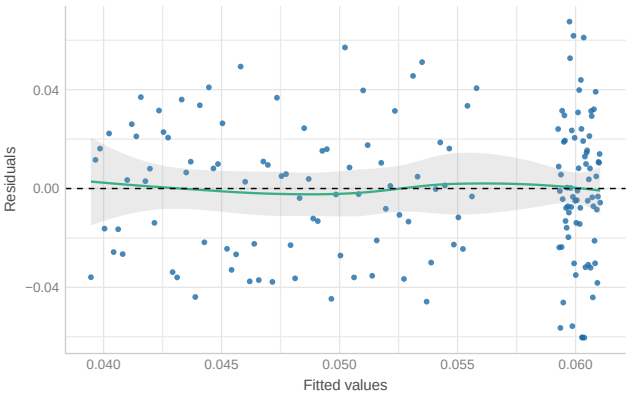
Linearity: Food Waste



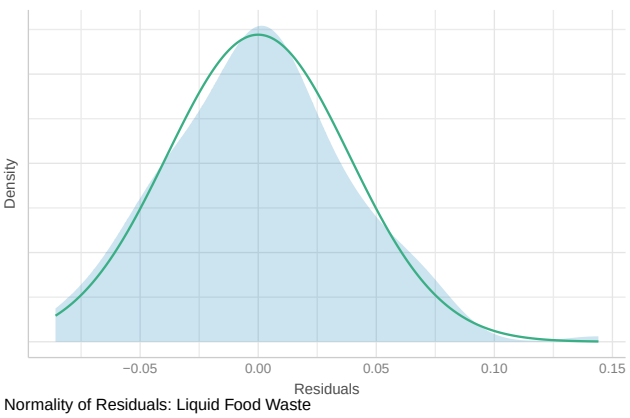
Linearity: Solid Food Waste



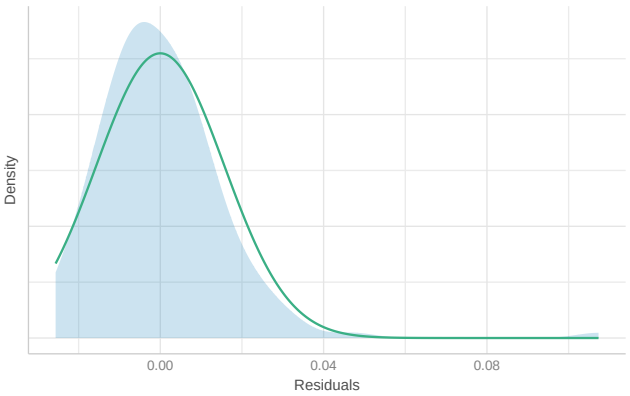
Linearity: Liquid Food Waste



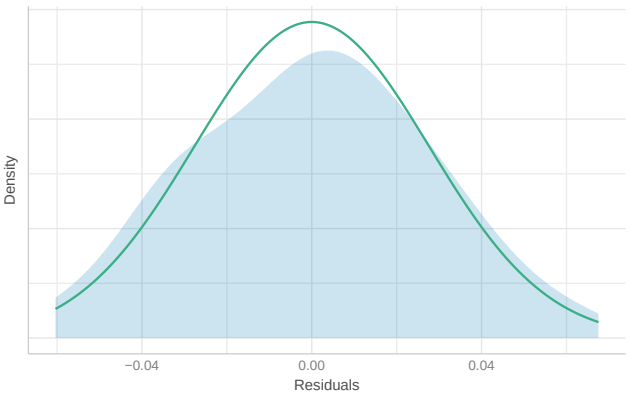
Normality of Residuals: Food Waste



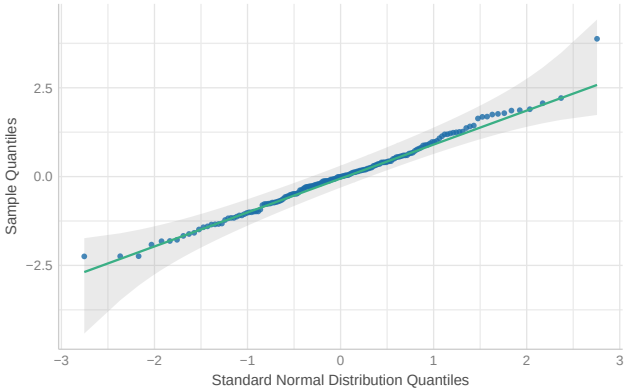
Normality of Residuals: Solid Food Waste



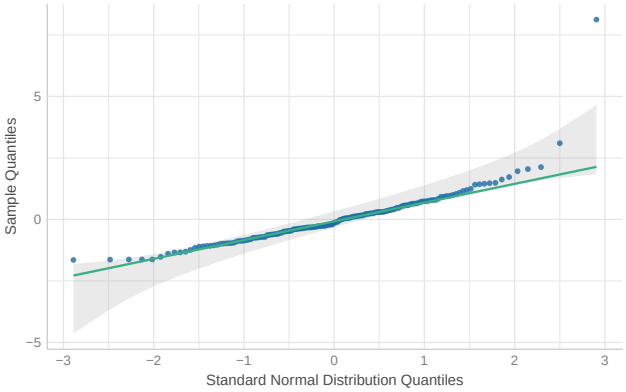
Normality of Residuals: Liquid Food Waste



