Rcode for probit estimation

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Rcode - Project

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1 Probit Estimation

1.1 Data and converting to Panel data

```
# Pakker
library(readxl)
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----------------------- tidyverse 2.0.0 --
## v dplyr     1.1.3     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.3     v tibble    3.2.1
## v lubridate 1.9.2     v tidyr     1.3.0
## 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 error
```

```
# Indlæs data fra Excel
short_term <- read_excel("/Users/lukasjespersen/Desktop/Kandidat/8.semester/Projekt/data/Yield_2.xlsx", 
long_term <- read_excel("/Users/lukasjespersen/Desktop/Kandidat/8.semester/Projekt/data/Yield_2.xlsx", s
gdp <- read_excel("/Users/lukasjespersen/Desktop/Kandidat/8.semester/Projekt/data/Yield_2.xlsx", sheet =
```

```
## New names:
## * `` -> `...31`
## * `` -> `...32`
## * `` -> `...33`
## * `` -> `...34`
```

```
mp_rate <- read_excel("/Users/lukasjespersen/Desktop/Kandidat/8.semester/Projekt/data/Yield_2.xlsx", she
cpi <- read_excel("/Users/lukasjespersen/Desktop/Kandidat/8.semester/Projekt/data/Yield_2.xlsx", sheet =


# Konverter wide til long format
short_term_long <- short_term %>%
  pivot_longer(-Time, names_to = "country", values_to = "rate_3m")

long_term_long <- long_term %>%
```

```
  pivot_longer(-Time, names_to = "country", values_to = "rate_10y")

gdp_long <- gdp %>%
  pivot_longer(-Time, names_to = "country", values_to = "gdp_growth")

mp_rate_long <- mp_rate %>%
  pivot_longer(-Time, names_to = "country", values_to = "mp_rate")

cpi_long <- cpi %>%
  pivot_longer(-Time, names_to = "country", values_to = "cpi")

# Merge de fem datasæt sammen
df <- short_term_long %>%
  left_join(long_term_long, by = c("Time", "country")) %>%
  left_join(gdp_long, by = c("Time", "country")) %>%
  left_join(mp_rate_long, by = c("Time", "country")) %>%
  left_join(cpi_long, by = c("Time", "country")) %>%
  rename(year = Time) %>%
  arrange(country, year) %>%
  mutate(term_spread = rate_10y - rate_3m,
      recession = ifelse(gdp_growth < 0 & lag(gdp_growth, default = 1) < 0, 1, 0))

# Se de første rækker
head(df)
```

```
## # A tibble: 6 x 9
##   year                country rate_3m rate_10y gdp_growth mp_rate   cpi
##   <dttm>              <chr>     <dbl>    <dbl>      <dbl>   <dbl> <dbl>
## 1 2000-01-01 00:00:00 Austria    3.54     5.70    0.00844     2.2  1.58
## 2 2000-04-01 00:00:00 Austria    4.26     5.56    1.23        2.8  2.11
## 3 2000-07-01 00:00:00 Austria    4.74     5.57    1.20        3.33 2.86
## 4 2000-10-01 00:00:00 Austria    5.02     5.39    0.747       3.74 2.83
## 5 2001-01-01 00:00:00 Austria    4.75     5.07   -0.215       3.75 2.78
## 6 2001-04-01 00:00:00 Austria    4.59     5.26   -0.229       3.61 3.08
## # i 2 more variables: term_spread <dbl>, recession <dbl>
```

1.2 The probit model estimation

```
# Load necessary libraries
library(dplyr)

# Konverter recession til en faktorvariabel (binær)
```

```r
df$recession <- as.factor(df$recession)

# Sorter data efter country og year
df <- df %>%
  arrange(country, year) %>%
  group_by(country) %>%
  mutate(term_spread_lag1 = lag(term_spread, 1)) %>% # Opret lagged variabel
  ungroup()

# Funktion til at estimere en probit-model for et enkelt land
run_probit <- function(df) {
  # Fjern rækker med NA i term_spread_lag4 (da de første 4 observationer for hvert land vil være NA)
  df <- df %>% filter(!is.na(term_spread_lag1))

  model <- glm(recession ~ term_spread + term_spread_lag1 + mp_rate,
               data = df,
               family = binomial(link = "probit"))
  return(summary(model))
}

# Anvend funktionen på hver gruppe af lande
results <- df %>%
  group_by(country) %>%
  group_split() %>%
  lapply(run_probit)

# Navngiv resultaterne efter land
names(results) <- unique(df$country)

# Udskriv resultaterne for hvert land
results
```

```
## $Austria
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)        -0.9136     0.3338  -2.737  0.00620 **
## term_spread         0.9036     0.4574   1.975  0.04821 *
## term_spread_lag1   -1.3076     0.4785  -2.733  0.00628 **
```

```
## mp_rate            0.1537     0.1222   1.258  0.20847
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 84.215  on 98  degrees of freedom
## Residual deviance: 68.259  on 95  degrees of freedom
## AIC: 76.259
##
## Number of Fisher Scoring iterations: 6
##
##
## $Belgium
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.75073    0.46277  -3.783 0.000155 ***
## term_spread       1.30769    0.53387   2.449 0.014307 *
## term_spread_lag1 -1.26884    0.54243  -2.339 0.019327 *
## mp_rate           0.01697    0.17158   0.099 0.921204
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 45.269  on 98  degrees of freedom
## Residual deviance: 37.886  on 95  degrees of freedom
## AIC: 45.886
##
## Number of Fisher Scoring iterations: 7
##
##
## $Bulgaria
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
```

```
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -3.19165    1.86021  -1.716   0.0862 .
## term_spread       0.03453    1.18265   0.029   0.9767
## term_spread_lag1  0.98720    1.30159   0.758   0.4482
## mp_rate          -2.71892    4.62385  -0.588   0.5565
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 29.528  on 60  degrees of freedom
## Residual deviance: 22.228  on 57  degrees of freedom
##   (1 observation deleted due to missingness)
## AIC: 30.228
##
## Number of Fisher Scoring iterations: 14
##
##
## $China
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                    Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -6.848e+00  4.902e+04       0        1
## term_spread       5.350e-15  1.783e+04       0        1
## term_spread_lag1 -3.251e-15  1.792e+04       0        1
## mp_rate           7.420e-15  1.217e+04       0        1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 0.0000e+00  on 42  degrees of freedom
## Residual deviance: 3.2173e-10  on 39  degrees of freedom
## AIC: 8
##
## Number of Fisher Scoring iterations: 24
##
##
## $Croatia
##
```

```
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.88459    0.56690  -3.324 0.000886 ***
## term_spread       0.10119    0.34379   0.294 0.768497
## term_spread_lag1  0.21933    0.31270   0.701 0.483052
## mp_rate           0.16500    0.08688   1.899 0.057549 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 47.532  on 50  degrees of freedom
## Residual deviance: 42.343  on 47  degrees of freedom
##   (6 observations deleted due to missingness)
## AIC: 50.343
##
## Number of Fisher Scoring iterations: 7
##
##
## $Cyprus
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                    Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -6.702e+00  3.338e+04       0        1
## term_spread      -9.447e-15  2.411e+04       0        1
## term_spread_lag1  3.801e-15  1.536e+04       0        1
## mp_rate          -4.910e-15  1.053e+04       0        1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 0.0000e+00  on 12  degrees of freedom
## Residual deviance: 2.6718e-10  on  9  degrees of freedom
## AIC: 8
##
## Number of Fisher Scoring iterations: 23
```

```
##
##
## $Czech
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -0.8924     0.6822  -1.308   0.1908
## term_spread        1.1064     0.5120   2.161   0.0307 *
## term_spread_lag1  -1.1889     0.5161  -2.304   0.0212 *
## mp_rate           -0.4526     0.2900  -1.561   0.1186
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 50.434  on 97  degrees of freedom
## Residual deviance: 38.145  on 94  degrees of freedom
## AIC: 46.145
##
## Number of Fisher Scoring iterations: 9
##
##
## $Denmark
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.21028    0.29218  -4.142 3.44e-05 ***
## term_spread       0.35033    0.46526   0.753   0.4515
## term_spread_lag1 -0.95538    0.47800  -1.999   0.0456 *
## mp_rate           0.03868    0.10356   0.373   0.7088
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
```

```
##     Null deviance: 60.318  on 98  degrees of freedom
## Residual deviance: 49.405  on 95  degrees of freedom
## AIC: 57.405
##
## Number of Fisher Scoring iterations: 7
##
##
## $Estonia
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)        -11.726  19949.573  -0.001    1.000
## term_spread        -38.328  42475.389  -0.001    0.999
## term_spread_lag1    43.896  44648.647   0.001    0.999
## mp_rate              3.104   5935.086   0.001    1.000
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 2.3035e+01  on 16  degrees of freedom
## Residual deviance: 4.2655e-10  on 13  degrees of freedom
## AIC: 8
##
## Number of Fisher Scoring iterations: 25
##
##
## $Finland
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -0.7400     0.2976  -2.486   0.0129 *
## term_spread        0.3910     0.4239   0.922   0.3563
## term_spread_lag1  -0.6093     0.4265  -1.429   0.1531
## mp_rate           -0.1669     0.1237  -1.349   0.1772
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 80.689  on 98  degrees of freedom
## Residual deviance: 76.924  on 95  degrees of freedom
## AIC: 84.924
##
## Number of Fisher Scoring iterations: 5
##
##
## $France
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -0.3950     0.5556  -0.711   0.4772
## term_spread        0.4298     0.6589   0.652   0.5142
## term_spread_lag1  -2.6470     1.1077  -2.390   0.0169 *
## mp_rate           -0.5564     0.3488  -1.595   0.1107
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 39.600  on 98  degrees of freedom
## Residual deviance: 23.801  on 95  degrees of freedom
## AIC: 31.801
##
## Number of Fisher Scoring iterations: 10
##
##
## $Germany
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -1.4476     0.3159  -4.582  4.6e-06 ***
```

```
## term_spread        0.9780     0.4599   2.127   0.0335 *
## term_spread_lag1  -0.9878     0.4604  -2.145   0.0319 *
## mp_rate            0.1671     0.1335   1.252   0.2107
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 69.069  on 98  degrees of freedom
## Residual deviance: 62.212  on 95  degrees of freedom
## AIC: 70.212
##
## Number of Fisher Scoring iterations: 5
##
##
## $Greece
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.70046    0.33936  -5.011 5.42e-07 ***
