econ490

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Import bank-wise data in the test group and the control group from Bloomberg and clean the data

The test set is as follow

```
## # A tibble: 3 x 6
##   date                  roe  t1cr bank  country     T
##   <dttm>              <dbl> <dbl> <chr> <chr>   <dbl>
## 1 2024-12-31 00:00:00  14.1  14.6 rbc   Canada      1
## 2 2024-09-30 00:00:00  14.2  14.5 rbc   Canada      1
## 3 2024-06-30 00:00:00  14.0  14.1 rbc   Canada      1
```

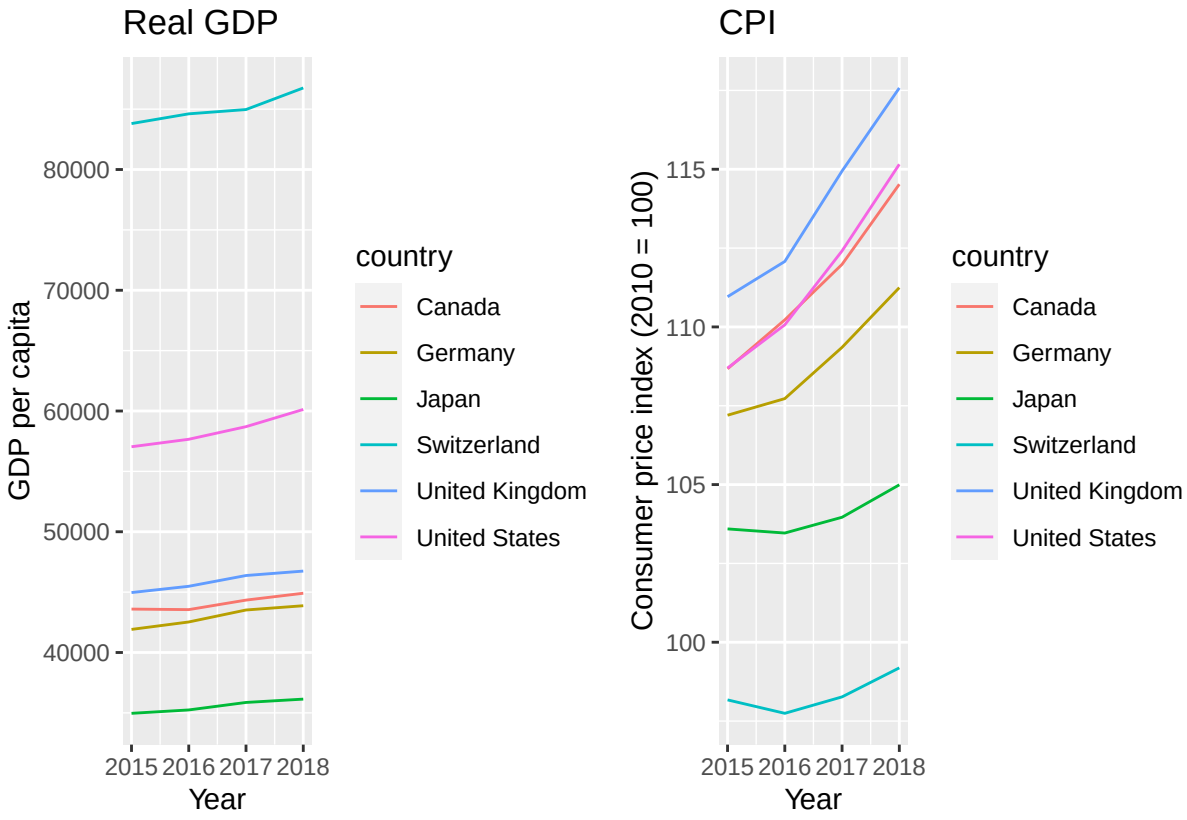
And the control set is as follow

```
## # A tibble: 3 x 6
##   date                  roe  t1cr bank  country           T
##   <dttm>              <dbl> <dbl> <chr> <chr>         <dbl>
## 1 2024-12-31 00:00:00  5.94  17.6 ubs   United States     0
## 2 2024-09-30 00:00:00  4.70  17.5 ubs   United States     0
## 3 2024-06-30 00:00:00  2.22  18   ubs   United States     0
```

Import Marco Data from World Bank, including GDP and CPI

```
##            country       year           gdp             cpi
##  Canada        :4   Min.   :2015   Min.   :34961   Min.   : 97.75
##  Germany       :4   1st Qu.:2016   1st Qu.:43272   1st Qu.:103.87
##  Japan         :4   Median :2016   Median :44936   Median :109.02
##  Switzerland   :4   Mean   :2016   Mean   :51986   Mean   :108.01
##  United Kingdom:4   3rd Qu.:2017   3rd Qu.:57920   3rd Qu.:112.01
##  United States :4   Max.   :2018   Max.   :86757   Max.   :117.58
```

