Assignment 2

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Question 1

```
set.seed(2021)
```

```
b0 <- 3
b1 <- 5
b2 <- 8

gamma <- 1

x1 <- rnorm(5000, mean = 1, sd = 1)
x2 <- rnorm(5000, mean = 2, sd = 1)

z <- rgamma(5000, shape = 1.2, scale = 1.1)

sigma_sq <- 1*exp(gamma*z)
epsilon <- rnorm(5000, mean = 0, sd = sqrt(sigma_sq))

y <- b0 + b1*x1 + b2*x2 + epsilon
```

```
model1 <- lm(y ~ x1 + x2)

modelsummary(model1,
             vcov = c("iid", "HC0"),
             gof_map = gm,
             stars = T)
```

```
lmtest::bptest(formula = y ~ x1 + x2)
```

```
##
##  studentized Breusch-Pagan test
##
## data:  y ~ x1 + x2
```

	Model 1	Model 2
(Intercept)	2.609***	2.609***
	(0.375)	(0.315)
x1	5.009***	5.009***
	(0.149)	(0.078)
x2	8.080***	8.080***
	(0.152)	(0.097)
N	5000	5000
Adj. R2	0.44	0.44

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

```
## BP = 0.50429, df = 2, p-value = 0.7771
```

```
gamma <- 0

sigma_sq <- 1*exp(gamma*z)
epsilon <- rnorm(5000, mean = 0, sd = sqrt(sigma_sq))

y <- b0 + b1*x1 + b2*x2 + epsilon
```

```
model1 <- lm(y ~ x1 + x2)
model2 <- lm(y ~ x1 + x2, weights = sigma_sq)
```