Question 3

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Load in Data

First load and view the appropriate datasets.

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.4.4     v tibble    3.2.1
## v lubridate 1.9.2     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
list.files('/Users/ramzankamoto/Documents/Masters/DS_EXAM/23550716/Question3/code', full.names = T, recu
```

```
alloc <- read_csv("/Users/ramzankamoto/Documents/Masters/DS_EXAM/23550716/Question3/data/Ukraine_Aid/Fi
```

```
## Rows: 41 Columns: 7
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (1): Country
## dbl (6): EU member, Financial allocations($ billion), Humanitarian allocatio...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
commit <- read_csv("/Users/ramzankamoto/Documents/Masters/DS_EXAM/23550716/Question3/data/Ukraine_Aid/F
```

```
## Rows: 42 Columns: 11
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (1): Country
## dbl (10): EU member, GDP in 2021($ billion), Financial commitments($ billion...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

Data Cleaning

I will compare EU countries with Rest of the World (RoW) by creating a plot bubble plot that shows which countries have allocated more resources as a percentage of GDP.

First create a new dataframe with our variables of interest.

```
new_commit <- commit %>%
    select(Country,`EU member` ,`GDP in 2021($ billion)`,`Total bilateral commitments($ billion)`) %>%
    mutate(commit_per_gdp = `Total bilateral commitments($ billion)`/`GDP in 2021($ billion)`*100)
```

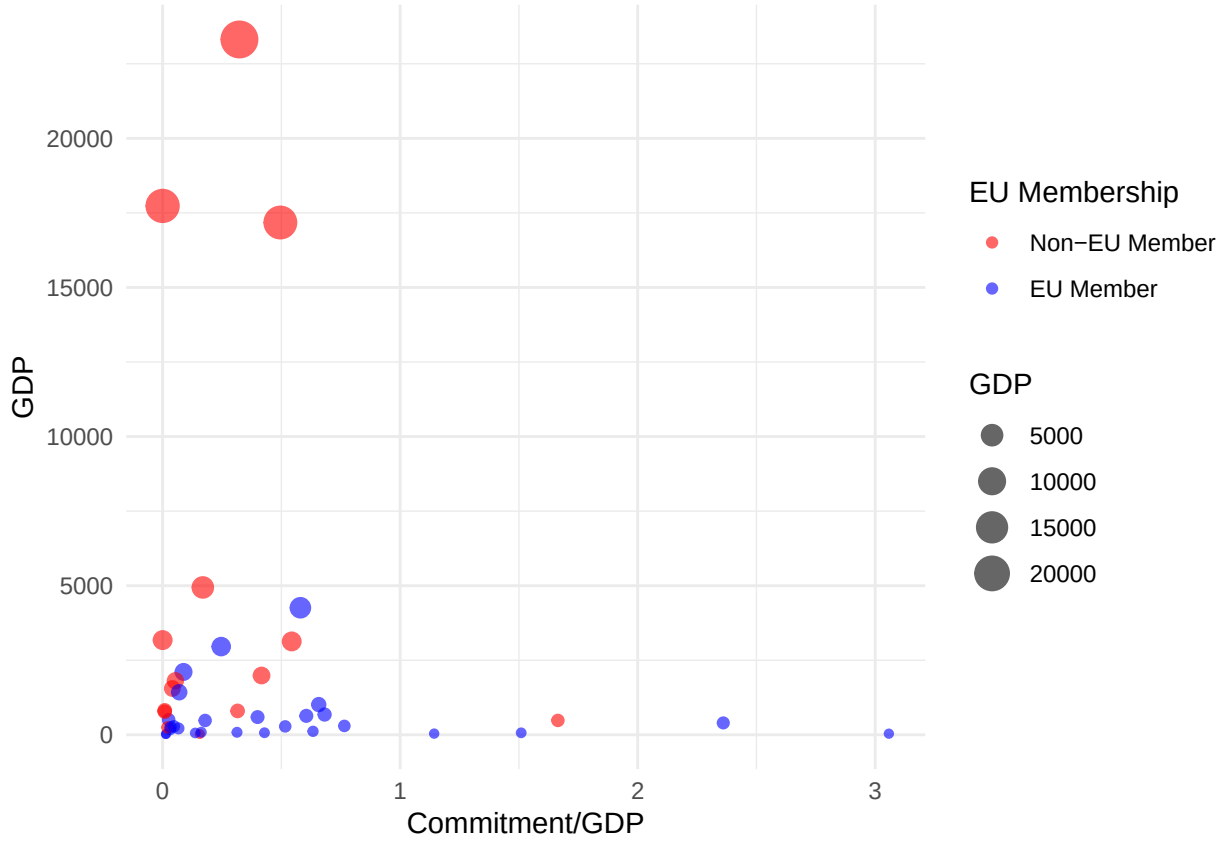
We then clean up the data a little so that it is less error prone.

```
commit_df <- new_commit %>%
    rename(country = Country,
           eu_member =`EU member`,
           gdp = `GDP in 2021($ billion)`,
           commit_gdp = commit_per_gdp
           )
```