## term_spread       0.22170    0.11690   1.896   0.0579 .
## term_spread_lag1 -0.05213    0.10645  -0.490   0.6243
## mp_rate          -0.03636    0.15067  -0.241   0.8093
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 102.317  on 98  degrees of freedom
## Residual deviance:  70.436  on 95  degrees of freedom
## AIC: 78.436
##
## Number of Fisher Scoring iterations: 6
##
##
## $Hungary
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
```

```
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.67210    0.71497  -2.339   0.0194 *
## term_spread      -0.19509    0.20250  -0.963   0.3353
## term_spread_lag1  0.11633    0.17391   0.669   0.5036
## mp_rate           0.04107    0.11236   0.366   0.7147
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 60.318  on 98  degrees of freedom
## Residual deviance: 55.335  on 95  degrees of freedom
## AIC: 63.335
##
## Number of Fisher Scoring iterations: 6
##
##
## $Ireland
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -1.8673     0.4205  -4.441 8.95e-06 ***
## term_spread        0.4088     0.2696   1.516  0.12942
## term_spread_lag1  -0.3660     0.2857  -1.281  0.20019
## mp_rate            0.4174     0.1512   2.760  0.00579 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 73.128  on 98  degrees of freedom
## Residual deviance: 60.744  on 95  degrees of freedom
## AIC: 68.744
##
## Number of Fisher Scoring iterations: 7
##
```

```
##
## $Italy
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -2.2936     0.5288  -4.337 1.44e-05 ***
## term_spread        1.2756     0.3791   3.365 0.000765 ***
## term_spread_lag1  -0.7481     0.3478  -2.151 0.031457 *
## mp_rate            0.2741     0.1601   1.712 0.086889 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 99.632  on 98  degrees of freedom
## Residual deviance: 80.365  on 95  degrees of freedom
## AIC: 88.365
##
## Number of Fisher Scoring iterations: 6
##
##
## $Latvia
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.14458    0.60638  -0.238   0.8115
## term_spread      -0.23130    0.12523  -1.847   0.0648 .
## term_spread_lag1  0.07984    0.12057   0.662   0.5079
## mp_rate          -0.11959    0.12606  -0.949   0.3428
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 75.846  on 94  degrees of freedom
```

```
## Residual deviance: 67.455  on 91  degrees of freedom
## AIC: 75.455
##
## Number of Fisher Scoring iterations: 5
##
##
## $Lithuania
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.69486    0.37606  -4.507 6.58e-06 ***
## term_spread       0.55852    0.38288   1.459    0.145
## term_spread_lag1 -0.54077    0.38957  -1.388    0.165
## mp_rate          -0.02209    0.10270  -0.215    0.830
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 39.176  on 94  degrees of freedom
## Residual deviance: 32.472  on 91  degrees of freedom
## AIC: 40.472
##
## Number of Fisher Scoring iterations: 8
##
##
## $Luxembourg
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -1.4840     0.3590  -4.133 3.57e-05 ***
## term_spread        0.9544     0.4357   2.190   0.0285 *
## term_spread_lag1  -1.1570     0.4888  -2.367   0.0179 *
## mp_rate            0.1638     0.1404   1.167   0.2434
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 60.318  on 98  degrees of freedom
## Residual deviance: 51.596  on 95  degrees of freedom
## AIC: 59.596
##
## Number of Fisher Scoring iterations: 6
##
##
## $Malta
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -3.3361     1.3519  -2.468   0.0136 *
## term_spread       -0.6707     1.0392  -0.645   0.5187
## term_spread_lag1   1.0745     1.1311   0.950   0.3421
## mp_rate            0.3455     0.2513   1.375   0.1692
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 26.636  on 94  degrees of freedom
## Residual deviance: 23.258  on 91  degrees of freedom
## AIC: 31.258
##
## Number of Fisher Scoring iterations: 9
##
##
## $Netherlands
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept)      -0.98873    0.28521  -3.467 0.000527 ***
## term_spread       0.16173    0.41035   0.394 0.693484
## term_spread_lag1 -0.22391    0.40442  -0.554 0.579819
## mp_rate           0.01463    0.11643   0.126 0.900001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 84.215  on 98  degrees of freedom
## Residual deviance: 83.767  on 95  degrees of freedom
## AIC: 91.767
##
## Number of Fisher Scoring iterations: 5
##
##
## $Poland
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.22639    1.31125  -0.173    0.863
## term_spread      -0.04867    1.12672  -0.043    0.966
## term_spread_lag1 -1.28449    0.98211  -1.308    0.191
## mp_rate          -0.53463    0.35650  -1.500    0.134
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 19.4005  on 94  degrees of freedom
## Residual deviance:  9.8235  on 91  degrees of freedom
## AIC: 17.823
##
## Number of Fisher Scoring iterations: 10
##
##
## $Portugal
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
```

```
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -2.6018     0.4867  -5.345 9.03e-08 ***
## term_spread        0.7107     0.2762   2.573  0.01007 *
## term_spread_lag1  -0.3539     0.2493  -1.419  0.15582
## mp_rate            0.4642     0.1729   2.685  0.00725 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 84.215  on 98  degrees of freedom
## Residual deviance: 56.466  on 95  degrees of freedom
## AIC: 64.466
##
## Number of Fisher Scoring iterations: 6
##
##
## $Romania
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -1.2705     1.3121  -0.968    0.333
## term_spread        0.1589     0.4560   0.348    0.728
## term_spread_lag1  -0.1194     0.3985  -0.300    0.764
## mp_rate           -0.1440     0.1997  -0.721    0.471
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 25.432  on 77  degrees of freedom
## Residual deviance: 23.449  on 74  degrees of freedom
## AIC: 31.449
##
## Number of Fisher Scoring iterations: 8
##
##
## $Slovakia
##
```

```
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -30.4843  1022.0477  -0.030    0.976
## term_spread         1.8465     1.9360   0.954    0.340
## term_spread_lag1    0.3088     4.0016   0.077    0.938
## mp_rate           -55.9381  2044.0721  -0.027    0.978
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 19.4847  on 96  degrees of freedom
## Residual deviance:  5.8254  on 93  degrees of freedom
## AIC: 13.825
##
## Number of Fisher Scoring iterations: 25
##
##
## $Slovenia
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -1.887008   0.444858  -4.242 2.22e-05 ***
## term_spread       1.031187   0.379028   2.721  0.00652 **
## term_spread_lag1 -0.928967   0.414296  -2.242  0.02494 *
## mp_rate          -0.007516   0.191770  -0.039  0.96874
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 44.087  on 89  degrees of freedom
## Residual deviance: 35.148  on 86  degrees of freedom
## AIC: 43.148
##
## Number of Fisher Scoring iterations: 7
##
```

```
##
## $Spain
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -3.0467     0.6075  -5.015 5.31e-07 ***
## term_spread        1.4002     0.4531   3.090    0.002 **
## term_spread_lag1  -0.6346     0.3966  -1.600    0.110
## mp_rate            0.2446     0.2211   1.106    0.269
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 80.689  on 98  degrees of freedom
## Residual deviance: 45.822  on 95  degrees of freedom
## AIC: 53.822
##
## Number of Fisher Scoring iterations: 7
##
##
## $Sweden
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)        -9.567      4.671  -2.048   0.0405 *
## term_spread         3.738      1.703   2.195   0.0282 *
## term_spread_lag1   -3.909      1.720  -2.272   0.0231 *
## mp_rate             2.076      1.131   1.836   0.0664 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 33.507  on 98  degrees of freedom
```

```
## Residual deviance: 14.759  on 95  degrees of freedom
## AIC: 22.759
##
## Number of Fisher Scoring iterations: 12
##
##
## $USA
##
## Call:
## glm(formula = recession ~ term_spread + term_spread_lag1 + mp_rate,
##     family = binomial(link = "probit"), data = df)
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.03215    0.82477  -0.039   0.9689
## term_spread       1.20009    0.81677   1.469   0.1417
## term_spread_lag1 -2.23663    0.90517  -2.471   0.0135 *
## mp_rate          -1.20835    0.61053  -1.979   0.0478 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 33.507  on 98  degrees of freedom
## Residual deviance: 16.229  on 95  degrees of freedom
## AIC: 24.229
##
## Number of Fisher Scoring iterations: 11
```

2 Calculating predicted probability

```r
# Load necessary libraries
library(dplyr)

# Konverter recession til en faktorvariabel (binær)
df$recession <- as.factor(df$recession)

# Sorter data efter country og year
df <- df %>%
  arrange(country, year) %>%
  group_by(country) %>%
  mutate(term_spread_lag1 = lag(term_spread, 1)) %>% # Opret lagged variabel
  ungroup()

# Funktion til at estimere en probit-model for et enkelt land og udregne de predikerede sandsynligheder
run_probit <- function(df) {
  # Fjern rækker med NA i term_spread_lag1 (da de første observationer for hvert land vil være NA)
  df_filtered <- df %>% filter(!is.na(term_spread_lag1))

  # Estimer probit-modellen
  model <- glm(recession ~ term_spread + term_spread_lag1 + mp_rate,
               data = df_filtered,
               family = binomial(link = "probit"))

  # Beregn de predikerede sandsynligheder for det specifikke land
  df$predicted_prob <- predict(model, newdata = df, type = "response")