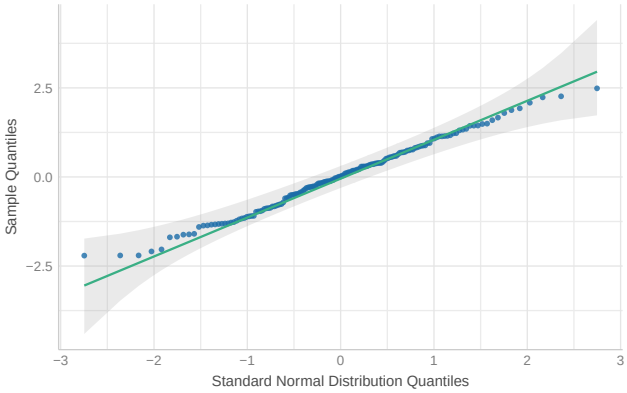
QQ Plot of Residuals: Food Waste



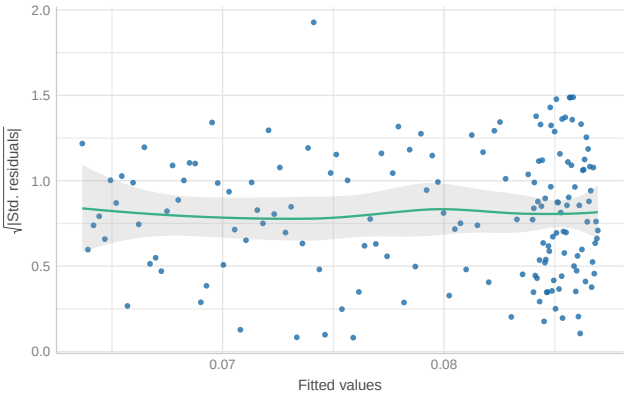
QQ Plot of Residuals: Solid Food Waste



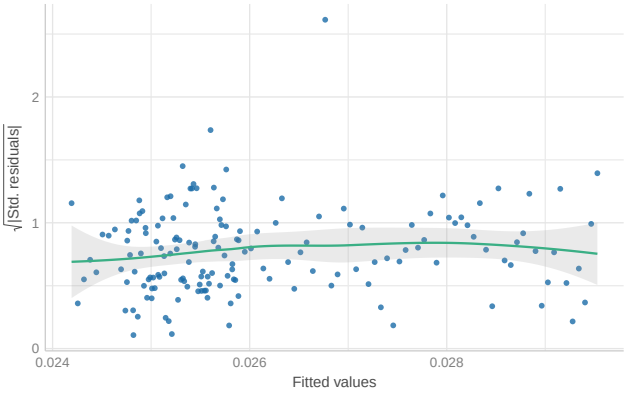
QQ Plot of Residuals: Liquid Food Waste



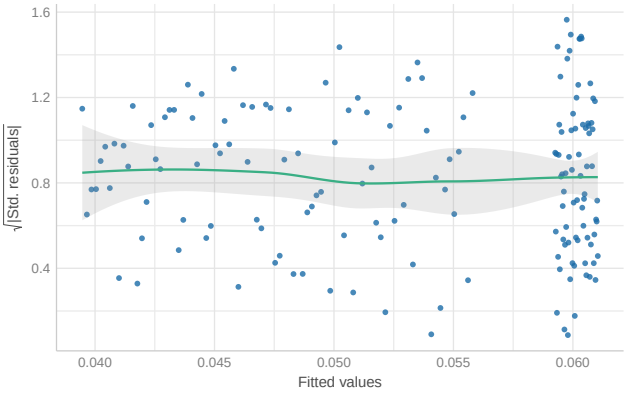
Homoscedasticity: Food Waste



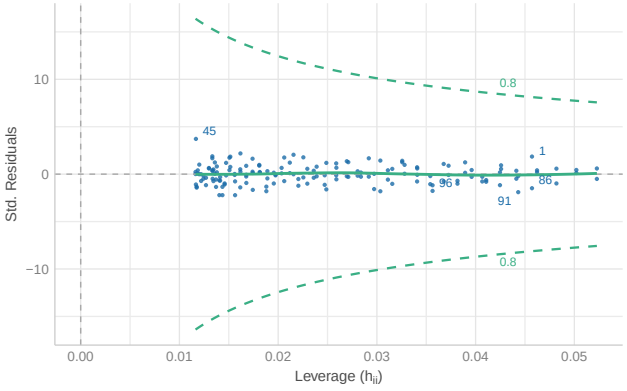
Homoscedasticity: Solid Food Waste



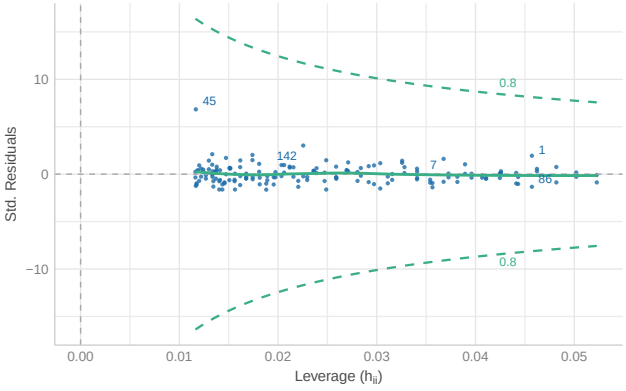
Homoscedasticity: Liquid Food Waste

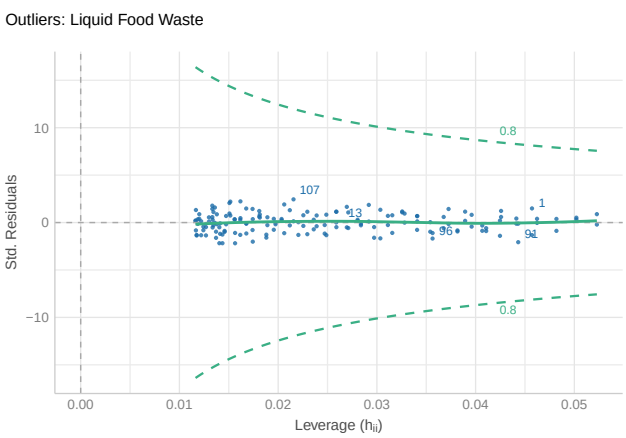


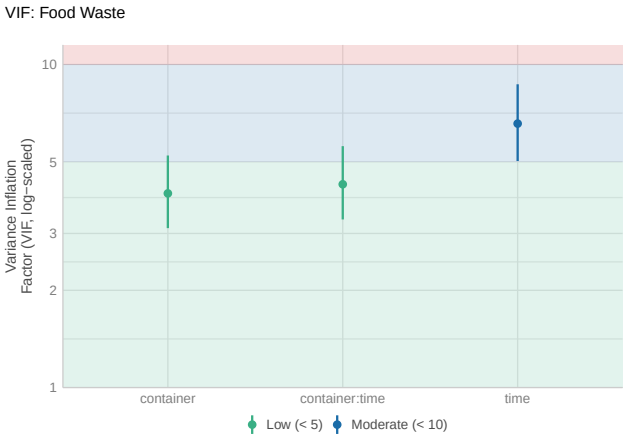
Outliers: Food Waste



Outliers: Solid Food Waste







Multiple model

```
##
## Call:
## lm(formula = rdt_multi_fw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.074837 -0.024496 -0.002514  0.019536  0.148986
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     2.272e-02  3.556e-02   0.639   0.5239
## container       2.445e-02  1.382e-02   1.768   0.0790 .
## time           -2.128e-04  2.480e-04  -0.858   0.3921
## temp_c         -1.980e-04  4.767e-04  -0.415   0.6785
## humi_p          9.816e-05  3.502e-04   0.280   0.7796
## prcp_mm        -1.753e-03  1.524e-03  -1.150   0.2519
## liquors         1.114e-03  1.918e-03   0.581   0.5624
## sales           4.082e-05  1.911e-05   2.135   0.0343 *
## halfs           7.092e-04  1.107e-03   0.641   0.5227
## container:time  1.984e-04  3.784e-04   0.524   0.6008
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Residual standard error: 0.03793 on 151 degrees of freedom
## Multiple R-squared:  0.1212, Adjusted R-squared:  0.06883
## F-statistic: 2.314 on 9 and 151 DF,  p-value: 0.01819

##
## Call:
## lm(formula = rdt_multi_sfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.027494 -0.010028 -0.001538  0.007102  0.104802
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     1.945e-02  1.477e-02   1.317    0.190
## container       4.123e-03  5.743e-03   0.718    0.474
## time           -7.996e-05  1.030e-04  -0.776    0.439
## temp_c         -1.554e-04  1.980e-04  -0.785    0.434
## humi_p         -3.292e-05  1.455e-04  -0.226    0.821
## prcp_mm        -7.440e-04  6.329e-04  -1.175    0.242
## liquors         6.531e-04  7.967e-04   0.820    0.414
## sales           9.221e-06  7.940e-06   1.161    0.247
## halfs          -2.701e-04  4.599e-04  -0.587    0.558
## container:time  4.472e-05  1.572e-04   0.285    0.776
##
## Residual standard error: 0.01576 on 151 degrees of freedom
## Multiple R-squared:  0.05157,    Adjusted R-squared:  -0.00496
## F-statistic: 0.9123 on 9 and 151 DF,  p-value: 0.5163

##
## Call:
## lm(formula = rdt_multi_lfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.051511 -0.017780 -0.004288  0.016169  0.078517
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     3.269e-03  2.512e-02   0.130   0.8966
## container       2.032e-02  9.764e-03   2.081   0.0391 *
## time           -1.329e-04  1.752e-04  -0.759   0.4493
## temp_c         -4.256e-05  3.367e-04  -0.126   0.8996
## humi_p          1.311e-04  2.474e-04   0.530   0.5969
## prcp_mm        -1.009e-03  1.076e-03  -0.937   0.3502
## liquors         4.605e-04  1.355e-03   0.340   0.7344
## sales           3.160e-05  1.350e-05   2.340   0.0206 *
## halfs           9.793e-04  7.819e-04   1.252   0.2124
## container:time  1.537e-04  2.673e-04   0.575   0.5661
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02679 on 151 degrees of freedom
## Multiple R-squared:  0.1694, Adjusted R-squared:  0.1198
```

```
## F-statistic: 3.421 on 9 and 151 DF,  p-value: 0.0007411
```

Ass-Multiple

1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals
3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

```
## OK: Error variance appears to be homoscedastic (p = 0.077).
```

```
## OK: Error variance appears to be homoscedastic (p = 0.053).
```

```
## OK: Error variance appears to be homoscedastic (p = 0.334).
```

```
## Warning: Non-normality of residuals detected (p = 0.001).
```

```
## Warning: Non-normality of residuals detected (p < .001).
```

```
## Warning: Non-normality of residuals detected (p = 0.023).
```

```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_fw_p
## BP = 15.097, df = 9, p-value = 0.08831
```

```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_sfw_p
## BP = 10.355, df = 9, p-value = 0.3225
```

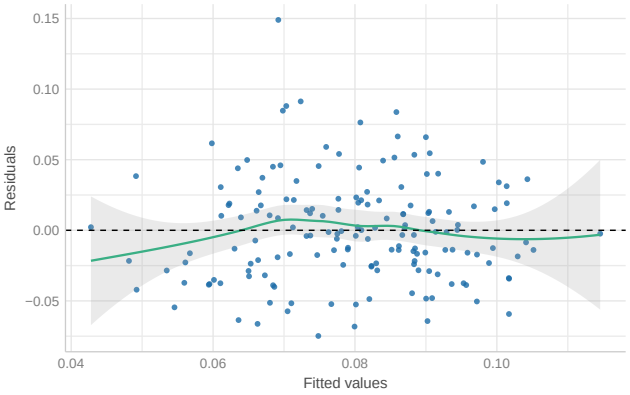
```
##
##  studentized Breusch-Pagan test
##
## data:  rdt_multi_lfw_p
## BP = 13.732, df = 9, p-value = 0.1322
```

```
## OK: Residuals appear to be independent and not autocorrelated (p = 0.872).
```

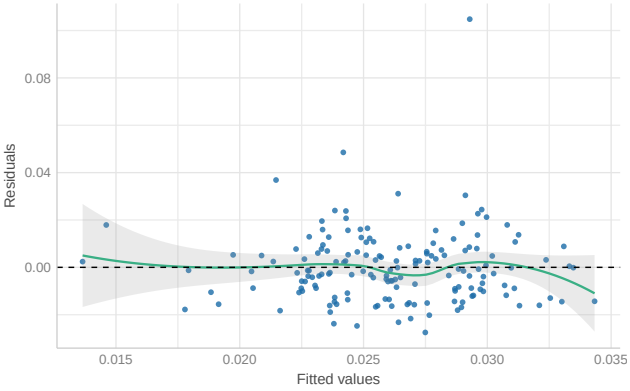
```
## OK: Residuals appear to be independent and not autocorrelated (p = 0.838).
```

```
## OK: Residuals appear to be independent and not autocorrelated (p = 0.892).
```