Plot

Use bubble plot function on our new dataframe

```
plot_gdp_vs_commit(commit_df)
```



From the plot we can clearly see that most EU nations are committing less than 1 % of their GDP to

aid Ukraine. Only five countries commit more than 1 % of their total GDP and these countries all have relatively small GDP's.

From this we might suggest that EU nations could be doing more to aid Ukraine in this war.

Next we run a simple regression to see how strong the effect that being an EU member has on total bilateral allocation controlling for all other variables.

First we clean up the data again.

```
# Slightly messy but renames variables to be more usable.
alloc_df <- alloc %>%
    rename(country = Country,
           eu_member = `EU member`,
           fin_alloc = `Financial allocations($ billion)`,
           humanitarian_alloc = `Humanitarian allocations($ billion)`,
           military_alloc = `Military allocations($ billion)`,
           total_bi_alloc = `Total bilateral allocations($ billion)`,
           share_eu_alloc = `Share in EU allocations($ billion)`) %>%
    select(-country)
```

Linear regression

```
ols_model1 <- lm_eu_effect(alloc_df, "total_bi_alloc", control_vars = c("fin_alloc","humanitarian_alloc

print(ols_model1)
```

```
##
## Call:
## lm(formula = formula, data = data)
##
## Residuals:
##        Min         1Q     Median         3Q        Max
## -7.212e-10 -1.815e-10 -9.260e-11  5.560e-11  9.855e-10
##
## Coefficients:
##                      Estimate Std. Error    t value Pr(>|t|)
## (Intercept)        -5.526e-11  1.006e-10 -5.490e-01   0.5863
## eu_member           2.421e-10  1.206e-10  2.007e+00   0.0525 .
## fin_alloc           1.000e+00  1.388e-11  7.203e+10   <2e-16 ***
## humanitarian_alloc  1.000e+00  1.186e-10  8.428e+09   <2e-16 ***
## military_alloc      1.000e+00  1.011e-11  9.891e+10   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.425e-10 on 35 degrees of freedom
##   (1 observation deleted due to missingness)
## Multiple R-squared:      1,  Adjusted R-squared:      1
## F-statistic: 1.265e+22 on 4 and 35 DF,  p-value: < 2.2e-16
```

Our regression shows that being a member of the EU is positively correlated with total billateral allocation.

Now we wish to make the table neater and more presentable, so we make use of the broom and kable packages.

```
# library(broom)
# library(kableExtra)
#
# tidy_model <- broom::tidy(ols_model1)
#   print(tidy_model)
#
# clean_model <- tidy_table(tidy_model)
#
# print(clean_model)

# Come back to this, doesnt really look that lakker
```

Summary

On air, I would discuss this as a disgrace. Eventhough being in the EU is positively correlated with total bilateral allocation, the EU members simply do not commit enough as a percentage of their GDP. How can the rest of the world pitch in when major european states are not willing to commit.