Equal variance assumption for log value price variable:

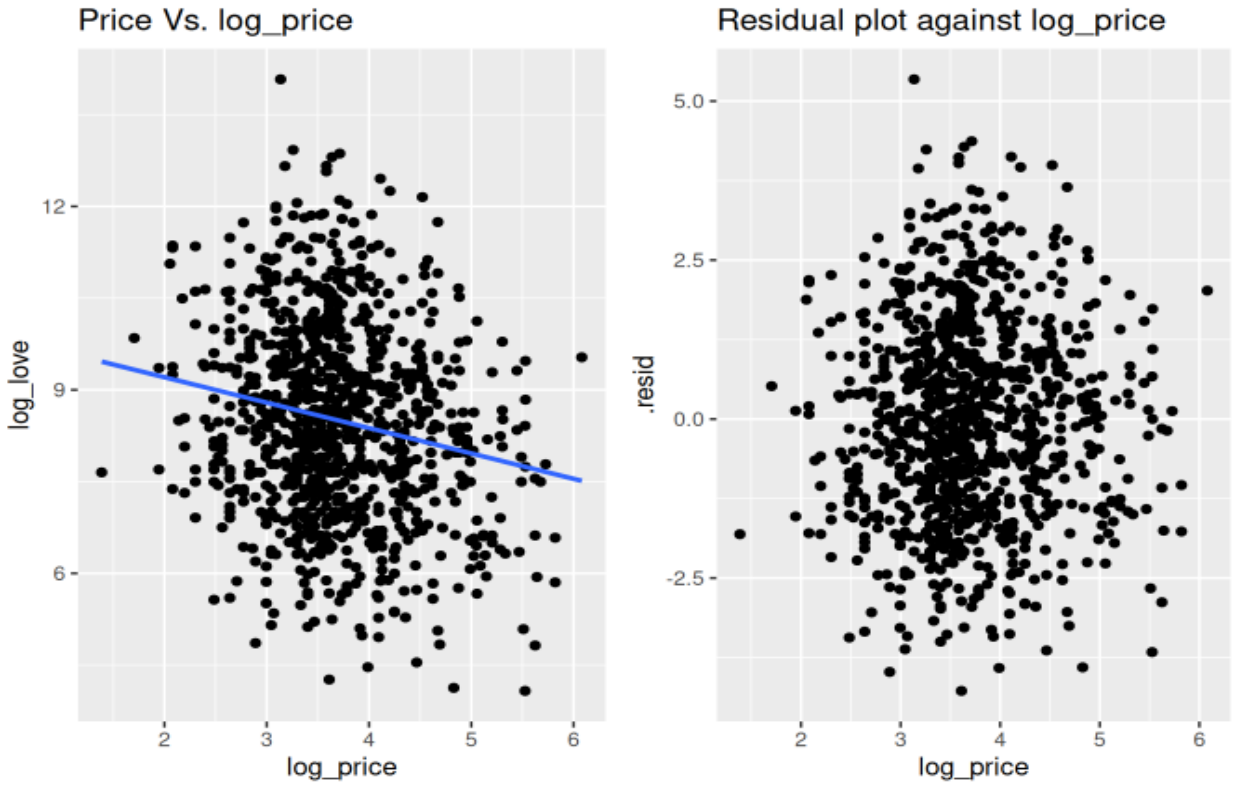
The Log Price predictor's equal variance assumption test results indicate that the error variance is constant. Both the scatterplot of Log Love vs. Log Price and the residual vs. predictor plot show a random cloud pattern, suggesting that the variance of errors does not vary systematically with the predictor. Furthermore, Levene's statistical test, used to assess the equality of variances across different groups, yielded a p-value of 0.457. This p-value indicates no significant difference in variances across groups, failing to reject the null hypothesis (Ho). Therefore, the assumption of equal variance is sustained for the Log Price predictor. This suggests that the variability in the errors remains consistent across different levels of Log Price, supporting the validity of using Log Price as a predictor in regression analysis with Log Love as the response variable.

```{r}
# SLR plot for value_price
p6 <- ggplot(data = love_lm1_aug, aes(x = log_value_price, y = log_love)) +
      geom_point() +
      #without CI band
      geom_smooth(method = "lm", se = FALSE) +
      ggtitle("log_love Vs. value_price")

# plot the residuals vs the predictors
p7 <- ggplot(data = love_lm1_aug, aes(y = .resid, x = log_value_price)) +
      geom_point() +
      ggtitle("Residual plot vs. value_price")

plot_grid(p6, p7, nrow = 1)
```

Plots of log Love vs. Log value price and plot residual vs. Log value price



Levene's Test for Homogeneity of Variance

Ho: error variance is constant

H_A: error variance is not constant

```{r}
# get the median
median <- median(love_lm1_aug$log_value_price)

print(paste("median of value_price : ", median))
```

```
[1] "median of value_price : 3.61091791264422"
```

```{r}
#split the data into two groups
love_lm1_aug <- love_lm1_aug %>%
      mutate(group = factor(if_else(log_value_price < median, 1, 2)))
```

```
# Checking the number of observations are in each group
love_lm1_aug %>% count(group)
```

```
  # A tibble: 2 × 2
    group     n
    <fct> <int>
  1 1       479
  2 2       521
```

```{r}
# Levene's Test for Homogeneity of Variance
leveneTest(y = love_lm1_aug$.resid,
group = love_lm1_aug$group) #from car package
```

```
Levene's Test for Homogeneity of Variance (center = median)
       Df F value Pr(>F)
group   1  0.5528 0.4574
      998
```

Because p-value > 0.05, we fail to reject and conclude that the error variance is constant for all x values, so there is no longer a significant issue with the normality or equal variance assumptions.