

Appendix K

L.I.N.E. assumptions analysis for log price variable

Linearity Assumption for log price variable:

Both plots, Residual vs. predictor and Residual vs. fitted values, show no discernible pattern, indicating no violation of linearity assumptions. Therefore, it can be concluded that log love and log price exhibit a linear relationship, supporting linear regression techniques.

```
```{r}
fit linear model
love_lm2 <- lm(log_love ~ log_price, data = sephoraData)

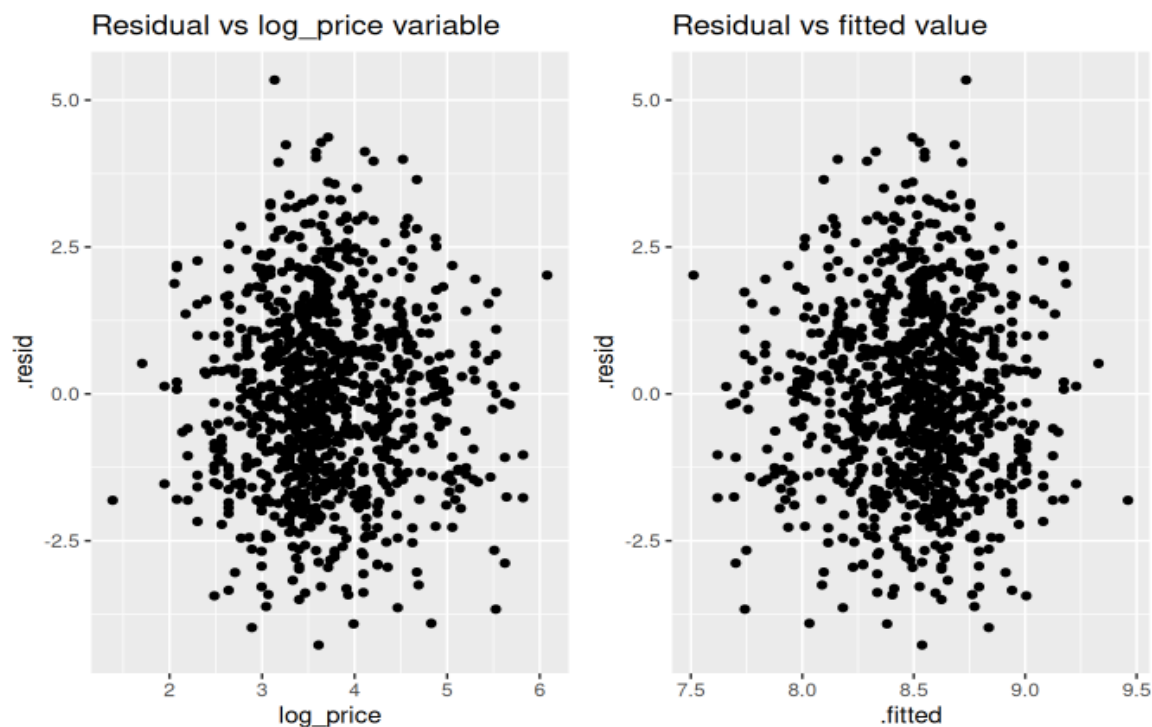
Augment LR for price
love_lm2_aug <- augment(love_lm2)

plot the residuals vs the predictors
p1 <- ggplot(data = love_lm2_aug, aes(y = .resid, x = log_price)) +
 geom_point() +
 ggtitle("Residual vs log_price variable")

plot the residuals vs the fitted values
p2 <- ggplot(data = love_lm2_aug, aes(y = .resid, x = .fitted)) +
 geom_point() +
 ggtitle("Residual vs fitted value")

plot_grid(p1, p2, nrow = 1)
```
```

Plots of residual vs. Log price and plot residual vs. Fitted value



Independence assumption for log price variable:

The residual vs. order plot displays a scattered distribution of residuals, suggesting no discernible pattern or trend. This random sequence sustains the independence assumption between log love response and log price predictor, indicating no violation of this assumption in the regression model.

```

```{r}
Plot residual vs. time or order
love_lm2_aug <- love_lm2_aug %>%
 mutate(order = seq(1:dim(love_lm2_aug)[1]))

ggplot(love_lm2_aug, aes(x = order, y = .resid)) +
 geom_point() +
 theme_minimal() +
 ggtitle("residual plot vs. order")
```

```

Residual vs order for log price