Let's visualize the macro data



Import the indcies in the main stock exchanges in the countries we have

```
##   exchange    stock_idx          country              year
##  DAX  :41   Min.   :-19.269   Length:246         Min.   :2015
##  NKY  :41   1st Qu.:  6.186   Class :character   1st Qu.:2017
##  SMI  :41   Median : 28.349   Mode  :character   Median :2020
##  SPTSX:41   Mean   : 41.882                      Mean   :2020
##  SPX  :41   3rd Qu.: 63.936                      3rd Qu.:2022
##  UKX  :41   Max.   :245.307                      Max.   :2025
##      month
##  Min.   : 2.000
##  1st Qu.: 3.000
##  Median : 6.000
##  Mean   : 7.366
##  3rd Qu.: 9.000
##  Max.   :12.000
```

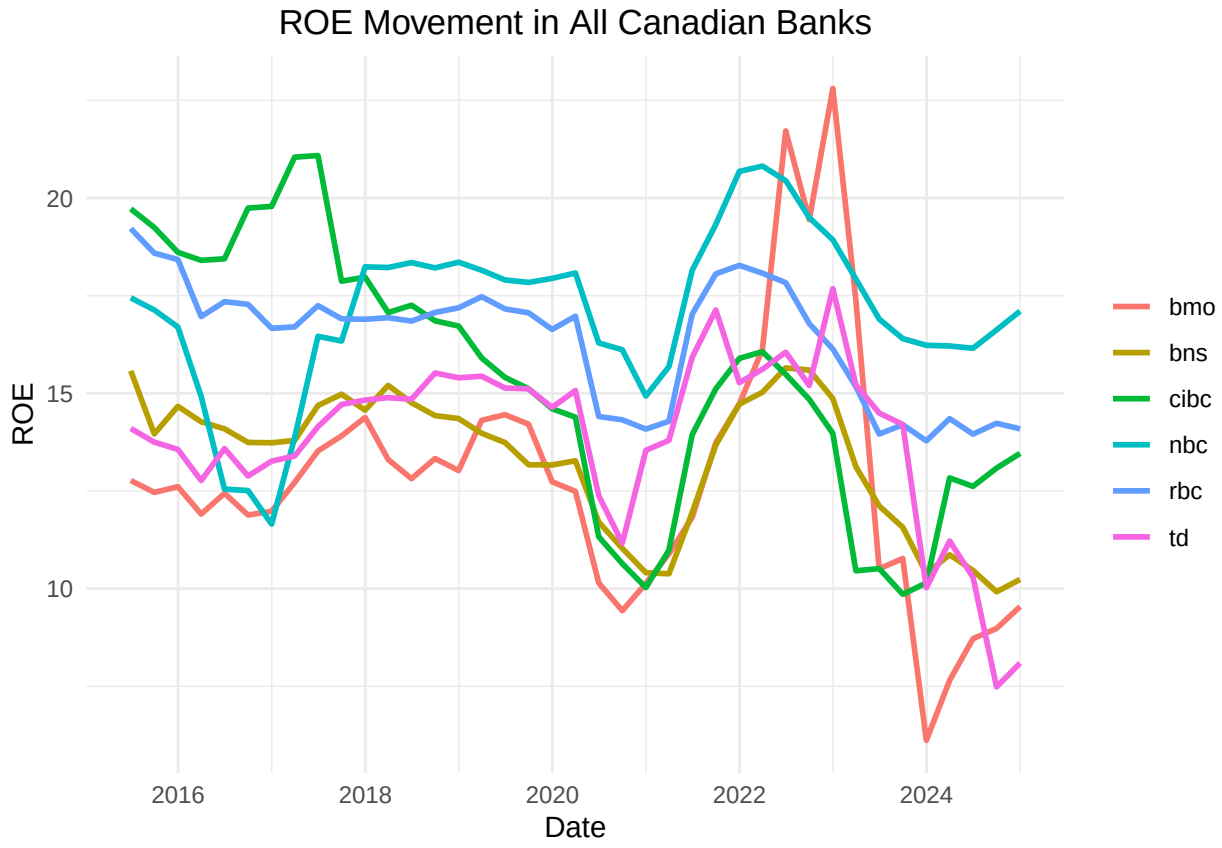
Integrate bank-wise, macro data & stock index

```
## # A tibble: 3 x 13
##   date                 roe  t1cr bank  country     T yr_qtr  post    TP    gdp
##   <dttm>             <dbl> <dbl> <chr> <chr>   <dbl> <chr>  <dbl> <dbl>  <dbl>
```