  # Runder de predikerede sandsynligheder til 4 decimaler
  df$predicted_prob <- round(df$predicted_prob, 4)

  # Opret en ny variabel "Predicted_Y", som angiver om modellen forudsiger recession
  df$Predicted_Y <- ifelse(df$predicted_prob > 0.3, 1, 0)

  return(df)
}

# Anvend funktionen på hver gruppe af lande og gem de predikerede sandsynligheder og den nye variabel
df_with_preds <- df %>%
  group_by(country) %>%
  group_split() %>%
  lapply(function(group_df) {
```

```
    run_probit(group_df)  # Kald run_probit for hvert land
  }) %>%
  bind_rows()  # Kombiner resultaterne til ét dataframe

# Se på de første rækker af resultatet
df_with_preds
```

```
## # A tibble: 2,900 x 12
##    year                country rate_3m rate_10y gdp_growth mp_rate   cpi
##    <dttm>              <chr>     <dbl>    <dbl>      <dbl>   <dbl> <dbl>
##  1 2000-01-01 00:00:00 Austria    3.54     5.70    0.00844    2.2   1.58
##  2 2000-04-01 00:00:00 Austria    4.26     5.56    1.23       2.8   2.11
##  3 2000-07-01 00:00:00 Austria    4.74     5.57    1.20       3.33  2.86
##  4 2000-10-01 00:00:00 Austria    5.02     5.39    0.747      3.74  2.83
##  5 2001-01-01 00:00:00 Austria    4.75     5.07   -0.215      3.75  2.78
##  6 2001-04-01 00:00:00 Austria    4.59     5.26   -0.229      3.61  3.08
##  7 2001-07-01 00:00:00 Austria    4.27     5.16    0.228      3.35  2.61
##  8 2001-10-01 00:00:00 Austria    3.44     4.84    0.401      2.46  2.14
##  9 2002-01-01 00:00:00 Austria    3.36     5.18    1.11       2.25  1.97
## 10 2002-04-01 00:00:00 Austria    3.45     5.31    0.0912     2.25  1.79
## # i 2,890 more rows
## # i 5 more variables: term_spread <dbl>, recession <fct>,
## #   term_spread_lag1 <dbl>, predicted_prob <dbl>, Predicted_Y <dbl>
```

2.1 Selecting variables to present

```
df_selected <- df_with_preds %>%
  select(year, country, recession, predicted_prob, Predicted_Y)

df_selected
```

```
## # A tibble: 2,900 x 5
##    year                country recession predicted_prob Predicted_Y
##    <dttm>              <chr>   <fct>              <dbl>       <dbl>
##  1 2000-01-01 00:00:00 Austria 0                 NA              NA
##  2 2000-04-01 00:00:00 Austria 0                  0.0161          0
##  3 2000-07-01 00:00:00 Austria 0                  0.0901          0
##  4 2000-10-01 00:00:00 Austria 0                  0.138           0
##  5 2001-01-01 00:00:00 Austria 0                  0.299           0
##  6 2001-04-01 00:00:00 Austria 1                  0.429           1
##  7 2001-07-01 00:00:00 Austria 0                  0.319           1
```

```
##  8 2001-10-01 00:00:00 Austria 0                 0.330            1
##  9 2002-01-01 00:00:00 Austria 0                 0.228            0
## 10 2002-04-01 00:00:00 Austria 0                 0.104            0
## # i 2,890 more rows
```

2.2 Comparisson of predicted recession and observed recession

All the data is shown here. In the project file you can see analysis of two countries.

```
options(tibble.print_max = Inf)

# Vælg de relevante kolonner
df_selected <- df_with_preds %>%
  select(year, country, recession, predicted_prob, Predicted_Y)

# Opdel dataene i separate tabeller baseret på country
results_by_country <- df_selected %>%
  group_by(country) %>%
  group_split()

# Navngiv tabellerne efter landene
names(results_by_country) <- unique(df_selected$country)

# Udskriv resultatet for et specifikt land, fx Danmark
results_by_country
```

```
## <list_of<
##   tbl_df<
##     year          : datetime<UTC>
##     country       : character
##     recession     : factor<8fa51>
##     predicted_prob: double
##     Predicted_Y   : double
##   >
## >[29]>
## $Austria
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Austria 0                NA               NA
##   2 2000-04-01 00:00:00 Austria 0                 0.0161           0
##   3 2000-07-01 00:00:00 Austria 0                 0.0901           0
##   4 2000-10-01 00:00:00 Austria 0                 0.138            0
```

```
##    5 2001-01-01 00:00:00 Austria 0                 0.299            0
##    6 2001-04-01 00:00:00 Austria 1                 0.429            1
##    7 2001-07-01 00:00:00 Austria 0                 0.319            1
##    8 2001-10-01 00:00:00 Austria 0                 0.330            1
##    9 2002-01-01 00:00:00 Austria 0                 0.228            0
##   10 2002-04-01 00:00:00 Austria 0                 0.104            0
##   11 2002-07-01 00:00:00 Austria 0                 0.0444           0
##   12 2002-10-01 00:00:00 Austria 0                 0.122            0
##   13 2003-01-01 00:00:00 Austria 0                 0.0993           0
##   14 2003-04-01 00:00:00 Austria 0                 0.129            0
##   15 2003-07-01 00:00:00 Austria 0                 0.168            0
##   16 2003-10-01 00:00:00 Austria 0                 0.0799           0
##   17 2004-01-01 00:00:00 Austria 0                 0.0391           0
##   18 2004-04-01 00:00:00 Austria 0                 0.0686           0
##   19 2004-07-01 00:00:00 Austria 0                 0.0323           0
##   20 2004-10-01 00:00:00 Austria 0                 0.0244           0
##   21 2005-01-01 00:00:00 Austria 0                 0.055            0
##   22 2005-04-01 00:00:00 Austria 0                 0.0617           0
##   23 2005-07-01 00:00:00 Austria 0                 0.0787           0
##   24 2005-10-01 00:00:00 Austria 0                 0.105            0
##   25 2006-01-01 00:00:00 Austria 0                 0.104            0
##   26 2006-04-01 00:00:00 Austria 0                 0.206            0
##   27 2006-07-01 00:00:00 Austria 0                 0.076            0
##   28 2006-10-01 00:00:00 Austria 0                 0.0976           0
##   29 2007-01-01 00:00:00 Austria 0                 0.278            0
##   30 2007-04-01 00:00:00 Austria 0                 0.313            1
##   31 2007-07-01 00:00:00 Austria 0                 0.175            0
##   32 2007-10-01 00:00:00 Austria 0                 0.233            0
##   33 2008-01-01 00:00:00 Austria 0                 0.422            1
##   34 2008-04-01 00:00:00 Austria 0                 0.363            1
##   35 2008-07-01 00:00:00 Austria 1                 0.357            1
##   36 2008-10-01 00:00:00 Austria 1                 0.493            1
##   37 2009-01-01 00:00:00 Austria 1                 0.896            1
##   38 2009-04-01 00:00:00 Austria 1                 0.144            0
##   39 2009-07-01 00:00:00 Austria 0                 0.0286           0
##   40 2009-10-01 00:00:00 Austria 0                 0.0156           0
##   41 2010-01-01 00:00:00 Austria 1                 0.0246           0
##   42 2010-04-01 00:00:00 Austria 0                 0.0075           0
##   43 2010-07-01 00:00:00 Austria 0                 0.0069           0
##   44 2010-10-01 00:00:00 Austria 0                 0.0517           0
##   45 2011-01-01 00:00:00 Austria 0                 0.0994           0
##   46 2011-04-01 00:00:00 Austria 0                 0.0136           0
##   47 2011-07-01 00:00:00 Austria 0                 0.0086           0
```

```
## 48 2011-10-01 00:00:00 Austria 0                0.123            0
## 49 2012-01-01 00:00:00 Austria 0                0.116            0
## 50 2012-04-01 00:00:00 Austria 0                0.0334           0
## 51 2012-07-01 00:00:00 Austria 0                0.0353           0
## 52 2012-10-01 00:00:00 Austria 0                0.0578           0
## 53 2013-01-01 00:00:00 Austria 1                0.054            0
## 54 2013-04-01 00:00:00 Austria 0                0.0501           0
## 55 2013-07-01 00:00:00 Austria 0                0.112            0
## 56 2013-10-01 00:00:00 Austria 0                0.0371           0
## 57 2014-01-01 00:00:00 Austria 0                0.03             0
## 58 2014-04-01 00:00:00 Austria 0                0.0303           0
## 59 2014-07-01 00:00:00 Austria 0                0.0453           0
## 60 2014-10-01 00:00:00 Austria 0                0.0484           0
## 61 2015-01-01 00:00:00 Austria 0                0.0417           0
## 62 2015-04-01 00:00:00 Austria 0                0.200            0
## 63 2015-07-01 00:00:00 Austria 0                0.177            0
## 64 2015-10-01 00:00:00 Austria 0                0.0719           0
## 65 2016-01-01 00:00:00 Austria 0                0.0696           0
## 66 2016-04-01 00:00:00 Austria 0                0.0771           0
## 67 2016-07-01 00:00:00 Austria 0                0.0828           0
## 68 2016-10-01 00:00:00 Austria 0                0.189            0
## 69 2017-01-01 00:00:00 Austria 0                0.133            0
## 70 2017-04-01 00:00:00 Austria 0                0.0871           0
## 71 2017-07-01 00:00:00 Austria 0                0.102            0
## 72 2017-10-01 00:00:00 Austria 0                0.0722           0
## 73 2018-01-01 00:00:00 Austria 0                0.132            0
## 74 2018-04-01 00:00:00 Austria 0                0.0736           0
## 75 2018-07-01 00:00:00 Austria 0                0.0638           0
## 76 2018-10-01 00:00:00 Austria 0                0.0857           0
## 77 2019-01-01 00:00:00 Austria 0                0.0643           0
## 78 2019-04-01 00:00:00 Austria 0                0.0702           0
## 79 2019-07-01 00:00:00 Austria 0                0.0641           0
## 80 2019-10-01 00:00:00 Austria 0                0.183            0
## 81 2020-01-01 00:00:00 Austria 1                0.127            0
## 82 2020-04-01 00:00:00 Austria 1                0.133            0
## 83 2020-07-01 00:00:00 Austria 0                0.129            0
## 84 2020-10-01 00:00:00 Austria 0                0.128            0
## 85 2021-01-01 00:00:00 Austria 1                0.197            0
## 86 2021-04-01 00:00:00 Austria 0                0.186            0
## 87 2021-07-01 00:00:00 Austria 0                0.0868           0
## 88 2021-10-01 00:00:00 Austria 0                0.160            0
## 89 2022-01-01 00:00:00 Austria 0                0.203            0
## 90 2022-04-01 00:00:00 Austria 0                0.304            1
```