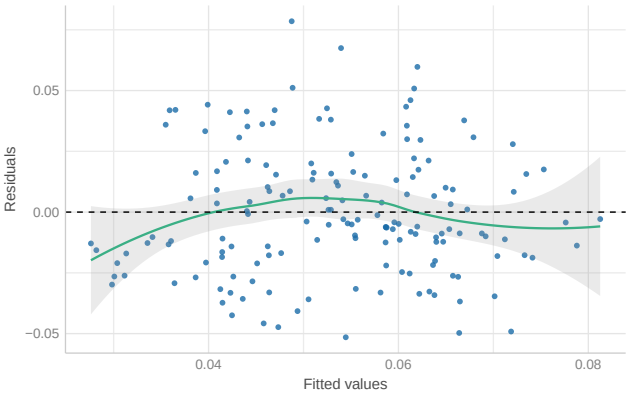
Linearity: Food Waste



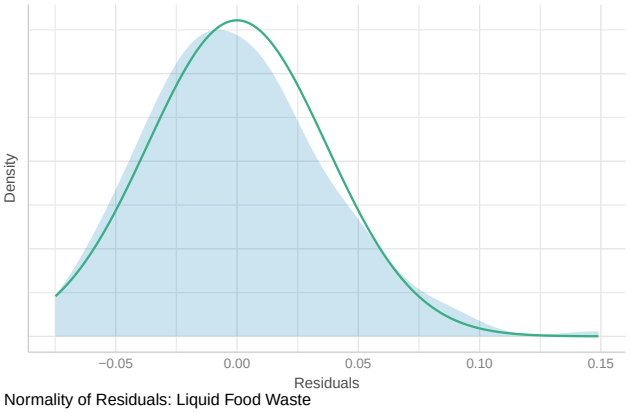
Linearity: Solid Food Waste



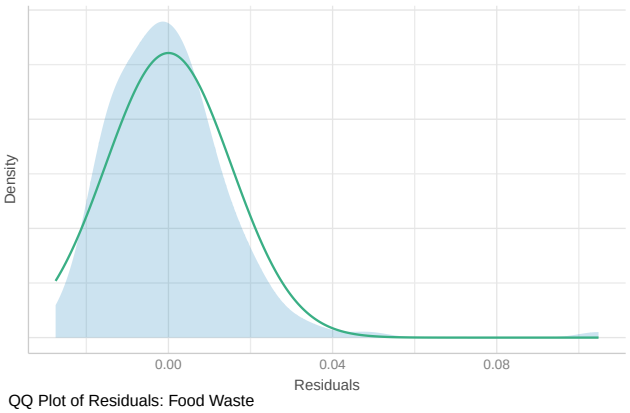
Linearity: Liquid Food Waste



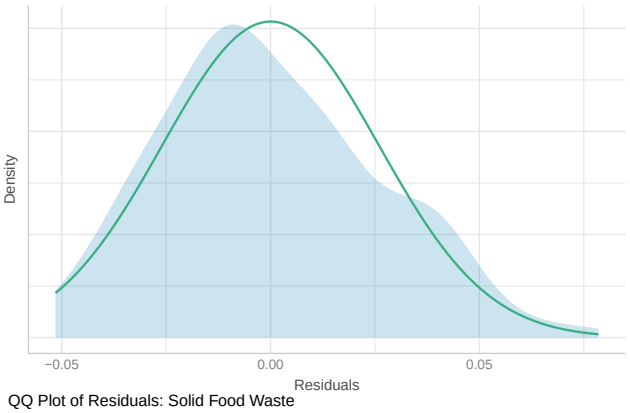
Normality of Residuals: Food Waste



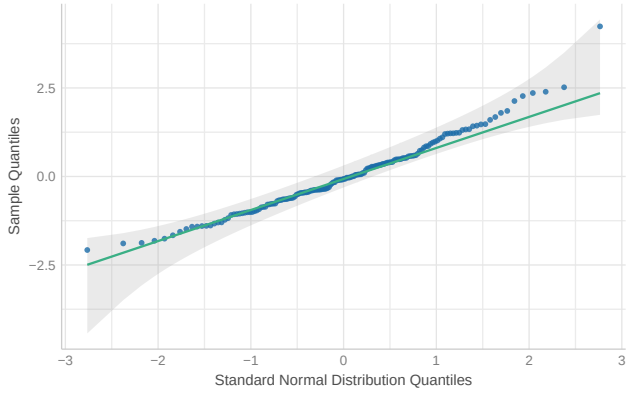
Normality of Residuals: Solid Food Waste



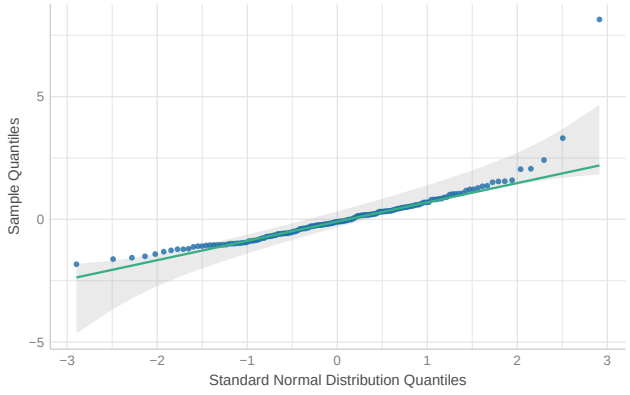
Normality of Residuals: Liquid Food Waste