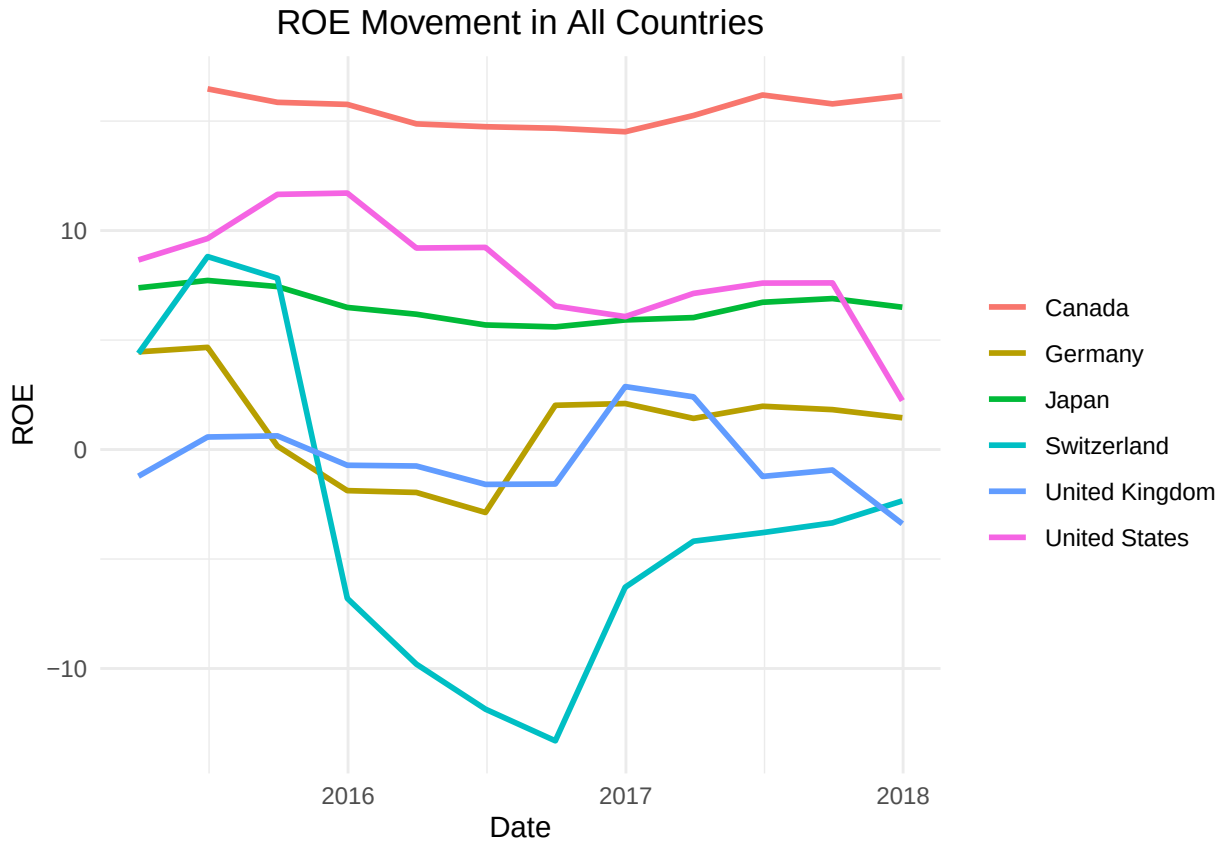
```
## 1 2017-12-31 00:00:00  16.9  12.3 rbc   Canada      1 2017q4     1     1 44339.
## 2 2017-09-30 00:00:00  16.9  12.4 rbc   Canada      1 2017q3     1     1 44339.
## 3 2017-06-30 00:00:00  17.2  12   rbc   Canada      1 2017q2     1     1 44339.
## # i 3 more variables: cpi <dbl>, exchange <fct>, stock_idx <dbl>
```

