

Plotting a regression line

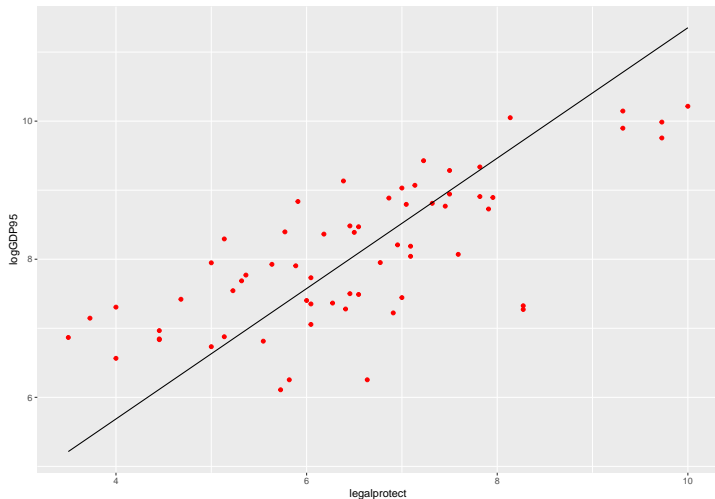
A more useful line is the fitted values from the regression. Here's a plot of that line with the points from the scatterplot for the Acemoglu IV:

```
IV_fitted <- tibble(col_origins$legalprotect,
                    fitted(col_origins_iv))
colnames(IV_fitted) <- c("legalprotect", "hat")

ggplot(col_origins, aes(x=legalprotect,
  y = logGDP95)) + geom_point(color="red") +
  geom_line(data = IV_fitted, aes(x=legalprotect,
  y=hat))
```



Plotting a regression line



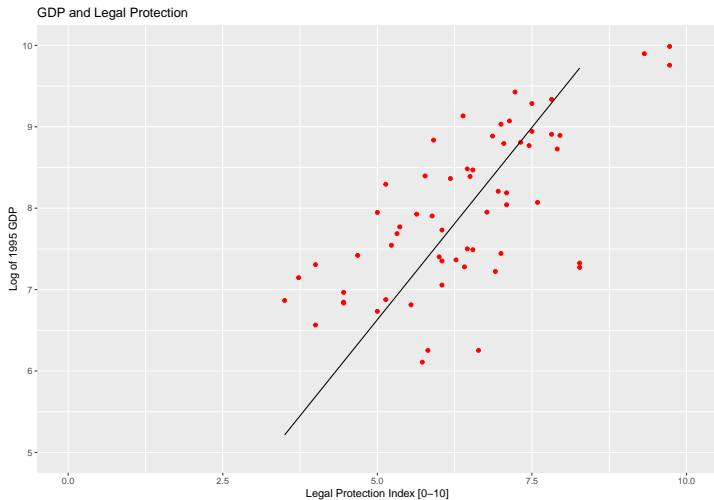
Specifying axis and titles

A standard task in making the graph is specifying graph titles (main and axes), as well as potentially specifying the scale of the axes.

```
ggplot(col_origins,  
  aes(x=legalprotect, y = logGDP95)) +  
  geom_point(color="red") +  
  geom_line(data = IV_fitted,  
    aes(x=legalprotect, y=hat)) +  
  ggtitle("GDP and Legal Protection") +  
  xlab("Legal Protection Index [0-10]") +  
  ylab("Log of 1995 GDP") +  
  xlim(0, 10) + ylim(5,10)
```



Specifying axis and titles



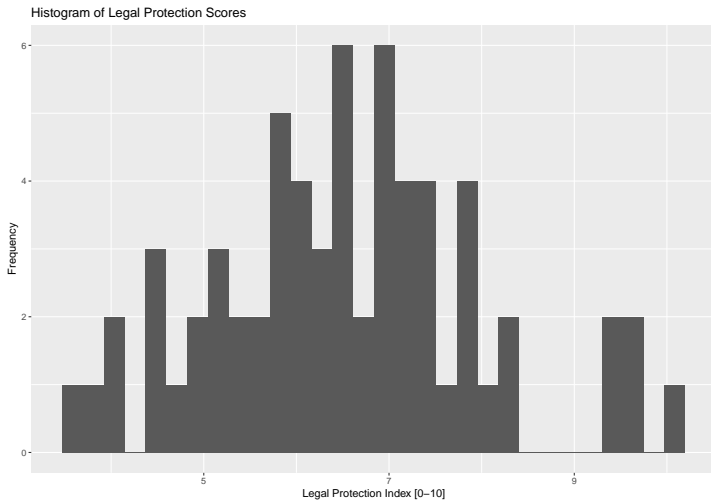
Histogram

The geometry point for histogram is **geom_histogram()**.

```
ggplot(col_origins, aes(x=legalprotect)) +  
  geom_histogram() +  
  ggtitle("Histogram of Legal Protection Scores") +  
  xlab("Legal Protection Index [0-10]") +  
  ylab("Frequency")
```