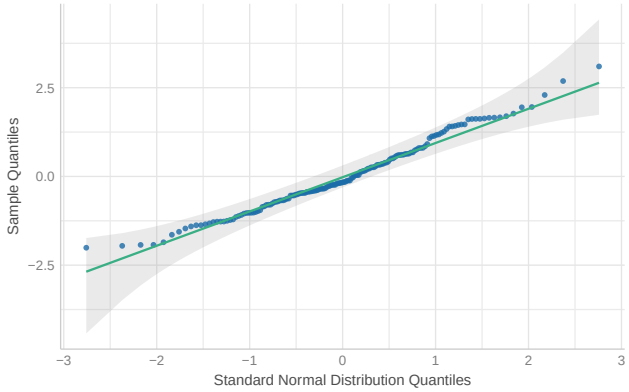
QQ Plot of Residuals: Food Waste



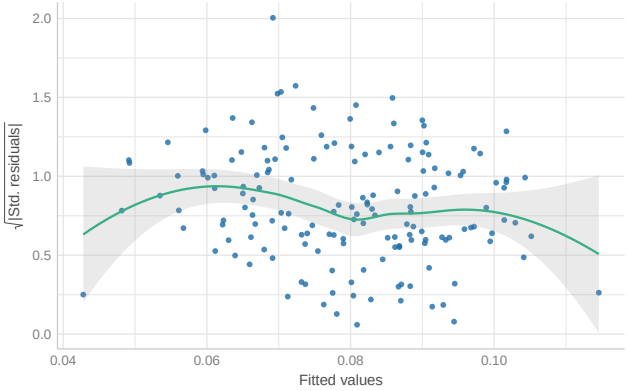
QQ Plot of Residuals: Solid Food Waste



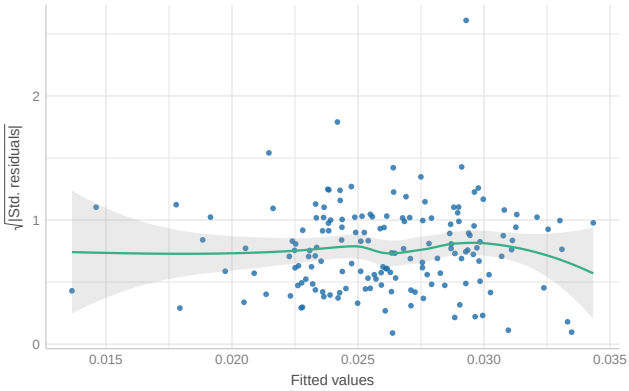
QQ Plot of Residuals: Liquid Food Waste



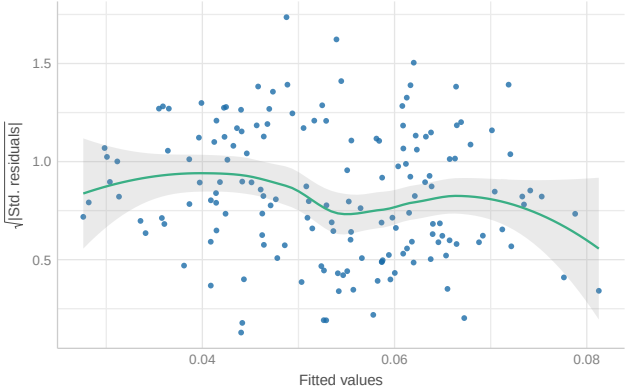
Homoscedasticity: Food Waste



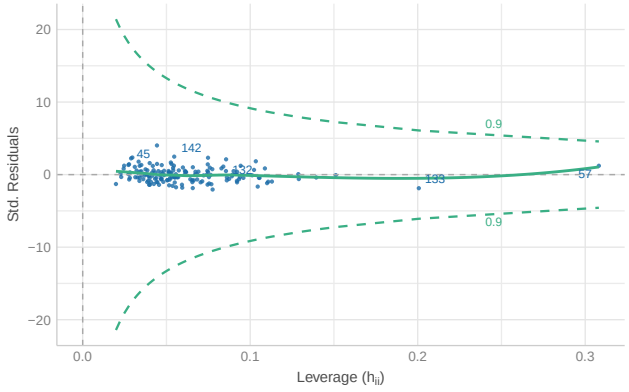
Homoscedasticity: Solid Food Waste



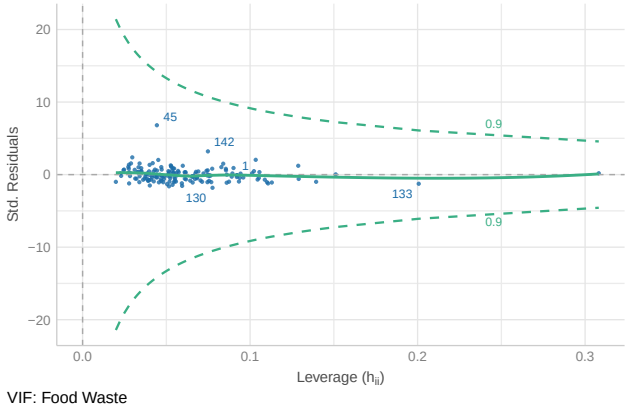
Homoscedasticity: Liquid Food Waste



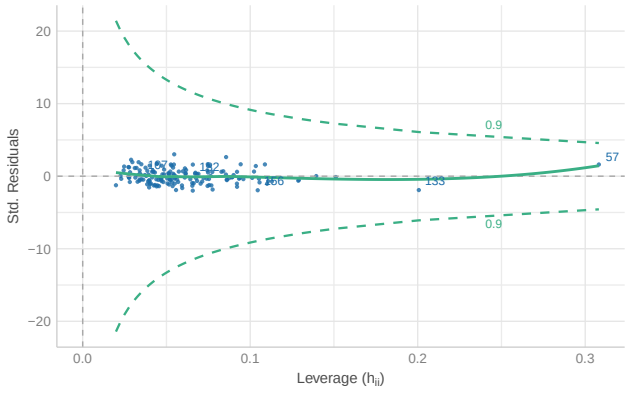
Outliers: Food Waste



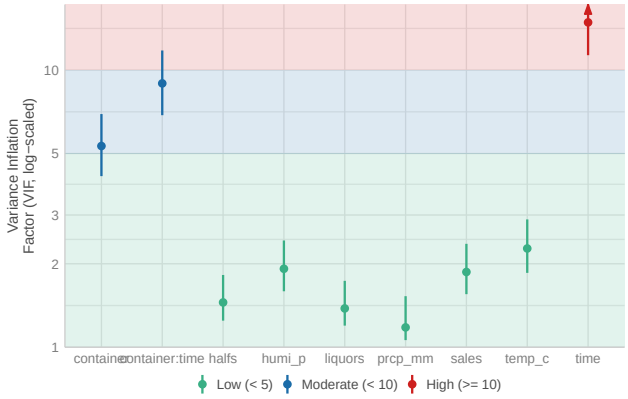
Outliers: Solid Food Waste



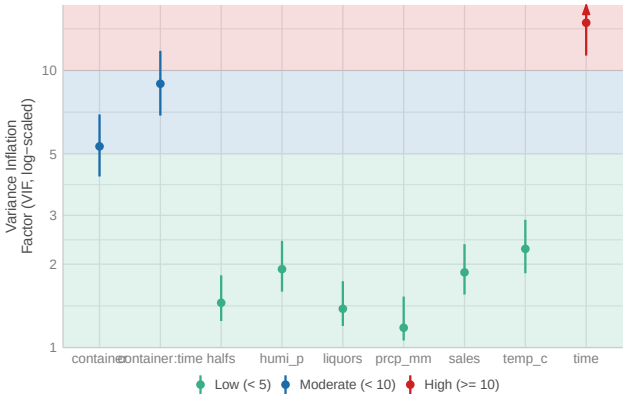
Outliers: Liquid Food Waste



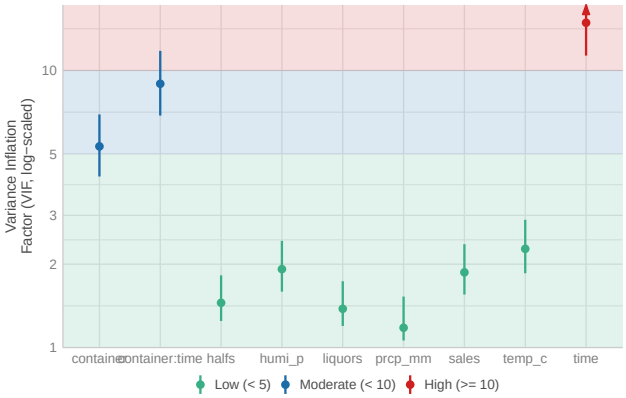
VIF: Food Waste



VIF: Solid Food Waste



VIF: Liquid Food Waste



polynomial model

```
##
## Call:
## lm(formula = rdt_poly_fw_p, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.07797 -0.02446 -0.00292  0.02073  0.14856
##
## Coefficients:
##                        Estimate Std. Error t value Pr(>|t|)
## (Intercept)           1.857e-02  3.821e-02   0.486   0.6277
## container             1.680e-02  1.965e-02   0.855   0.3940
## time                 -3.906e-04  7.030e-04  -0.556   0.5793
## I(time^2)            -2.359e-06  7.623e-06  -0.309   0.7574
## temp_c               -1.356e-04  4.821e-04  -0.281   0.7789
## humi_p                1.238e-04  3.544e-04   0.349   0.7273
## prcp_mm              -2.078e-03  1.562e-03  -1.330   0.1855
## liquors               1.201e-03  1.927e-03   0.623   0.5339
## sales                 4.164e-05  1.925e-05   2.163   0.0321 *
## halfs                 6.986e-04  1.117e-03   0.625   0.5327
## container:time        1.170e-03  1.106e-03   1.058   0.2919
## container:I(time^2) -8.306e-06  1.306e-05  -0.636   0.5257
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03805 on 149 degrees of freedom
## Multiple R-squared:  0.1274, Adjusted R-squared:  0.06295
## F-statistic: 1.977 on 11 and 149 DF,  p-value: 0.0344


##
## Call:
## lm(formula = rdt_poly_sfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.027962 -0.010345 -0.002081  0.006764  0.102708
```

```
##
## Coefficients:
##                        Estimate Std. Error t value Pr(>|t|)
## (Intercept)          1.199e-02  1.582e-02   0.758    0.450
## container            6.501e-03  8.136e-03   0.799    0.426
## time                -4.329e-04  2.910e-04  -1.487    0.139
## I(time^2)           -4.166e-06  3.156e-06  -1.320    0.189
## temp_c              -1.347e-04  1.996e-04  -0.675    0.501
## humi_p              -5.413e-06  1.467e-04  -0.037    0.971
## prcp_mm             -8.951e-04  6.468e-04  -1.384    0.168
## liquors              7.133e-04  7.977e-04   0.894    0.373
## sales                1.022e-05  7.970e-06   1.282    0.202
## halfs               -3.289e-04  4.625e-04  -0.711    0.478
## container:time       6.071e-04  4.580e-04   1.326    0.187
## container:I(time^2)  1.443e-06  5.406e-06   0.267    0.790
##
## Residual standard error: 0.01575 on 149 degrees of freedom
## Multiple R-squared:  0.06457,    Adjusted R-squared:  -0.004489
## F-statistic: 0.935 on 11 and 149 DF,  p-value: 0.5087
```