Check the ROE movement in Canada

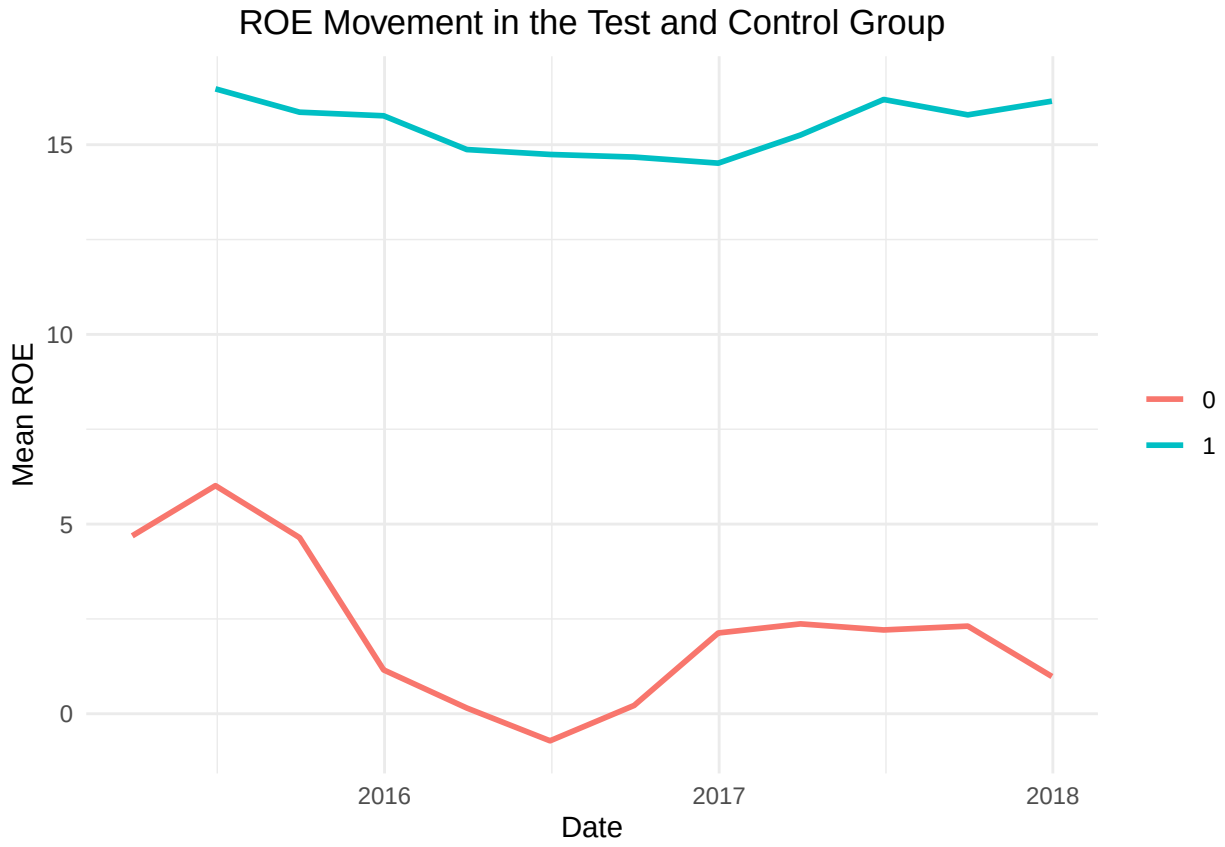
```
## Warning: Using 'size' aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use 'linewidth' instead.
## This warning is displayed once every 8 hours.
## Call 'lifecycle::last_lifecycle_warnings()' to see where this warning was
## generated.
```



Check the ROE movement in each couuntry



Check ROE movement in the test and control groups



Estimating the DID estimator

```
##
## Call:
## lm(formula = roe ~ T + post + TP, data = df_both)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -14.8405  -2.6021  -0.0146   3.3029   8.0236
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   4.1254     0.9675   4.264 3.77e-05 ***
## T            11.9052     1.4779   8.055 3.83e-13 ***
## post         -2.9180     1.1850  -2.462   0.0151 *
## TP            2.1604     1.7665   1.223   0.2235
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.74 on 134 degrees of freedom
## Multiple R-squared:  0.6744, Adjusted R-squared:  0.6671
## F-statistic:  92.5 on 3 and 134 DF,  p-value: < 2.2e-16
```

The coefficient for 'did' is the differences-in-differences estimator. The effect is **not significant** at 10% with the treatment having no positive effect.

did w fixed effect generated from Stata

Variable	Coefficient	Std. Err.	t	P>abs(t)	90% Conf. Interval
TP	**-6.190274**	3.132214	-1.98	0.051	-11.39 to -0.99
t1cr	**0.6889748**	0.3686563	1.87	0.064	0.08 to 1.30
gdp	**-0.0099364**	0.0041104	-2.42	0.017	-0.02 to -0.00
cpi	**1.811661**	1.025921	1.77	0.080	0.11 to 3.51
stock_idx	0.0169595	0.0705168	0.24	0.810	-0.10 to 0.13
_cons	**279.2408**	121.7997	2.29	0.024	77.20 to 481.29

HDFE Regression Statistics

Statistic	Value
F-statistic	2.91
Prob > F	0.0165
R-squared	0.9266
Adjusted R-squared	0.9086
Root MSE	2.4830