Histogram



Bar plot

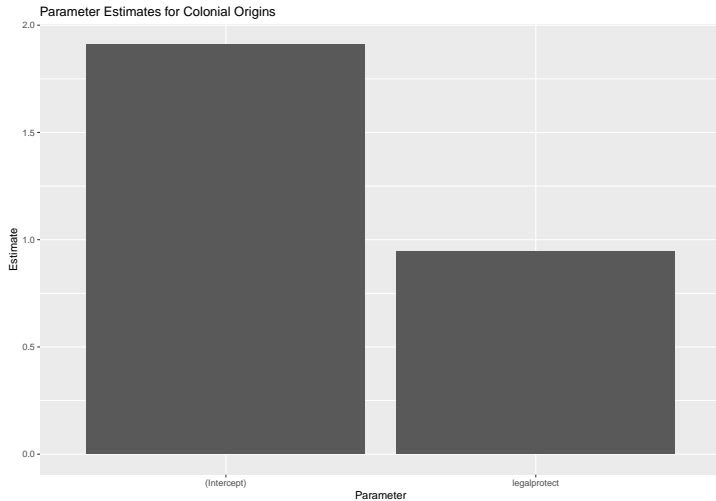
The geometry for a bar plot is **geom_bar()**. By default, a bar plot uses frequencies for its values, but you can use values from a column by specifying **stat = "identity"** inside **geom_bar()**.

```
coeffs_IV <- tidy(col_origins_iv)

ggplot(coeffs_IV,
  aes(x=term, y=estimate)) +
  geom_bar(stat = "identity") +
  ggtitle("Parameter Estimates for Colonial Origins") +
  xlab("Parameter") + ylab("Estimate")
```



Bar plot



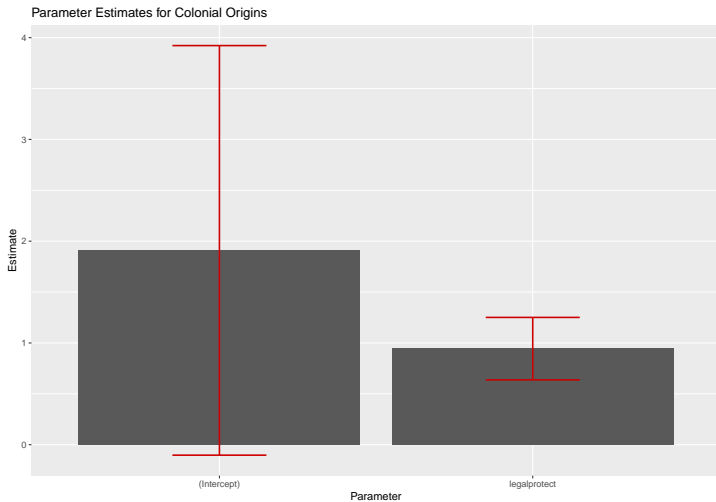
Adding error bars

You can easily add error bars by specifying the values for the error bar inside of `geom_errorbar()`.

```
ggplot(coeffs_IV,
  aes(x=term, y=estimate)) +
  geom_bar(stat = "identity") +
  ggtitle("Parameter Estimates for Colonial Origins") +
  xlab("Parameter") + ylab("Estimate") +
  geom_errorbar(aes(ymin=estimate - 1.96 * std.error,
    ymax=estimate + 1.96 * std.error),
    size=.75, width=.3, color="red3")
```



Adding error bars



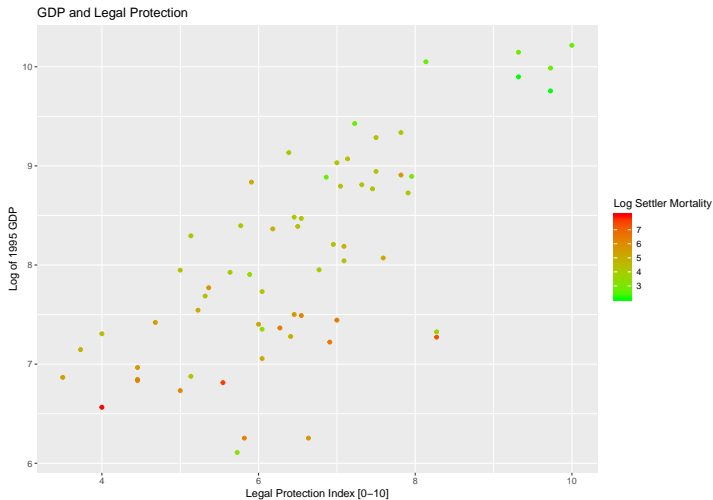
Adding colors

You can easily add color to graph points as well. There are a lot of aesthetic options to do that — here I demonstrate adding a color *scale* to the graph.

```
ggplot(col_origins, aes(x=legalprotect,
  y = logGDP95 , col= log.settler.mort)) +
  geom_point() +
  ggtitle("GDP and Legal Protection") +
  xlab("Legal Protection Index [0-10]") +
  ylab("Log of 1995 GDP") +
  scale_color_gradient(low="green", high="red3",
    name="Log Settler Mortality")
```



Adding colors



Adding colors: example 2

```
ggplot(col_origins, aes(x=legalprotect)) +  
  geom_histogram(col="black", fill="red2") +  
  ggtitle("Histogram of Legal Protection Scores") +  
  xlab("Legal Protection Index [0-10]") +  
  ylab("Frequency")
```



Adding colors: example 2

