Exponential Regression Model of Revenue Growth and Previous Spending

The exponential regression model assumes that the relationship between the dependent variable (Revenue_Growth) and the independent variable (Previous_Spending) is of the form:

$$\mathrm{y} = a \cdot e^{b \cdot \mathrm{x}} \tag{1}$$

where

Revenue_Growth is represented by 'y'\ Previous_Spending is represented by 'x'\ 'a' and 'b' are where a and b are parameters to be estimated from the data.\

The log transformation is used to linearize the model:

$$\log(x) = \log(a) + b \cdot x \tag{2}$$

The regression coefficients estimated by the model are in the log scale, so we need to transform them back to the original scale by taking the exponent of the coefficients.

Load required libraries

Load and prepare data

In [ ]:
```
data <- read_excel("C:\\Users\\aleksandar.dimitrov\\Desktop\\R Tests\\Spain_Limit_Incr
```

Build exponential regression model

In [ ]:
```
model <- lm(log(Revenue_Growth) ~ Previous_Spending, data = data)
```

Transform coefficients back to the original scale

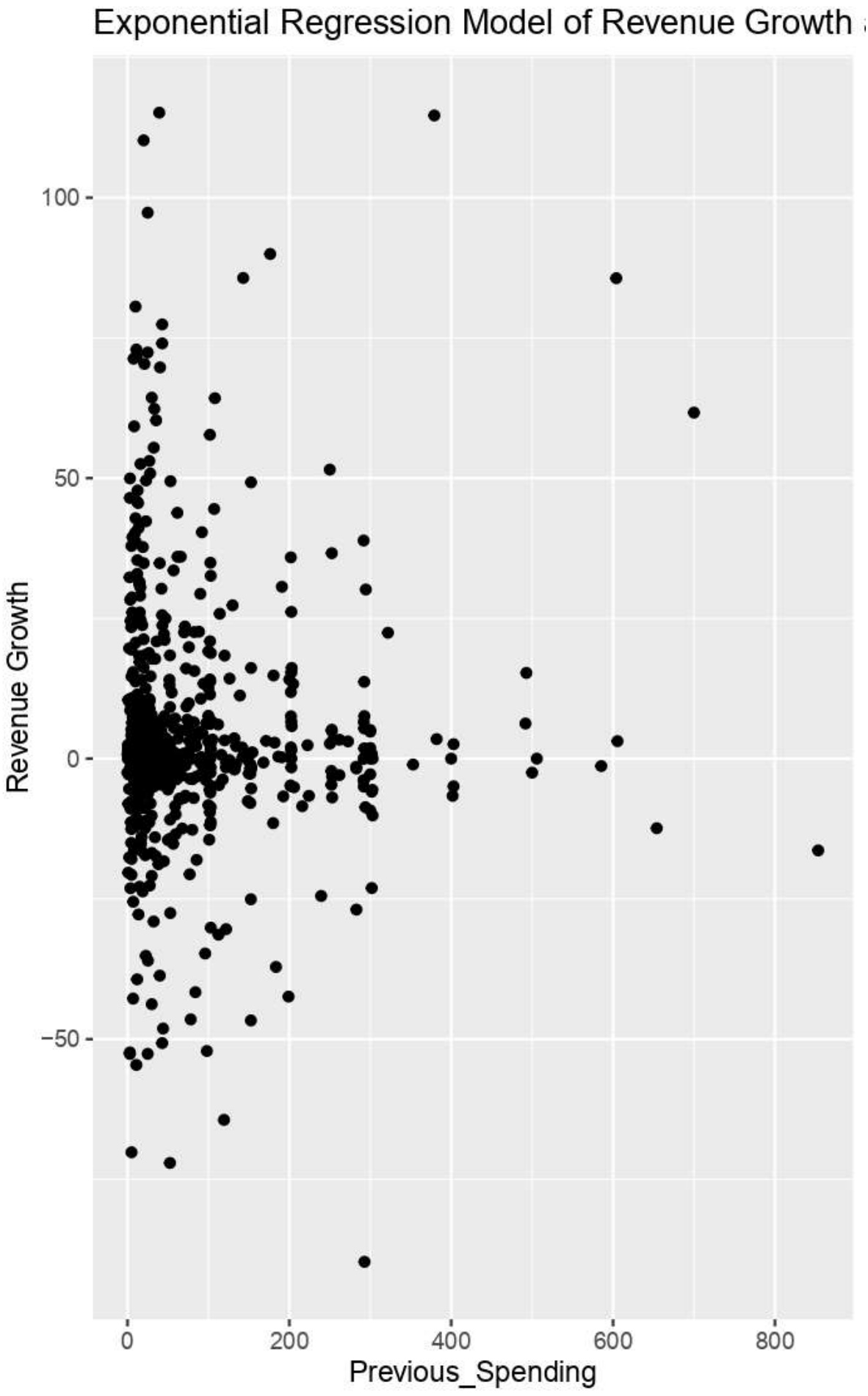
In [ ]:
```
model$coefficients[1] <- exp(model$coefficients[1])
```

Print model summary

In [ ]:
```
summary(model)
```

Plot the regression line

In [ ]:
```
ggplot(data, aes(x = Previous_Spending, y = Revenue_Growth)) +
  geom_point() +
  stat_smooth(method = "lm", formula = y ~ exp(x * coef(model)[2]) * coef(model)[1], s
  labs(x = "Previous_Spending", y = "Revenue Growth", title = "Exponential Regression
```


Exponential Regression Model of Revenue Growth
100
50
0
−50
Revenue Growth
0
200
400
600
800
Previous_Spending

Key insights

The relationship between Previous Spending (independent variable) and Revenue Growth (dependent variable) is non-linear, and that an exponential regression model may be a better fit for the data than a linear regression model.

The exponential regression model assumes that the majority of the points are concentrated near the beginning of the axis. This suggests that there is a strong relationship between Previous Spending and Revenue Growth at lower levels of spending, but this relationship weakens or becomes less clear as spending levels increase, which is characteristic of an exponential relationship. It's important to note that other types of non-linear relationships may also exist between the two variables, and it's possible that a different type of non-linear regression model may be a better fit for the data. Therefore, it's important to consider multiple types of non-linear regression models, and choose the model that best fits the data based on criteria such as goodness of fit measures and interpretability.