```
##  91 2022-07-01 00:00:00 Austria 0                0.0143           0
##  92 2022-10-01 00:00:00 Austria 0                0.0432           0
##  93 2023-01-01 00:00:00 Austria 0                0.0577           0
##  94 2023-04-01 00:00:00 Austria 1                0.123            0
##  95 2023-07-01 00:00:00 Austria 1                0.327            1
##  96 2023-10-01 00:00:00 Austria 1                0.384            1
##  97 2024-01-01 00:00:00 Austria 0                0.423            1
##  98 2024-04-01 00:00:00 Austria 0                0.655            1
##  99 2024-07-01 00:00:00 Austria 1                0.509            1
## 100 2024-10-01 00:00:00 Austria 1                0.620            1
##
## $Belgium
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Belgium 0                NA               NA
##   2 2000-04-01 00:00:00 Belgium 0                0.0029           0
##   3 2000-07-01 00:00:00 Belgium 0                0.0125           0
##   4 2000-10-01 00:00:00 Belgium 0                0.0136           0
##   5 2001-01-01 00:00:00 Belgium 0                0.0416           0
##   6 2001-04-01 00:00:00 Belgium 0                0.106            0
##   7 2001-07-01 00:00:00 Belgium 0                0.086            0
##   8 2001-10-01 00:00:00 Belgium 1                0.148            0
##   9 2002-01-01 00:00:00 Belgium 0                0.132            0
##  10 2002-04-01 00:00:00 Belgium 0                0.057            0
##  11 2002-07-01 00:00:00 Belgium 0                0.0147           0
##  12 2002-10-01 00:00:00 Belgium 0                0.0494           0
##  13 2003-01-01 00:00:00 Belgium 0                0.0505           0
##  14 2003-04-01 00:00:00 Belgium 0                0.0676           0
##  15 2003-07-01 00:00:00 Belgium 0                0.127            0
##  16 2003-10-01 00:00:00 Belgium 0                0.0791           0
##  17 2004-01-01 00:00:00 Belgium 0                0.0388           0
##  18 2004-04-01 00:00:00 Belgium 0                0.0742           0
##  19 2004-07-01 00:00:00 Belgium 0                0.0285           0
##  20 2004-10-01 00:00:00 Belgium 0                0.0135           0
##  21 2005-01-01 00:00:00 Belgium 0                0.0296           0
##  22 2005-04-01 00:00:00 Belgium 0                0.0268           0
##  23 2005-07-01 00:00:00 Belgium 0                0.0271           0
##  24 2005-10-01 00:00:00 Belgium 0                0.0375           0
##  25 2006-01-01 00:00:00 Belgium 0                0.0321           0
##  26 2006-04-01 00:00:00 Belgium 0                0.0747           0
##  27 2006-07-01 00:00:00 Belgium 0                0.0131           0
##  28 2006-10-01 00:00:00 Belgium 0                0.0101           0
```

```
## 29 2007-01-01 00:00:00 Belgium 0                0.0486           0
## 30 2007-04-01 00:00:00 Belgium 0                0.0583           0
## 31 2007-07-01 00:00:00 Belgium 0                0.0159           0
## 32 2007-10-01 00:00:00 Belgium 0                0.0161           0
## 33 2008-01-01 00:00:00 Belgium 0                0.0585           0
## 34 2008-04-01 00:00:00 Belgium 0                0.0387           0
## 35 2008-07-01 00:00:00 Belgium 0                0.0402           0
## 36 2008-10-01 00:00:00 Belgium 1                0.0929           0
## 37 2009-01-01 00:00:00 Belgium 1                0.857            1
## 38 2009-04-01 00:00:00 Belgium 0                0.188            0
## 39 2009-07-01 00:00:00 Belgium 0                0.0876           0
## 40 2009-10-01 00:00:00 Belgium 0                0.0496           0
## 41 2010-01-01 00:00:00 Belgium 0                0.0699           0
## 42 2010-04-01 00:00:00 Belgium 0                0.0225           0
## 43 2010-07-01 00:00:00 Belgium 0                0.0116           0
## 44 2010-10-01 00:00:00 Belgium 0                0.0954           0
## 45 2011-01-01 00:00:00 Belgium 0                0.178            0
## 46 2011-04-01 00:00:00 Belgium 0                0.0225           0
## 47 2011-07-01 00:00:00 Belgium 0                0.022            0
## 48 2011-10-01 00:00:00 Belgium 0                0.149            0
## 49 2012-01-01 00:00:00 Belgium 0                0.0266           0
## 50 2012-04-01 00:00:00 Belgium 1                0.038            0
## 51 2012-07-01 00:00:00 Belgium 0                0.016            0
## 52 2012-10-01 00:00:00 Belgium 0                0.0294           0
## 53 2013-01-01 00:00:00 Belgium 1                0.0539           0
## 54 2013-04-01 00:00:00 Belgium 0                0.0307           0
## 55 2013-07-01 00:00:00 Belgium 0                0.139            0
## 56 2013-10-01 00:00:00 Belgium 0                0.0283           0
## 57 2014-01-01 00:00:00 Belgium 0                0.0307           0
## 58 2014-04-01 00:00:00 Belgium 0                0.0151           0
## 59 2014-07-01 00:00:00 Belgium 0                0.0126           0
## 60 2014-10-01 00:00:00 Belgium 0                0.018            0
## 61 2015-01-01 00:00:00 Belgium 0                0.0125           0
## 62 2015-04-01 00:00:00 Belgium 0                0.0831           0
## 63 2015-07-01 00:00:00 Belgium 0                0.0805           0
## 64 2015-10-01 00:00:00 Belgium 0                0.0297           0
## 65 2016-01-01 00:00:00 Belgium 0                0.0394           0
## 66 2016-04-01 00:00:00 Belgium 0                0.0274           0
## 67 2016-07-01 00:00:00 Belgium 0                0.0174           0
## 68 2016-10-01 00:00:00 Belgium 0                0.0935           0
## 69 2017-01-01 00:00:00 Belgium 0                0.101            0
## 70 2017-04-01 00:00:00 Belgium 0                0.0338           0
## 71 2017-07-01 00:00:00 Belgium 0                0.0467           0
```

```
##  72 2017-10-01 00:00:00 Belgium 0                0.0276          0
##  73 2018-01-01 00:00:00 Belgium 0                0.0808          0
##  74 2018-04-01 00:00:00 Belgium 0                0.0389          0
##  75 2018-07-01 00:00:00 Belgium 0                0.033           0
##  76 2018-10-01 00:00:00 Belgium 0                0.0533          0
##  77 2019-01-01 00:00:00 Belgium 0                0.0286          0
##  78 2019-04-01 00:00:00 Belgium 0                0.0165          0
##  79 2019-07-01 00:00:00 Belgium 0                0.0106          0
##  80 2019-10-01 00:00:00 Belgium 0                0.055           0
##  81 2020-01-01 00:00:00 Belgium 0                0.0411          0
##  82 2020-04-01 00:00:00 Belgium 1                0.0406          0
##  83 2020-07-01 00:00:00 Belgium 0                0.0316          0
##  84 2020-10-01 00:00:00 Belgium 0                0.0293          0
##  85 2021-01-01 00:00:00 Belgium 0                0.0656          0
##  86 2021-04-01 00:00:00 Belgium 0                0.091           0
##  87 2021-07-01 00:00:00 Belgium 0                0.0259          0
##  88 2021-10-01 00:00:00 Belgium 0                0.063           0
##  89 2022-01-01 00:00:00 Belgium 0                0.119           0
##  90 2022-04-01 00:00:00 Belgium 0                0.318           1
##  91 2022-07-01 00:00:00 Belgium 0                0.0093          0
##  92 2022-10-01 00:00:00 Belgium 0                0.0085          0
##  93 2023-01-01 00:00:00 Belgium 0                0.0056          0
##  94 2023-04-01 00:00:00 Belgium 0                0.0066          0
##  95 2023-07-01 00:00:00 Belgium 0                0.0217          0
##  96 2023-10-01 00:00:00 Belgium 0                0.0207          0
##  97 2024-01-01 00:00:00 Belgium 0                0.0222          0
##  98 2024-04-01 00:00:00 Belgium 0                0.0891          0
##  99 2024-07-01 00:00:00 Belgium 0                0.0539          0
## 100 2024-10-01 00:00:00 Belgium 0                0.149           0
##
## $Bulgaria
## # A tibble: 100 x 5
##     year                country  recession predicted_prob Predicted_Y
##     <dttm>              <chr>    <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Bulgaria 0                 NA              NA
##   2 2000-04-01 00:00:00 Bulgaria 0                 NA              NA
##   3 2000-07-01 00:00:00 Bulgaria 0                 NA              NA
##   4 2000-10-01 00:00:00 Bulgaria 0                 NA              NA
##   5 2001-01-01 00:00:00 Bulgaria 0                 NA              NA
##   6 2001-04-01 00:00:00 Bulgaria 0                 NA              NA
##   7 2001-07-01 00:00:00 Bulgaria 0                 NA              NA
##   8 2001-10-01 00:00:00 Bulgaria 0                 NA              NA
##   9 2002-01-01 00:00:00 Bulgaria 0                 NA              NA
```

```