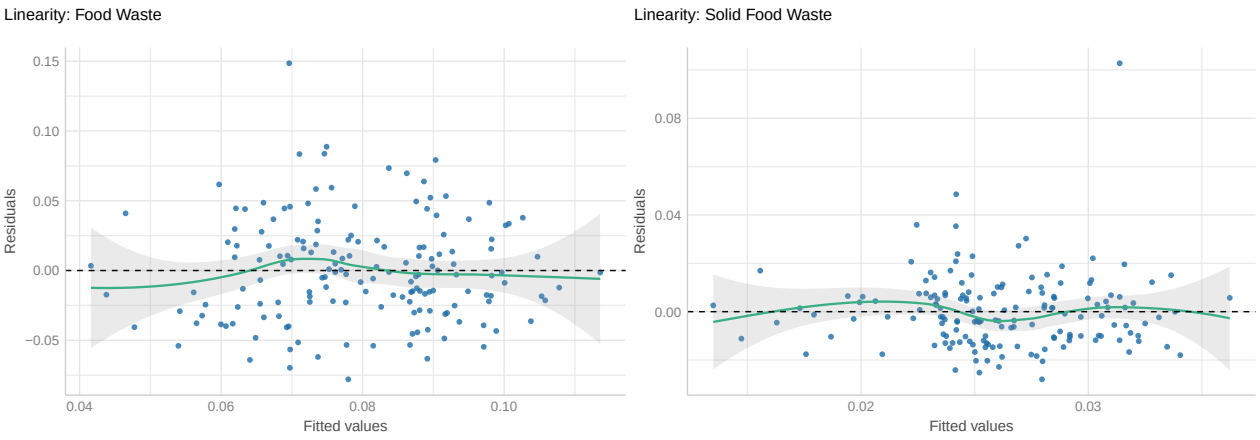
```
##
## Call:
## lm(formula = rdt_poly_lfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.050007 -0.018305 -0.003888  0.017097  0.076798
##
## Coefficients:
##                        Estimate Std. Error t value Pr(>|t|)
## (Intercept)          6.582e-03  2.697e-02   0.244   0.8076
## container            1.030e-02  1.387e-02   0.742   0.4590
## time                 4.226e-05  4.962e-04   0.085   0.9322
## I(time^2)            1.808e-06  5.381e-06   0.336   0.7374
## temp_c              -8.461e-07  3.403e-04  -0.002   0.9980
## humi_p               1.292e-04  2.502e-04   0.517   0.6062
## prcp_mm             -1.183e-03  1.103e-03  -1.073   0.2851
## liquors              4.880e-04  1.360e-03   0.359   0.7203
## sales                3.143e-05  1.359e-05   2.313   0.0221 *
## halfs                1.028e-03  7.887e-04   1.303   0.1947
## container:time       5.629e-04  7.809e-04   0.721   0.4721
## container:I(time^2) -9.749e-06  9.218e-06  -1.058   0.2920
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02686 on 149 degrees of freedom
## Multiple R-squared:  0.1761, Adjusted R-squared:  0.1152
## F-statistic: 2.895 on 11 and 149 DF,  p-value: 0.00176
```

Ass-Poly

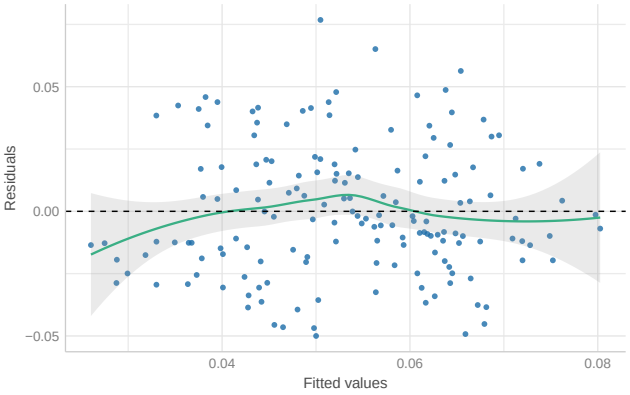
1. Linearity of the relationships between the dependent and independent variables
2. Normality of the residuals

3. Homoscedasticity of the residuals
4. No influential points (outliers)
5. No multicollinearity
6. Independence of the observations

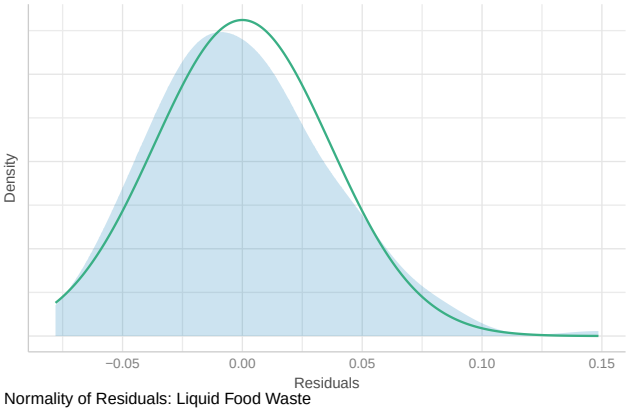
```
## OK: Error variance appears to be homoscedastic (p = 0.107).

## Warning: Heteroscedasticity (non-constant error variance) detected (p = 0.004).

## OK: Error variance appears to be homoscedastic (p = 0.321).

## Warning: Non-normality of residuals detected (p = 0.012).

## Warning: Non-normality of residuals detected (p < .001).

## Warning: Non-normality of residuals detected (p = 0.023).

##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_fw_p
## BP = 17.523, df = 11, p-value = 0.09332

##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_sfw_p
## BP = 11.556, df = 11, p-value = 0.3979

##
##  studentized Breusch-Pagan test
##
## data:  rdt_poly_lfw_p
## BP = 16.922, df = 11, p-value = 0.1102

## OK: Residuals appear to be independent and not autocorrelated (p = 0.938).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.770).

## OK: Residuals appear to be independent and not autocorrelated (p = 0.900).
```



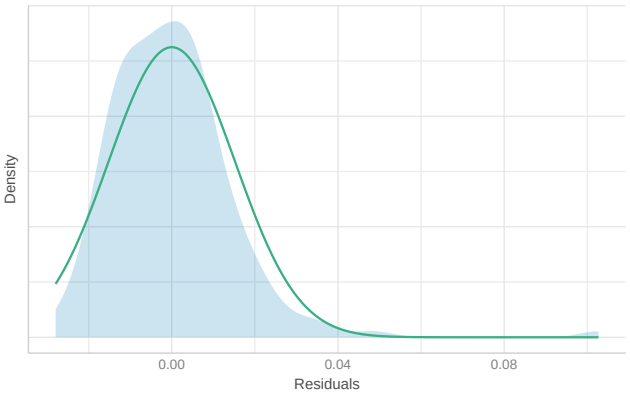
Linearity: Liquid Food Waste



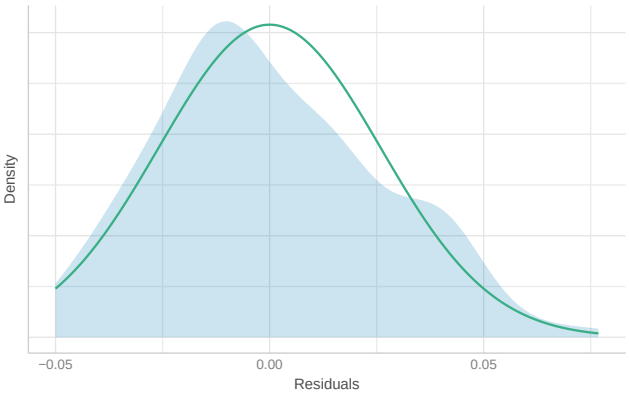
Normality of Residuals: Food Waste



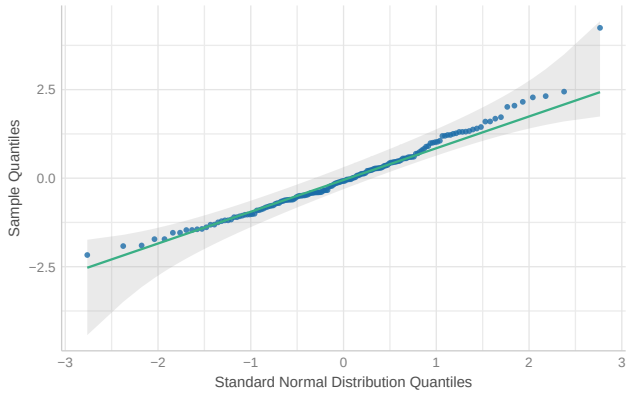
Normality of Residuals: Solid Food Waste



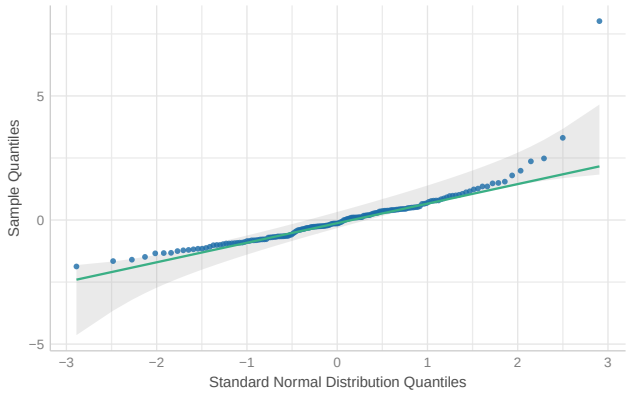
Normality of Residuals: Liquid Food Waste



