Spatial Economics – Assignment 1

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The executable code that was used in compiling the assignment is available on GitHub at https://github.com/maxmheinze/spatial.

Exercise 1

Preliminaries

First, we load the `MASS` package and check what variables there are in the `Boston` dataset.

```
# Header ---------------------------------------------------------------

rm(list = ls())
gc()

pacman::p_load(MASS)

# Check Column Names ---------------------------------------------------

colnames(Boston)
```

Creating the Function

Next, we create the desired function.

```
# Create the function --------------------------------------------------

boston_quick_ols <- function(dependent, ...) {

    # Create a formula string from the inputs
    independents <- paste(c(...), collapse = " + ")
    formula_string <- paste(dependent, "~", independents)

    # Fit the model
    fitted_model <- lm(as.formula(formula_string), data = Boston)

    # Get the summary
    fitted_model_summary <- summary(fitted_model)

    # Get point estimates and confidence intervals
    list_coef <- fitted_model_summary$coefficients
    list_conf <- confint(fitted_model, level = 0.95)
    list_ervr <- fitted_model_summary$sigma^2

    # Output a list
    return(list(coefficients = list_coef[, 1], error_variance = list_ervr, test_statistic_t
    = list_coef[,
        3], test_statistic_p = list_coef[, 4], confidence_intervals = list_conf))

}
```

A Simple Linear Model

Next, we apply the function, using a collection of four independent variables.

```
boston_quick_ols("medv", "rm", "age", "dis", "nox")
```

```
## $coefficients
##  (Intercept)           rm          age          dis          nox
##  -6.61135440   8.00051949  -0.06932587  -1.08526888 -22.10858455
##
## $error_variance
## [1] 37.35166
##
## $test_statistic_t
```

```
## (Intercept)          rm         age         dis         nox
##   -1.590287   19.654992   -4.422259   -4.850184   -5.486524
##
## $test_statistic_p
##  (Intercept)           rm          age          dis          nox
## 1.124008e-01 3.520952e-64 1.198751e-05 1.649044e-06 6.516890e-08
##
## $confidence_intervals
##                    2.5 %       97.5 %
## (Intercept) -14.7793094   1.55660058
## rm            7.2007886   8.80025034
## age          -0.1001258  -0.03852595
## dis          -1.5248891  -0.64564866
## nox         -30.0256124 -14.19155674
```