## 10 2002-04-01 00:00:00 Bulgaria 0          NA         NA
## 11 2002-07-01 00:00:00 Bulgaria 0          NA         NA
## 12 2002-10-01 00:00:00 Bulgaria 0          NA         NA
## 13 2003-01-01 00:00:00 Bulgaria 0          NA         NA
## 14 2003-04-01 00:00:00 Bulgaria 0           0          0
## 15 2003-07-01 00:00:00 Bulgaria 0           0          0
## 16 2003-10-01 00:00:00 Bulgaria 0           0          0
## 17 2004-01-01 00:00:00 Bulgaria 0           0          0
## 18 2004-04-01 00:00:00 Bulgaria 0           0          0
## 19 2004-07-01 00:00:00 Bulgaria 0           0          0
## 20 2004-10-01 00:00:00 Bulgaria 0           0          0
## 21 2005-01-01 00:00:00 Bulgaria 0           0          0
## 22 2005-04-01 00:00:00 Bulgaria 0           0          0
## 23 2005-07-01 00:00:00 Bulgaria 0           0          0
## 24 2005-10-01 00:00:00 Bulgaria 0           0          0
## 25 2006-01-01 00:00:00 Bulgaria 0           0          0
## 26 2006-04-01 00:00:00 Bulgaria 0           0          0
## 27 2006-07-01 00:00:00 Bulgaria 0           0          0
## 28 2006-10-01 00:00:00 Bulgaria 0           0          0
## 29 2007-01-01 00:00:00 Bulgaria 0           0          0
## 30 2007-04-01 00:00:00 Bulgaria 0           0          0
## 31 2007-07-01 00:00:00 Bulgaria 0           0          0
## 32 2007-10-01 00:00:00 Bulgaria 0           0          0
## 33 2008-01-01 00:00:00 Bulgaria 0           0          0
## 34 2008-04-01 00:00:00 Bulgaria 0           0          0
## 35 2008-07-01 00:00:00 Bulgaria 0           0          0
## 36 2008-10-01 00:00:00 Bulgaria 0           0          0
## 37 2009-01-01 00:00:00 Bulgaria 0           0          0
## 38 2009-04-01 00:00:00 Bulgaria 0           0          0
## 39 2009-07-01 00:00:00 Bulgaria 0           0          0
## 40 2009-10-01 00:00:00 Bulgaria 0           0.0005     0
## 41 2010-01-01 00:00:00 Bulgaria 0           0.0268     0
## 42 2010-04-01 00:00:00 Bulgaria 0           0.0374     0
## 43 2010-07-01 00:00:00 Bulgaria 0           0.0427     0
## 44 2010-10-01 00:00:00 Bulgaria 0           0.0476     0
## 45 2011-01-01 00:00:00 Bulgaria 0           0.0318     0
## 46 2011-04-01 00:00:00 Bulgaria 0           0.0161     0
## 47 2011-07-01 00:00:00 Bulgaria 0           0.021      0
## 48 2011-10-01 00:00:00 Bulgaria 0           0.0166     0
## 49 2012-01-01 00:00:00 Bulgaria 0           0.0209     0
## 50 2012-04-01 00:00:00 Bulgaria 0           0.0748     0
## 51 2012-07-01 00:00:00 Bulgaria 1           0.190      0
## 52 2012-10-01 00:00:00 Bulgaria 1           0.229      0
```

```
##   53 2013-01-01 00:00:00 Bulgaria 1                 0.096             0
##   54 2013-04-01 00:00:00 Bulgaria 1                 0.142             0
##   55 2013-07-01 00:00:00 Bulgaria 0                 0.161             0
##   56 2013-10-01 00:00:00 Bulgaria 0                 0.222             0
##   57 2014-01-01 00:00:00 Bulgaria 0                 0.268             0
##   58 2014-04-01 00:00:00 Bulgaria 0                 0.273             0
##   59 2014-07-01 00:00:00 Bulgaria 0                 0.208             0
##   60 2014-10-01 00:00:00 Bulgaria 0                 0.282             0
##   61 2015-01-01 00:00:00 Bulgaria 0                 0.269             0
##   62 2015-04-01 00:00:00 Bulgaria 0                 0.125             0
##   63 2015-07-01 00:00:00 Bulgaria 0                 0.0842            0
##   64 2015-10-01 00:00:00 Bulgaria 0                 0.0923            0
##   65 2016-01-01 00:00:00 Bulgaria 0                 0.149             0
##   66 2016-04-01 00:00:00 Bulgaria 0                 0.224             0
##   67 2016-07-01 00:00:00 Bulgaria 0                 0.190             0
##   68 2016-10-01 00:00:00 Bulgaria 0                 0.152             0
##   69 2017-01-01 00:00:00 Bulgaria 0                 0.0708            0
##   70 2017-04-01 00:00:00 Bulgaria 0                 0.0639            0
##   71 2017-07-01 00:00:00 Bulgaria 0                 0.0632            0
##   72 2017-10-01 00:00:00 Bulgaria 0                 0.0548            0
##   73 2018-01-01 00:00:00 Bulgaria 0                 0.024             0
##   74 2018-04-01 00:00:00 Bulgaria 0                 0.014             0
##   75 2018-07-01 00:00:00 Bulgaria 0                NA                NA
##   76 2018-10-01 00:00:00 Bulgaria 0                NA                NA
##   77 2019-01-01 00:00:00 Bulgaria 0                NA                NA
##   78 2019-04-01 00:00:00 Bulgaria 0                NA                NA
##   79 2019-07-01 00:00:00 Bulgaria 0                NA                NA
##   80 2019-10-01 00:00:00 Bulgaria 0                NA                NA
##   81 2020-01-01 00:00:00 Bulgaria 0                NA                NA
##   82 2020-04-01 00:00:00 Bulgaria 1                NA                NA
##   83 2020-07-01 00:00:00 Bulgaria 0                NA                NA
##   84 2020-10-01 00:00:00 Bulgaria 0                NA                NA
##   85 2021-01-01 00:00:00 Bulgaria 0                NA                NA
##   86 2021-04-01 00:00:00 Bulgaria 0                NA                NA
##   87 2021-07-01 00:00:00 Bulgaria 0                NA                NA
##   88 2021-10-01 00:00:00 Bulgaria 0                NA                NA
##   89 2022-01-01 00:00:00 Bulgaria 0                NA                NA
##   90 2022-04-01 00:00:00 Bulgaria 0                NA                NA
##   91 2022-07-01 00:00:00 Bulgaria 0                NA                NA
##   92 2022-10-01 00:00:00 Bulgaria 0                NA                NA
##   93 2023-01-01 00:00:00 Bulgaria 0                NA                NA
##   94 2023-04-01 00:00:00 Bulgaria 0                NA                NA
##   95 2023-07-01 00:00:00 Bulgaria 0                NA                NA
```

```
##  96 2023-10-01 00:00:00 Bulgaria 0                NA               NA
##  97 2024-01-01 00:00:00 Bulgaria 0                NA               NA
##  98 2024-04-01 00:00:00 Bulgaria 0                NA               NA
##  99 2024-07-01 00:00:00 Bulgaria 0                NA               NA
## 100 2024-10-01 00:00:00 Bulgaria 0                NA               NA
##
## $China
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 China   0                     NA          NA
##   2 2000-04-01 00:00:00 China   <NA>                  NA          NA
##   3 2000-07-01 00:00:00 China   <NA>                  NA          NA
##   4 2000-10-01 00:00:00 China   <NA>                  NA          NA
##   5 2001-01-01 00:00:00 China   <NA>                  NA          NA
##   6 2001-04-01 00:00:00 China   <NA>                  NA          NA
##   7 2001-07-01 00:00:00 China   <NA>                  NA          NA
##   8 2001-10-01 00:00:00 China   <NA>                  NA          NA
##   9 2002-01-01 00:00:00 China   <NA>                  NA          NA
##  10 2002-04-01 00:00:00 China   <NA>                  NA          NA
##  11 2002-07-01 00:00:00 China   <NA>                  NA          NA
##  12 2002-10-01 00:00:00 China   <NA>                  NA          NA
##  13 2003-01-01 00:00:00 China   <NA>                  NA          NA
##  14 2003-04-01 00:00:00 China   <NA>                  NA          NA
##  15 2003-07-01 00:00:00 China   <NA>                  NA          NA
##  16 2003-10-01 00:00:00 China   <NA>                  NA          NA
##  17 2004-01-01 00:00:00 China   <NA>                  NA          NA
##  18 2004-04-01 00:00:00 China   <NA>                  NA          NA
##  19 2004-07-01 00:00:00 China   <NA>                  NA          NA
##  20 2004-10-01 00:00:00 China   <NA>                  NA          NA
##  21 2005-01-01 00:00:00 China   <NA>                  NA          NA
##  22 2005-04-01 00:00:00 China   <NA>                  NA          NA
##  23 2005-07-01 00:00:00 China   <NA>                  NA          NA
##  24 2005-10-01 00:00:00 China   <NA>                  NA          NA
##  25 2006-01-01 00:00:00 China   <NA>                  NA          NA
##  26 2006-04-01 00:00:00 China   <NA>                  NA          NA
##  27 2006-07-01 00:00:00 China   <NA>                  NA          NA
##  28 2006-10-01 00:00:00 China   <NA>                  NA          NA
##  29 2007-01-01 00:00:00 China   <NA>                  NA          NA
##  30 2007-04-01 00:00:00 China   <NA>                  NA          NA
##  31 2007-07-01 00:00:00 China   <NA>                  NA          NA
##  32 2007-10-01 00:00:00 China   <NA>                  NA          NA
##  33 2008-01-01 00:00:00 China   <NA>                  NA          NA
```

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## 34 2008-04-01 00:00:00 China <NA>                 NA          NA