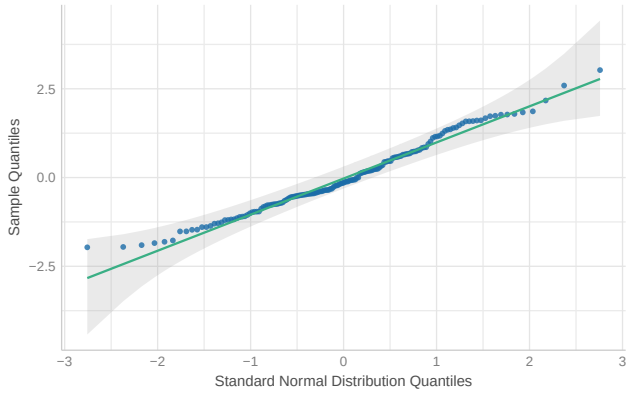
QQ Plot of Residuals: Food Waste



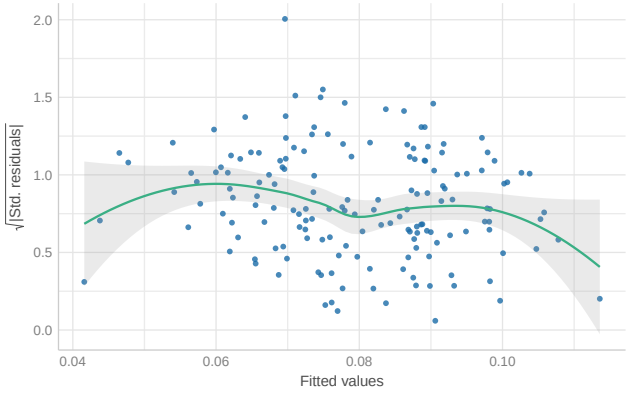
QQ Plot of Residuals: Solid Food Waste



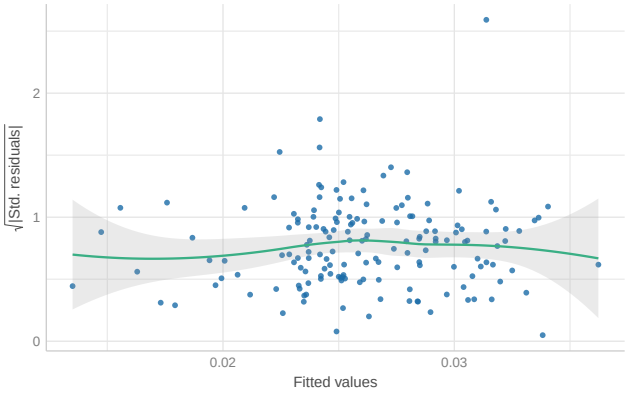
QQ Plot of Residuals: Liquid Food Waste



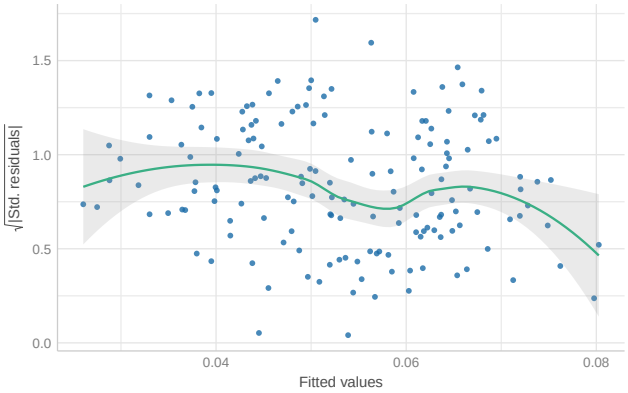
Homoscedasticity: Food Waste



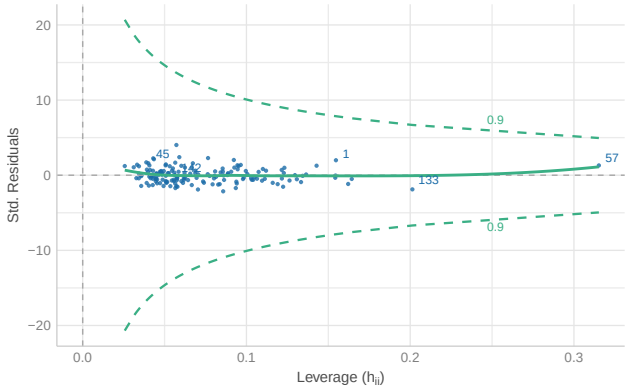
Homoscedasticity: Solid Food Waste



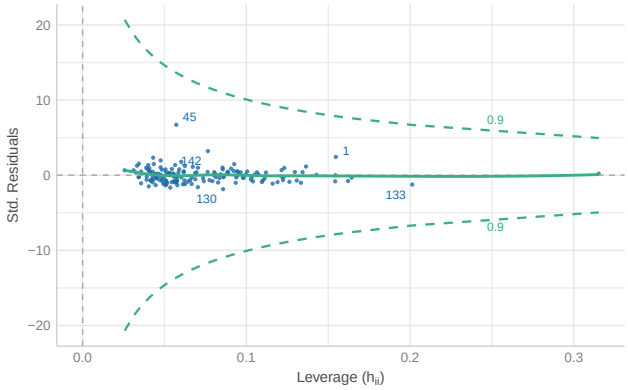
Homoscedasticity: Liquid Food Waste



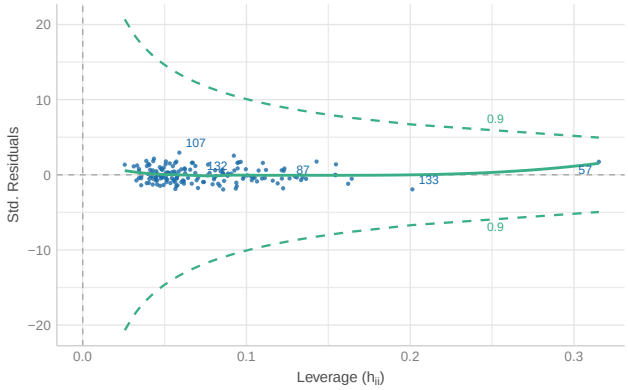
Outliers: Food Waste



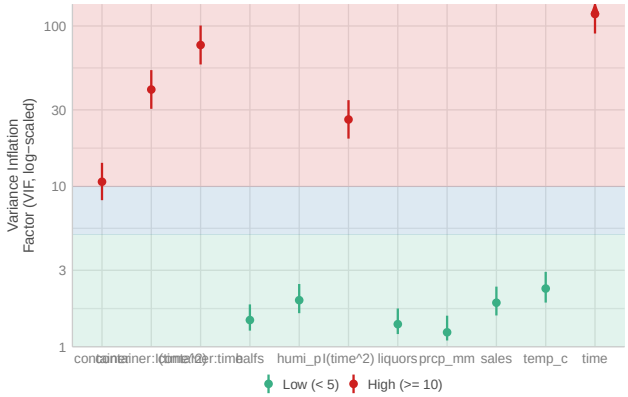
Outliers: Solid Food Waste



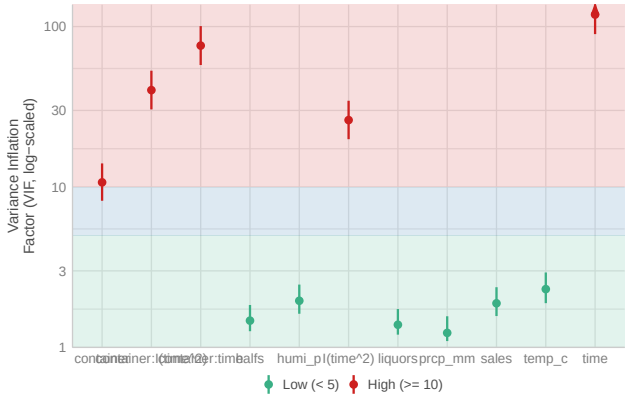
Outliers: Liquid Food Waste



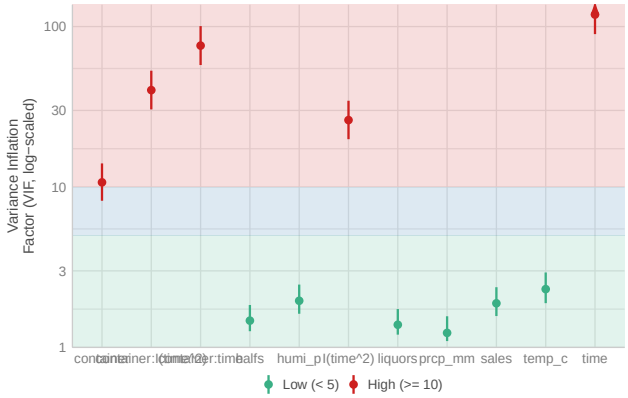
VIF: Food Waste



VIF: Solid Food Waste



VIF: Liquid Food Waste



Cubic model

```
##
## Call:
## lm(formula = rdt_poly3_fw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.075327 -0.024795 -0.003087  0.023996  0.150164
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)          6.343e-03  3.869e-02   0.164   0.8700
## container            3.233e-02  2.412e-02   1.340   0.1823
## time                -3.297e-03  1.750e-03  -1.885   0.0615 .
## I(time^2)           -8.808e-05  4.813e-05  -1.830   0.0693 .
## I(time^3)           -6.576e-07  3.644e-07  -1.805   0.0732 .
## temp_c               8.336e-05  5.189e-04   0.161   0.8726
## humi_p               6.240e-05  3.559e-04   0.175   0.8610
## prcp_mm             -2.544e-03  1.577e-03  -1.613   0.1089
## liquors              8.443e-04  1.928e-03   0.438   0.6621
## sales                4.040e-05  1.920e-05   2.105   0.0370 *
## halfs                9.267e-04  1.120e-03   0.827   0.4093
## container:time       4.590e-03  2.677e-03   1.714   0.0886 .
## container:I(time^2)  6.111e-05  8.238e-05   0.742   0.4593
## container:I(time^3)  7.933e-07  6.624e-07   1.198   0.2330
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03787 on 147 degrees of freedom
## Multiple R-squared:  0.147,  Adjusted R-squared:  0.07153
## F-statistic: 1.948 on 13 and 147 DF,  p-value: 0.02915
```

```
##
## Call:
## lm(formula = rdt_poly3_sfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.028116 -0.010438 -0.001034  0.006871  0.103441
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)          6.987e-03  1.601e-02   0.436   0.6632
## container            1.338e-02  9.986e-03   1.340   0.1822
## time                -1.653e-03  7.242e-04  -2.282   0.0239 *
## I(time^2)           -4.020e-05  1.992e-05  -2.018   0.0454 *
## I(time^3)           -2.764e-07  1.508e-07  -1.832   0.0690 .
## temp_c              -3.778e-05  2.148e-04  -0.176   0.8606
## humi_p              -3.221e-05  1.473e-04  -0.219   0.8272
## prcp_mm             -1.087e-03  6.528e-04  -1.664   0.0981 .
## liquors              5.660e-04  7.981e-04   0.709   0.4793
## sales                9.731e-06  7.946e-06   1.225   0.2226
## halfs               -2.356e-04  4.636e-04  -0.508   0.6121
```

```
## container:time       1.973e-03  1.108e-03   1.780   0.0771 .
## container:I(time^2)  3.300e-05  3.410e-05   0.968   0.3347
## container:I(time^3)  3.118e-07  2.742e-07   1.137   0.2573
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01568 on 147 degrees of freedom
## Multiple R-squared:  0.08587,    Adjusted R-squared:  0.005027
## F-statistic: 1.062 on 13 and 147 DF,  p-value: 0.3965
```

```
##
## Call:
## lm(formula = rdt_poly3_lfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.050013 -0.019310 -0.003956  0.016136  0.074786
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)         -6.442e-04  2.741e-02  -0.024   0.9813
## container            1.895e-02  1.709e-02   1.108   0.2695
## time                -1.644e-03  1.240e-03  -1.327   0.1867
## I(time^2)           -4.788e-05  3.410e-05  -1.404   0.1623
## I(time^3)           -3.813e-07  2.582e-07  -1.477   0.1419
## temp_c               1.211e-04  3.676e-04   0.330   0.7422
## humi_p               9.461e-05  2.521e-04   0.375   0.7080
## prcp_mm             -1.457e-03  1.117e-03  -1.304   0.1942
## liquors              2.783e-04  1.366e-03   0.204   0.8389
## sales                3.067e-05  1.360e-05   2.255   0.0256 *
## halfs                1.162e-03  7.935e-04   1.465   0.1451
## container:time       2.617e-03  1.897e-03   1.380   0.1698
## container:I(time^2)  2.811e-05  5.836e-05   0.482   0.6308
## container:I(time^3)  4.815e-07  4.693e-07   1.026   0.3066
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02683 on 147 degrees of freedom