## 35 2008-07-01 00:00:00 China <NA>                 NA          NA
## 36 2008-10-01 00:00:00 China <NA>                 NA          NA
## 37 2009-01-01 00:00:00 China <NA>                 NA          NA
## 38 2009-04-01 00:00:00 China <NA>                 NA          NA
## 39 2009-07-01 00:00:00 China <NA>                 NA          NA
## 40 2009-10-01 00:00:00 China <NA>                 NA          NA
## 41 2010-01-01 00:00:00 China <NA>                 NA          NA
## 42 2010-04-01 00:00:00 China <NA>                 NA          NA
## 43 2010-07-01 00:00:00 China <NA>                 NA          NA
## 44 2010-10-01 00:00:00 China <NA>                 NA          NA
## 45 2011-01-01 00:00:00 China 0                    NA          NA
## 46 2011-04-01 00:00:00 China 0                    NA          NA
## 47 2011-07-01 00:00:00 China 0                    NA          NA
## 48 2011-10-01 00:00:00 China 0                    NA          NA
## 49 2012-01-01 00:00:00 China 0                    NA          NA
## 50 2012-04-01 00:00:00 China 0                    NA          NA
## 51 2012-07-01 00:00:00 China 0                    NA          NA
## 52 2012-10-01 00:00:00 China 0                    NA          NA
## 53 2013-01-01 00:00:00 China 0                    NA          NA
## 54 2013-04-01 00:00:00 China 0                    NA          NA
## 55 2013-07-01 00:00:00 China 0                    NA          NA
## 56 2013-10-01 00:00:00 China 0                    NA          NA
## 57 2014-01-01 00:00:00 China 0                    NA          NA
## 58 2014-04-01 00:00:00 China 0                     0           0
## 59 2014-07-01 00:00:00 China 0                     0           0
## 60 2014-10-01 00:00:00 China 0                     0           0
## 61 2015-01-01 00:00:00 China 0                     0           0
## 62 2015-04-01 00:00:00 China 0                     0           0
## 63 2015-07-01 00:00:00 China 0                     0           0
## 64 2015-10-01 00:00:00 China 0                     0           0
## 65 2016-01-01 00:00:00 China 0                     0           0
## 66 2016-04-01 00:00:00 China 0                     0           0
## 67 2016-07-01 00:00:00 China 0                     0           0
## 68 2016-10-01 00:00:00 China 0                     0           0
## 69 2017-01-01 00:00:00 China 0                     0           0
## 70 2017-04-01 00:00:00 China 0                     0           0
## 71 2017-07-01 00:00:00 China 0                     0           0
## 72 2017-10-01 00:00:00 China 0                     0           0
## 73 2018-01-01 00:00:00 China 0                     0           0
## 74 2018-04-01 00:00:00 China 0                     0           0
## 75 2018-07-01 00:00:00 China 0                     0           0
## 76 2018-10-01 00:00:00 China 0                     0           0
```

```
##  77 2019-01-01 00:00:00 China   0                       0           0
##  78 2019-04-01 00:00:00 China   0                       0           0
##  79 2019-07-01 00:00:00 China   0                       0           0
##  80 2019-10-01 00:00:00 China   0                       0           0
##  81 2020-01-01 00:00:00 China   0                       0           0
##  82 2020-04-01 00:00:00 China   0                       0           0
##  83 2020-07-01 00:00:00 China   0                       0           0
##  84 2020-10-01 00:00:00 China   0                       0           0
##  85 2021-01-01 00:00:00 China   0                       0           0
##  86 2021-04-01 00:00:00 China   0                       0           0
##  87 2021-07-01 00:00:00 China   0                       0           0
##  88 2021-10-01 00:00:00 China   0                       0           0
##  89 2022-01-01 00:00:00 China   0                       0           0
##  90 2022-04-01 00:00:00 China   0                       0           0
##  91 2022-07-01 00:00:00 China   0                       0           0
##  92 2022-10-01 00:00:00 China   0                       0           0
##  93 2023-01-01 00:00:00 China   0                       0           0
##  94 2023-04-01 00:00:00 China   0                       0           0
##  95 2023-07-01 00:00:00 China   0                       0           0
##  96 2023-10-01 00:00:00 China   0                       0           0
##  97 2024-01-01 00:00:00 China   0                       0           0
##  98 2024-04-01 00:00:00 China   0                       0           0
##  99 2024-07-01 00:00:00 China   0                       0           0
## 100 2024-10-01 00:00:00 China   0                       0           0
##
## $Croatia
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Croatia 0                     NA          NA
##   2 2000-04-01 00:00:00 Croatia 0                     NA          NA
##   3 2000-07-01 00:00:00 Croatia 0                     NA          NA
##   4 2000-10-01 00:00:00 Croatia 0                     NA          NA
##   5 2001-01-01 00:00:00 Croatia 0                     NA          NA
##   6 2001-04-01 00:00:00 Croatia 0                     NA          NA
##   7 2001-07-01 00:00:00 Croatia 0                     NA          NA
##   8 2001-10-01 00:00:00 Croatia 0                     NA          NA
##   9 2002-01-01 00:00:00 Croatia 0                     NA          NA
##  10 2002-04-01 00:00:00 Croatia 0                     NA          NA
##  11 2002-07-01 00:00:00 Croatia 0                     NA          NA
##  12 2002-10-01 00:00:00 Croatia 0                     NA          NA
##  13 2003-01-01 00:00:00 Croatia 0                     NA          NA
##  14 2003-04-01 00:00:00 Croatia 0                     NA          NA
```

```
## 15 2003-07-01 00:00:00 Croatia 0             NA              NA
## 16 2003-10-01 00:00:00 Croatia 0             NA              NA
## 17 2004-01-01 00:00:00 Croatia 0             NA              NA
## 18 2004-04-01 00:00:00 Croatia 0             NA              NA
## 19 2004-07-01 00:00:00 Croatia 0             NA              NA
## 20 2004-10-01 00:00:00 Croatia 0             NA              NA
## 21 2005-01-01 00:00:00 Croatia 0             NA              NA
## 22 2005-04-01 00:00:00 Croatia 0             NA              NA
## 23 2005-07-01 00:00:00 Croatia 0             NA              NA
## 24 2005-10-01 00:00:00 Croatia 0             NA              NA
## 25 2006-01-01 00:00:00 Croatia 0              0.0249          0
## 26 2006-04-01 00:00:00 Croatia 0              0.0529          0
## 27 2006-07-01 00:00:00 Croatia 0              0.0748          0
## 28 2006-10-01 00:00:00 Croatia 0              0.101           0
## 29 2007-01-01 00:00:00 Croatia 0              0.186           0
## 30 2007-04-01 00:00:00 Croatia 0              0.186           0
## 31 2007-07-01 00:00:00 Croatia 0              0.252           0
## 32 2007-10-01 00:00:00 Croatia 0              0.058           0
## 33 2008-01-01 00:00:00 Croatia 0              0.0324          0
## 34 2008-04-01 00:00:00 Croatia 0              0.089           0
## 35 2008-07-01 00:00:00 Croatia 0              0.495           1
## 36 2008-10-01 00:00:00 Croatia 1              0.809           1
## 37 2009-01-01 00:00:00 Croatia 1              0.0549          0
## 38 2009-04-01 00:00:00 Croatia 0              0.0434          0
## 39 2009-07-01 00:00:00 Croatia 0              0.0158          0
## 40 2009-10-01 00:00:00 Croatia 0              0.0284          0
## 41 2010-01-01 00:00:00 Croatia 0              0.128           0
## 42 2010-04-01 00:00:00 Croatia 1              0.308           1
## 43 2010-07-01 00:00:00 Croatia 0              0.305           1
## 44 2010-10-01 00:00:00 Croatia 0              0.290           0
## 45 2011-01-01 00:00:00 Croatia 1              0.283           0
## 46 2011-04-01 00:00:00 Croatia 0              0.314           1
## 47 2011-07-01 00:00:00 Croatia 0              0.335           1
## 48 2011-10-01 00:00:00 Croatia 1              0.226           0
## 49 2012-01-01 00:00:00 Croatia 1              0.128           0
## 50 2012-04-01 00:00:00 Croatia 1              0.179           0
## 51 2012-07-01 00:00:00 Croatia 0              0.229           0
## 52 2012-10-01 00:00:00 Croatia 0              0.165           0
## 53 2013-01-01 00:00:00 Croatia 0              0.159           0
## 54 2013-04-01 00:00:00 Croatia 0              0.194           0
## 55 2013-07-01 00:00:00 Croatia 0              0.198           0
## 56 2013-10-01 00:00:00 Croatia 1              0.213           0
## 57 2014-01-01 00:00:00 Croatia 1              0.259           0
```

```
##  58 2014-04-01 00:00:00 Croatia 0                0.264           0
##  59 2014-07-01 00:00:00 Croatia 0                0.206           0
##  60 2014-10-01 00:00:00 Croatia 0                0.164           0
##  61 2015-01-01 00:00:00 Croatia 0                0.133           0
##  62 2015-04-01 00:00:00 Croatia 0                0.134           0
##  63 2015-07-01 00:00:00 Croatia 0                0.142           0
##  64 2015-10-01 00:00:00 Croatia 0                0.160           0
##  65 2016-01-01 00:00:00 Croatia 0                0.147           0
##  66 2016-04-01 00:00:00 Croatia 0                0.172           0
##  67 2016-07-01 00:00:00 Croatia 0                0.173           0
##  68 2016-10-01 00:00:00 Croatia 0                0.142           0
##  69 2017-01-01 00:00:00 Croatia 0                0.124           0
##  70 2017-04-01 00:00:00 Croatia 0                0.135           0
##  71 2017-07-01 00:00:00 Croatia 0                0.129           0
##  72 2017-10-01 00:00:00 Croatia 0                0.118           0
##  73 2018-01-01 00:00:00 Croatia 0                0.111           0
##  74 2018-04-01 00:00:00 Croatia 0                0.0919          0
##  75 2018-07-01 00:00:00 Croatia 0               NA              NA
##  76 2018-10-01 00:00:00 Croatia 0               NA              NA
##  77 2019-01-01 00:00:00 Croatia 0               NA              NA
##  78 2019-04-01 00:00:00 Croatia 0                0.0806          0
##  79 2019-07-01 00:00:00 Croatia 0               NA              NA
##  80 2019-10-01 00:00:00 Croatia 1               NA              NA
##  81 2020-01-01 00:00:00 Croatia 1               NA              NA
##  82 2020-04-01 00:00:00 Croatia 1               NA              NA
##  83 2020-07-01 00:00:00 Croatia 0               NA              NA
##  84 2020-10-01 00:00:00 Croatia 0               NA              NA
##  85 2021-01-01 00:00:00 Croatia 0               NA              NA
##  86 2021-04-01 00:00:00 Croatia 0               NA              NA
##  87 2021-07-01 00:00:00 Croatia 0               NA              NA
##  88 2021-10-01 00:00:00 Croatia 0               NA              NA
##  89 2022-01-01 00:00:00 Croatia 0               NA              NA
##  90 2022-04-01 00:00:00 Croatia 0               NA              NA
##  91 2022-07-01 00:00:00 Croatia 0               NA              NA
##  92 2022-10-01 00:00:00 Croatia 0               NA              NA
##  93 2023-01-01 00:00:00 Croatia 0               NA              NA
##  94 2023-04-01 00:00:00 Croatia 0               NA              NA
##  95 2023-07-01 00:00:00 Croatia 0               NA              NA
##  96 2023-10-01 00:00:00 Croatia 0               NA              NA
##  97 2024-01-01 00:00:00 Croatia 0               NA              NA
##  98 2024-04-01 00:00:00 Croatia 0               NA              NA
##  99 2024-07-01 00:00:00 Croatia 0               NA              NA
## 100 2024-10-01 00:00:00 Croatia 0               NA              NA
```

```
##
## $Cyprus
## # A tibble: 100 x 5
##    year                country recession predicted_prob Predicted_Y
##    <dttm>              <chr>   <fct>              <dbl>       <dbl>
##  1 2000-01-01 00:00:00 Cyprus  0                     NA          NA
##  2 2000-04-01 00:00:00 Cyprus  0                     NA          NA
##  3 2000-07-01 00:00:00 Cyprus  0                     NA          NA
##  4 2000-10-01 00:00:00 Cyprus  0                     NA          NA
##  5 2001-01-01 00:00:00 Cyprus  0                     NA          NA
##  6 2001-04-01 00:00:00 Cyprus  0                     NA          NA
##  7 2001-07-01 00:00:00 Cyprus  0                     NA          NA
##  8 2001-10-01 00:00:00 Cyprus  0                     NA          NA
##  9 2002-01-01 00:00:00 Cyprus  0                     NA          NA
## 10 2002-04-01 00:00:00 Cyprus  0                     NA          NA
## 11 2002-07-01 00:00:00 Cyprus  0                     NA          NA
## 12 2002-10-01 00:00:00 Cyprus  0                     NA          NA
## 13 2003-01-01 00:00:00 Cyprus  0                     NA          NA
## 14 2003-04-01 00:00:00 Cyprus  1                     NA          NA
## 15 2003-07-01 00:00:00 Cyprus  0                     NA          NA
## 16 2003-10-01 00:00:00 Cyprus  0                     NA          NA
## 17 2004-01-01 00:00:00 Cyprus  0                     NA          NA
## 18 2004-04-01 00:00:00 Cyprus  0                     NA          NA
## 19 2004-07-01 00:00:00 Cyprus  0                     NA          NA
## 20 2004-10-01 00:00:00 Cyprus  0                     NA          NA
## 21 2005-01-01 00:00:00 Cyprus  0                     NA          NA
## 22 2005-04-01 00:00:00 Cyprus  0                     NA          NA
## 23 2005-07-01 00:00:00 Cyprus  0                     NA          NA
## 24 2005-10-01 00:00:00 Cyprus  0                     NA          NA
## 25 2006-01-01 00:00:00 Cyprus  0                     NA          NA
## 26 2006-04-01 00:00:00 Cyprus  0                     NA          NA
## 27 2006-07-01 00:00:00 Cyprus  0                     NA          NA
## 28 2006-10-01 00:00:00 Cyprus  0                     NA          NA
## 29 2007-01-01 00:00:00 Cyprus  0                     NA          NA
## 30 2007-04-01 00:00:00 Cyprus  0                     NA          NA
## 31 2007-07-01 00:00:00 Cyprus  0                     NA          NA
## 32 2007-10-01 00:00:00 Cyprus  0                     NA          NA
## 33 2008-01-01 00:00:00 Cyprus  0                     NA          NA
## 34 2008-04-01 00:00:00 Cyprus  0                     NA          NA
## 35 2008-07-01 00:00:00 Cyprus  0                     NA          NA
## 36 2008-10-01 00:00:00 Cyprus  1                     NA          NA
## 37 2009-01-01 00:00:00 Cyprus  1                     NA          NA
## 38 2009-04-01 00:00:00 Cyprus  1                     NA          NA
```

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## 39 2009-07-01 00:00:00 Cyprus  1                     NA         NA
## 40 2009-10-01 00:00:00 Cyprus  0                     NA         NA
## 41 2010-01-01 00:00:00 Cyprus  0                     NA         NA
## 42 2010-04-01 00:00:00 Cyprus  0                     NA         NA
## 43 2010-07-01 00:00:00 Cyprus  0                     NA         NA
## 44 2010-10-01 00:00:00 Cyprus  0                     NA         NA
## 45 2011-01-01 00:00:00 Cyprus  0                     NA         NA
## 46 2011-04-01 00:00:00 Cyprus  0                     NA         NA
## 47 2011-07-01 00:00:00 Cyprus  1                     NA         NA
## 48 2011-10-01 00:00:00 Cyprus  0                     NA         NA
## 49 2012-01-01 00:00:00 Cyprus  0                     NA         NA
## 50 2012-04-01 00:00:00 Cyprus  1                     NA         NA
## 51 2012-07-01 00:00:00 Cyprus  1                     NA         NA
## 52 2012-10-01 00:00:00 Cyprus  1                     NA         NA
## 53 2013-01-01 00:00:00 Cyprus  1                     NA         NA
## 54 2013-04-01 00:00:00 Cyprus  1                     NA         NA
## 55 2013-07-01 00:00:00 Cyprus  1                     NA         NA
## 56 2013-10-01 00:00:00 Cyprus  1                     NA         NA
## 57 2014-01-01 00:00:00 Cyprus  1                     NA         NA
## 58 2014-04-01 00:00:00 Cyprus  1                     NA         NA
## 59 2014-07-01 00:00:00 Cyprus  1                     NA         NA
## 60 2014-10-01 00:00:00 Cyprus  0                     NA         NA
## 61 2015-01-01 00:00:00 Cyprus  0                     NA         NA
## 62 2015-04-01 00:00:00 Cyprus  0                     NA         NA
## 63 2015-07-01 00:00:00 Cyprus  0                     NA         NA
## 64 2015-10-01 00:00:00 Cyprus  0                     NA         NA
## 65 2016-01-01 00:00:00 Cyprus  0                     NA         NA
## 66 2016-04-01 00:00:00 Cyprus  0                     NA         NA
## 67 2016-07-01 00:00:00 Cyprus  0                     NA         NA
## 68 2016-10-01 00:00:00 Cyprus  0                     NA         NA
## 69 2017-01-01 00:00:00 Cyprus  0                     NA         NA
## 70 2017-04-01 00:00:00 Cyprus  0                     NA         NA
## 71 2017-07-01 00:00:00 Cyprus  0                     NA         NA
## 72 2017-10-01 00:00:00 Cyprus  0                     NA         NA
## 73 2018-01-01 00:00:00 Cyprus  0                     NA         NA
## 74 2018-04-01 00:00:00 Cyprus  0                     NA         NA
## 75 2018-07-01 00:00:00 Cyprus  0                     NA         NA
## 76 2018-10-01 00:00:00 Cyprus  0                     NA         NA
## 77 2019-01-01 00:00:00 Cyprus  0                     NA         NA
## 78 2019-04-01 00:00:00 Cyprus  0                     NA         NA
## 79 2019-07-01 00:00:00 Cyprus  0                     NA         NA
## 80 2019-10-01 00:00:00 Cyprus  0                     NA         NA
## 81 2020-01-01 00:00:00 Cyprus  0                     NA         NA
```

```
##  82 2020-04-01 00:00:00 Cyprus  1                      NA          NA
##  83 2020-07-01 00:00:00 Cyprus  0                      NA          NA
##  84 2020-10-01 00:00:00 Cyprus  0                      NA          NA
##  85 2021-01-01 00:00:00 Cyprus  0                      NA          NA
##  86 2021-04-01 00:00:00 Cyprus  0                      NA          NA
##  87 2021-07-01 00:00:00 Cyprus  0                      NA          NA
##  88 2021-10-01 00:00:00 Cyprus  0                       0           0
##  89 2022-01-01 00:00:00 Cyprus  0                       0           0
##  90 2022-04-01 00:00:00 Cyprus  0                       0           0
##  91 2022-07-01 00:00:00 Cyprus  0                       0           0
##  92 2022-10-01 00:00:00 Cyprus  0                       0           0
##  93 2023-01-01 00:00:00 Cyprus  0                       0           0
##  94 2023-04-01 00:00:00 Cyprus  0                       0           0
##  95 2023-07-01 00:00:00 Cyprus  0                       0           0
##  96 2023-10-01 00:00:00 Cyprus  0                       0           0
##  97 2024-01-01 00:00:00 Cyprus  0                       0           0
##  98 2024-04-01 00:00:00 Cyprus  0                       0           0
##  99 2024-07-01 00:00:00 Cyprus  0                       0           0
## 100 2024-10-01 00:00:00 Cyprus  0                       0           0
##
## $Czech
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Czech   0                 NA              NA