## Multiple R-squared:  0.1887, Adjusted R-squared:  0.117
## F-statistic: 2.631 on 13 and 147 DF,  p-value: 0.002514
```

Quartic model

```
##
## Call:
## lm(formula = rdt_poly4_fw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.075470 -0.024339 -0.003301  0.023904  0.148010
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)          1.489e-02  4.337e-02   0.343   0.7318
## container            2.588e-02  3.012e-02   0.859   0.3916
## time                -1.926e-03  3.541e-03  -0.544   0.5873
## I(time^2)           -1.803e-05  1.643e-04  -0.110   0.9128
## I(time^3)            5.983e-07  2.839e-06   0.211   0.8334
## I(time^4)            7.256e-09  1.627e-08   0.446   0.6562
## temp_c               9.970e-05  5.242e-04   0.190   0.8494
## humi_p               3.479e-05  3.634e-04   0.096   0.9239
## prcp_mm             -2.586e-03  1.593e-03  -1.623   0.1068
## liquors              8.721e-04  1.946e-03   0.448   0.6547
## sales                4.080e-05  1.934e-05   2.109   0.0366 *
## halfs                9.161e-04  1.127e-03   0.813   0.4178
## container:time       3.297e-03  5.307e-03   0.621   0.5354
## container:I(time^2) -1.457e-05  2.720e-04  -0.054   0.9573
## container:I(time^3) -3.401e-07  5.263e-06  -0.065   0.9486
## container:I(time^4) -8.117e-09  3.353e-08  -0.242   0.8091
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03811 on 145 degrees of freedom
## Multiple R-squared:  0.1481, Adjusted R-squared:  0.06002
## F-statistic: 1.681 on 15 and 145 DF,  p-value: 0.0607


##
## Call:
## lm(formula = rdt_poly4_sfw_p, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.026376 -0.010198 -0.001428  0.006948  0.100389
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          1.889e-02  1.779e-02   1.062   0.2899
## container            1.075e-03  1.235e-02   0.087   0.9307
## time                 2.333e-04  1.452e-03   0.161   0.8726
## I(time^2)            5.598e-05  6.736e-05   0.831   0.4073
## I(time^3)            1.445e-06  1.164e-06   1.241   0.2166
## I(time^4)            9.930e-09  6.670e-09   1.489   0.1387
## temp_c              -2.364e-05  2.150e-04  -0.110   0.9126
## humi_p              -7.340e-05  1.490e-04  -0.493   0.6231
## prcp_mm             -1.114e-03  6.533e-04  -1.705   0.0904 .
## liquors              5.647e-04  7.979e-04   0.708   0.4803
## sales                1.042e-05  7.931e-06   1.313   0.1911
## halfs               -2.575e-04  4.623e-04  -0.557   0.5785
## container:time       1.206e-03  2.176e-03   0.554   0.5803
## container:I(time^2) -1.334e-04  1.115e-04  -1.196   0.2335
## container:I(time^3)  7.772e-08  2.158e-06   0.036   0.9713
## container:I(time^4) -2.000e-08  1.375e-08  -1.455   0.1479
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01563 on 145 degrees of freedom
## Multiple R-squared:  0.104,  Adjusted R-squared:  0.01131
```

```
## F-statistic: 1.122 on 15 and 145 DF,  p-value: 0.3418

##
## Call:
## lm(formula = rdt_poly4_lfw_p, data = .)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.04932 -0.01875 -0.00414  0.01605  0.07566
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)         -4.000e-03  3.072e-02  -0.130   0.8966
## container            2.480e-02  2.133e-02   1.163   0.2469
## time                -2.159e-03  2.508e-03  -0.861   0.3907
## I(time^2)           -7.401e-05  1.164e-04  -0.636   0.5257
## I(time^3)           -8.463e-07  2.011e-06  -0.421   0.6745
## I(time^4)           -2.674e-09  1.152e-08  -0.232   0.8168
## temp_c               1.233e-04  3.713e-04   0.332   0.7403
## humi_p               1.082e-04  2.574e-04   0.420   0.6749
## prcp_mm             -1.472e-03  1.129e-03  -1.304   0.1942
## liquors              3.074e-04  1.378e-03   0.223   0.8238
## sales                3.038e-05  1.370e-05   2.218   0.0281 *
## halfs                1.174e-03  7.986e-04   1.470   0.1438
## container:time       2.091e-03  3.760e-03   0.556   0.5789
## container:I(time^2)  1.189e-04  1.927e-04   0.617   0.5383
## container:I(time^3) -4.178e-07  3.728e-06  -0.112   0.9109
## container:I(time^4)  1.189e-08  2.375e-08   0.500   0.6175
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02699 on 145 degrees of freedom
## Multiple R-squared:  0.1901, Adjusted R-squared:  0.1064
## F-statistic: 2.269 on 15 and 145 DF,  p-value: 0.006618
```

Some model

```
##
## Call:
## lm(formula = rdt_sales, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -464.65 -156.75   -7.94  132.75  452.58
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    653.2167    45.3342  14.409   <2e-16 ***
## container      -21.1864    65.7665  -0.322   0.7478
## time            -2.1632     0.9051  -2.390   0.0180 *
## container:time   3.0966     1.4334   2.160   0.0323 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 208.4 on 157 degrees of freedom
## Multiple R-squared:  0.07338,    Adjusted R-squared:  0.05568
## F-statistic: 4.145 on 3 and 157 DF,  p-value: 0.00737
```

```
##
## Call:
## lm(formula = rdt_sales_mult, data = .)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -400.38 -104.13   -9.09   93.36  439.38
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     382.140    147.670   2.588   0.0106 *
## container       -31.487     58.605  -0.537   0.5919
## time             -1.011      1.049  -0.964   0.3367
## temp_c            2.704      2.011   1.345   0.1807
## humi_p            1.429      1.481   0.965   0.3362
## prcp_mm          -5.455      6.451  -0.846   0.3991
## liquors          43.158      7.347   5.874 2.59e-08 ***
## halfs            28.934      4.069   7.110 4.23e-11 ***
## container:time    1.546      1.601   0.966   0.3357
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 160.9 on 152 degrees of freedom
## Multiple R-squared:  0.4648, Adjusted R-squared:  0.4366
## F-statistic:  16.5 on 8 and 152 DF,  p-value: < 2.2e-16
```

```
##
## Call:
## lm(formula = rdt_sales, data = .)
##
## Residuals:
```

```
##     Min      1Q  Median      3Q     Max
## -398.79 -101.98   -7.22   94.60  437.60
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)         441.27206  157.99058   2.793   0.0059 **
## container           -63.00940   83.19361  -0.757   0.4500
## time                  1.96129    2.97708   0.659   0.5110
## I(time^2)             0.03465    0.03220   1.076   0.2837
## temp_c                2.57848    2.03385   1.268   0.2068
## humi_p                1.20252    1.49982   0.802   0.4239
## prcp_mm              -4.47457    6.61600  -0.676   0.4999
## liquors              42.38676    7.40288   5.726 5.44e-08 ***
## halfs                29.22421    4.09386   7.139 3.77e-11 ***
## container:time       -2.27212    4.68807  -0.485   0.6286
## container:I(time^2)  -0.02417    0.05535  -0.437   0.6630
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 161.4 on 150 degrees of freedom
## Multiple R-squared:  0.4691, Adjusted R-squared:  0.4337
## F-statistic: 13.25 on 10 and 150 DF,  p-value: < 2.2e-16
```

Local Regression

per Customer

```
##
## Call:
## lm(formula = food_waste_p_kg ~ container, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.071951 -0.021391  0.001999  0.021733  0.079921
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.066985   0.007257   9.230 2.69e-12 ***
## container   0.016731   0.010164   1.646    0.106
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03629 on 49 degrees of freedom
## Multiple R-squared:  0.0524, Adjusted R-squared:  0.03306
## F-statistic: 2.709 on 1 and 49 DF,  p-value: 0.1062
```

```
##
## Call:
## lm(formula = solid_waste_p_kg ~ container, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.022725 -0.006960 -0.002115  0.007308  0.025352
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.022725   0.002242  10.135 1.29e-13 ***
## container   0.001804   0.003140   0.575    0.568
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01121 on 49 degrees of freedom
## Multiple R-squared:  0.006691,   Adjusted R-squared:  -0.01358
## F-statistic: 0.3301 on 1 and 49 DF,  p-value: 0.5682
```

```
##
## Call:
## lm(formula = liquid_waste_p_kg ~ container, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.056246 -0.019655  0.000813  0.019476  0.068086
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.044261   0.005547   7.979 2.06e-10 ***
```

```
## container   0.014926   0.007769   1.921   0.0605 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02774 on 49 degrees of freedom
## Multiple R-squared:  0.07005,    Adjusted R-squared:  0.05107
## F-statistic: 3.691 on 1 and 49 DF,  p-value: 0.06053
```

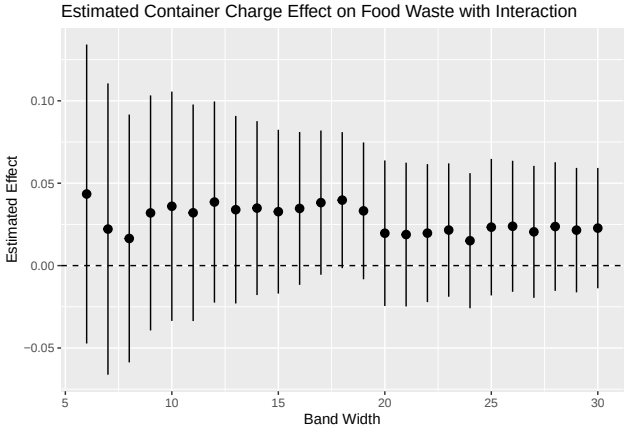
Interaction

```
##
## Call:
## lm(formula = food_waste_p_kg ~ container * time, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.076915 -0.019486 -0.000832  0.025310  0.076839
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.0552496  0.0151211   3.654 0.000649 ***
## container       0.0233299  0.0205930   1.133 0.263003
## time           -0.0009027  0.0010172  -0.888 0.379327
## container:time  0.0013136  0.0013979   0.940 0.352184
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03667 on 47 degrees of freedom
## Multiple R-squared:  0.07158,    Adjusted R-squared:  0.01232
## F-statistic: 1.208 on 3 and 47 DF,  p-value: 0.3172
```

```
##
## Call:
## lm(formula = solid_waste_p_kg ~ container * time, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.025961 -0.006713 -0.002136  0.008028  0.024176
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.0189002  0.0046765   4.042 0.000195 ***
## container       0.0054568  0.0063688   0.857 0.395900
## time           -0.0002942  0.0003146  -0.935 0.354488
## container:time  0.0003079  0.0004323   0.712 0.479863
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01134 on 47 degrees of freedom
## Multiple R-squared:  0.02488,    Adjusted R-squared:  -0.03736
## F-statistic: 0.3997 on 3 and 47 DF,  p-value: 0.7538
```

```
##
```

```
## Call:
## lm(formula = liquid_waste_p_kg ~ container * time, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.059985 -0.016844  0.000476  0.019769  0.065107
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.0363494  0.0115661   3.143   0.0029 **
## container       0.0178730  0.0157515   1.135   0.2623
## time           -0.0006086  0.0007780  -0.782   0.4380
## container:time  0.0010057  0.0010693   0.941   0.3517
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02805 on 47 degrees of freedom
## Multiple R-squared:  0.08762,    Adjusted R-squared:  0.02938
## F-statistic: 1.504 on 3 and 47 DF,  p-value: 0.2256
```



Multiple

```
##
## Call:
## lm(formula = food_waste_p_kg ~ container * time + temp_c + humi_p +
##     prcp_mm + liquors + sales + halfs, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.070198 -0.018478 -0.000523  0.021209  0.070930
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     7.963e-02  7.727e-02   1.031    0.309
## container       1.269e-02  2.150e-02   0.590    0.558
## time           -7.400e-04  1.049e-03  -0.706    0.484
## temp_c          1.008e-03  8.579e-04   1.174    0.247
## humi_p         -4.189e-04  8.007e-04  -0.523    0.604
```

```
## prcp_mm        -3.606e-03  3.060e-03  -1.178    0.245
## liquors         8.516e-04  3.177e-03   0.268    0.790
## sales           3.606e-05  3.459e-05   1.043    0.303
## halfs           3.668e-04  2.245e-03   0.163    0.871
## container:time  1.555e-03  1.585e-03   0.981    0.332
##
## Residual standard error: 0.03567 on 41 degrees of freedom
## Multiple R-squared:  0.2336, Adjusted R-squared:  0.06541
## F-statistic: 1.389 on 9 and 41 DF,  p-value: 0.2247
```

```
##
## Call:
## lm(formula = solid_waste_p_kg ~ container * time + temp_c + humi_p +
##     prcp_mm + liquors + sales + halfs, data = .)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -0.0186022 -0.0056049 -0.0005597  0.0058769  0.0210676
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     3.528e-02  2.293e-02   1.539   0.1315
## container       1.389e-03  6.381e-03   0.218   0.8288
## time           -2.229e-04  3.112e-04  -0.716   0.4778
## temp_c          5.332e-04  2.546e-04   2.095   0.0424 *
## humi_p         -2.283e-04  2.376e-04  -0.961   0.3421
## prcp_mm        -8.376e-04  9.079e-04  -0.923   0.3616
## liquors         1.705e-04  9.426e-04   0.181   0.8573
## sales           1.810e-05  1.026e-05   1.763   0.0853 .
## halfs          -4.264e-04  6.661e-04  -0.640   0.5257
## container:time  3.030e-04  4.703e-04   0.644   0.5230
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01058 on 41 degrees of freedom
## Multiple R-squared:  0.2592, Adjusted R-squared:  0.09653
## F-statistic: 1.594 on 9 and 41 DF,  p-value: 0.1495
```

```
##
## Call:
## lm(formula = liquid_waste_p_kg ~ container * time + temp_c +
##     humi_p + prcp_mm + liquors + sales + halfs, data = .)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.051596 -0.015189 -0.001578  0.016023  0.063417
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     4.436e-02  6.054e-02   0.733    0.468
## container       1.130e-02  1.685e-02   0.671    0.506
## time           -5.171e-04  8.218e-04  -0.629    0.533
## temp_c          4.743e-04  6.722e-04   0.706    0.484
## humi_p         -1.905e-04  6.274e-04  -0.304    0.763
```

```
## prcp_mm        -2.768e-03  2.398e-03  -1.155    0.255
## liquors         6.810e-04  2.489e-03   0.274    0.786
## sales           1.797e-05  2.710e-05   0.663    0.511
## halfs           7.931e-04  1.759e-03   0.451    0.654
## container:time  1.252e-03  1.242e-03   1.008    0.319
##
## Residual standard error: 0.02795 on 41 degrees of freedom
## Multiple R-squared:  0.2097, Adjusted R-squared:  0.03621
## F-statistic: 1.209 on 9 and 41 DF,  p-value: 0.3161
```