##   2 2000-04-01 00:00:00 Czech   0                 NA              NA
##   3 2000-07-01 00:00:00 Czech   0                  0.0056          0
##   4 2000-10-01 00:00:00 Czech   0                  0.0008          0
##   5 2001-01-01 00:00:00 Czech   0                 0                0
##   6 2001-04-01 00:00:00 Czech   0                 0                0
##   7 2001-07-01 00:00:00 Czech   0                 0                0
##   8 2001-10-01 00:00:00 Czech   0                 0                0
##   9 2002-01-01 00:00:00 Czech   0                  0.0002          0
##  10 2002-04-01 00:00:00 Czech   0                  0.0001          0
##  11 2002-07-01 00:00:00 Czech   0                 0                0
##  12 2002-10-01 00:00:00 Czech   0                  0.0011          0
##  13 2003-01-01 00:00:00 Czech   0                  0.0025          0
##  14 2003-04-01 00:00:00 Czech   0                  0.0757          0
##  15 2003-07-01 00:00:00 Czech   0                  0.347           1
##  16 2003-10-01 00:00:00 Czech   0                  0.288           0
##  17 2004-01-01 00:00:00 Czech   0                  0.118           0
##  18 2004-04-01 00:00:00 Czech   0                  0.127           0
##  19 2004-07-01 00:00:00 Czech   0                  0.074           0
```

```
## 20 2004-10-01 00:00:00 Czech   0                 0.0136          0
## 21 2005-01-01 00:00:00 Czech   0                 0.0064          0
## 22 2005-04-01 00:00:00 Czech   0                 0.0444          0
## 23 2005-07-01 00:00:00 Czech   0                 0.0196          0
## 24 2005-10-01 00:00:00 Czech   0                 0.033           0
## 25 2006-01-01 00:00:00 Czech   0                 0.0261          0
## 26 2006-04-01 00:00:00 Czech   0                 0.111           0
## 27 2006-07-01 00:00:00 Czech   0                 0.0381          0
## 28 2006-10-01 00:00:00 Czech   0                 0.0426          0
## 29 2007-01-01 00:00:00 Czech   0                 0.131           0
## 30 2007-04-01 00:00:00 Czech   0                 0.163           0
## 31 2007-07-01 00:00:00 Czech   0                 0.105           0
## 32 2007-10-01 00:00:00 Czech   0                 0.0672          0
## 33 2008-01-01 00:00:00 Czech   0                 0.114           0
## 34 2008-04-01 00:00:00 Czech   0                 0.206           0
## 35 2008-07-01 00:00:00 Czech   0                 0.15            0
## 36 2008-10-01 00:00:00 Czech   0                 0.088           0
## 37 2009-01-01 00:00:00 Czech   1                 0.811           1
## 38 2009-04-01 00:00:00 Czech   1                 0.483           1
## 39 2009-07-01 00:00:00 Czech   0                 0.196           0
## 40 2009-10-01 00:00:00 Czech   0                 0.0219          0
## 41 2010-01-01 00:00:00 Czech   0                 0.205           0
## 42 2010-04-01 00:00:00 Czech   0                 0.139           0
## 43 2010-07-01 00:00:00 Czech   0                 0.0611          0
## 44 2010-10-01 00:00:00 Czech   0                 0.138           0
## 45 2011-01-01 00:00:00 Czech   0                 0.251           0
## 46 2011-04-01 00:00:00 Czech   0                 0.0983          0
## 47 2011-07-01 00:00:00 Czech   0                 0.0477          0
## 48 2011-10-01 00:00:00 Czech   0                 0.170           0
## 49 2012-01-01 00:00:00 Czech   0                 0.0908          0
## 50 2012-04-01 00:00:00 Czech   1                 0.0868          0
## 51 2012-07-01 00:00:00 Czech   1                 0.0252          0
## 52 2012-10-01 00:00:00 Czech   1                 0.0816          0
## 53 2013-01-01 00:00:00 Czech   1                 0.0972          0
## 54 2013-04-01 00:00:00 Czech   0                 0.0748          0
## 55 2013-07-01 00:00:00 Czech   0                 0.208           0
## 56 2013-10-01 00:00:00 Czech   0                 0.0717          0
## 57 2014-01-01 00:00:00 Czech   0                 0.102           0
## 58 2014-04-01 00:00:00 Czech   0                 0.0239          0
## 59 2014-07-01 00:00:00 Czech   0                 0.0377          0
## 60 2014-10-01 00:00:00 Czech   0                 0.0253          0
## 61 2015-01-01 00:00:00 Czech   0                 0.0263          0
## 62 2015-04-01 00:00:00 Czech   0                 0.124           0
```

```
##  63 2015-07-01 00:00:00 Czech   0                 0.0802            0
##  64 2015-10-01 00:00:00 Czech   0                 0.0218            0
##  65 2016-01-01 00:00:00 Czech   0                 0.0247            0
##  66 2016-04-01 00:00:00 Czech   0                 0.0057            0
##  67 2016-07-01 00:00:00 Czech   0                 0.0029            0
##  68 2016-10-01 00:00:00 Czech   0                 0.0084            0
##  69 2017-01-01 00:00:00 Czech   0                 0.011             0
##  70 2017-04-01 00:00:00 Czech   0                 0.0131            0
##  71 2017-07-01 00:00:00 Czech   0                 0.0136            0
##  72 2017-10-01 00:00:00 Czech   0                 0.0502            0
##  73 2018-01-01 00:00:00 Czech   0                 0.021             0
##  74 2018-04-01 00:00:00 Czech   0                 0.0213            0
##  75 2018-07-01 00:00:00 Czech   0                 0.0146            0
##  76 2018-10-01 00:00:00 Czech   0                 0.0062            0
##  77 2019-01-01 00:00:00 Czech   0                 0.0136            0
##  78 2019-04-01 00:00:00 Czech   0                 0.0317            0
##  79 2019-07-01 00:00:00 Czech   0                 0.0109            0
##  80 2019-10-01 00:00:00 Czech   0                 0.0547            0
##  81 2020-01-01 00:00:00 Czech   0                 0.028             0
##  82 2020-04-01 00:00:00 Czech   1                 0.238             0
##  83 2020-07-01 00:00:00 Czech   0                 0.0379            0
##  84 2020-10-01 00:00:00 Czech   0                 0.0485            0
##  85 2021-01-01 00:00:00 Czech   0                 0.0832            0
##  86 2021-04-01 00:00:00 Czech   0                 0.0438            0
##  87 2021-07-01 00:00:00 Czech   0                 0.0052            0
##  88 2021-10-01 00:00:00 Czech   0                 0.0003            0
##  89 2022-01-01 00:00:00 Czech   0                 0.0005            0
##  90 2022-04-01 00:00:00 Czech   0                 0.0142            0
##  91 2022-07-01 00:00:00 Czech   0                 0                 0
##  92 2022-10-01 00:00:00 Czech   0                 0.0361            0
##  93 2023-01-01 00:00:00 Czech   0                 0.0004            0
##  94 2023-04-01 00:00:00 Czech   0                 0.0009            0
##  95 2023-07-01 00:00:00 Czech   0                 0.001             0
##  96 2023-10-01 00:00:00 Czech   0                 0.0029            0
##  97 2024-01-01 00:00:00 Czech   0                 0.0028            0
##  98 2024-04-01 00:00:00 Czech   0                 0.0569            0
##  99 2024-07-01 00:00:00 Czech   0                 0.0037            0
## 100 2024-10-01 00:00:00 Czech   0                 0.0069            0
##
## $Denmark
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
```

```
##    1 2000-01-01 00:00:00 Denmark 0               NA               NA
##    2 2000-04-01 00:00:00 Denmark 0                0.0067           0
##    3 2000-07-01 00:00:00 Denmark 0                0.0243           0
##    4 2000-10-01 00:00:00 Denmark 0                0.192            0
##    5 2001-01-01 00:00:00 Denmark 0                0.152            0
##    6 2001-04-01 00:00:00 Denmark 0                0.235            0
##    7 2001-07-01 00:00:00 Denmark 0                0.142            0
##    8 2001-10-01 00:00:00 Denmark 0                0.130            0
##    9 2002-01-01 00:00:00 Denmark 0                0.0622           0
##   10 2002-04-01 00:00:00 Denmark 0                0.0225           0
##   11 2002-07-01 00:00:00 Denmark 0                0.0144           0
##   12 2002-10-01 00:00:00 Denmark 0                0.0318           0
##   13 2003-01-01 00:00:00 Denmark 0                0.0237           0
##   14 2003-04-01 00:00:00 Denmark 0                0.0257           0
##   15 2003-07-01 00:00:00 Denmark 0                0.0255           0
##   16 2003-10-01 00:00:00 Denmark 0                0.0094           0
##   17 2004-01-01 00:00:00 Denmark 0                0.0047           0
##   18 2004-04-01 00:00:00 Denmark 0                0.01             0
##   19 2004-07-01 00:00:00 Denmark 0                0.0067           0
##   20 2004-10-01 00:00:00 Denmark 0                0.0041           0
##   21 2005-01-01 00:00:00 Denmark 0                0.0092           0
##   22 2005-04-01 00:00:00 Denmark 0                0.0148           0
##   23 2005-07-01 00:00:00 Denmark 0                0.0269           0
##   24 2005-10-01 00:00:00 Denmark 0                0.0418           0
##   25 2006-01-01 00:00:00 Denmark 0                0.0391           0
##   26 2006-04-01 00:00:00 Denmark 0                0.0629           0
##   27 2006-07-01 00:00:00 Denmark 0                0.0323           0
##   28 2006-10-01 00:00:00 Denmark 1                0.0528           0
##   29 2007-01-01 00:00:00 Denmark 0                0.127            0
##   30 2007-04-01 00:00:00 Denmark 0                0.154            0
##   31 2007-07-01 00:00:00 Denmark 0                0.110            0
##   32 2007-10-01 00:00:00 Denmark 0                0.148            0
##   33 2008-01-01 00:00:00 Denmark 0                0.228            0
##   34 2008-04-01 00:00:00 Denmark 1                0.251            0
##   35 2008-07-01 00:00:00 Denmark 1                0.238            0
##   36 2008-10-01 00:00:00 Denmark 1                0.199            0
##   37 2009-01-01 00:00:00 Denmark 1                0.682            1
##   38 2009-04-01 00:00:00 Denmark 1                0.331            1
##   39 2009-07-01 00:00:00 Denmark 0                0.0691           0
##   40 2009-10-01 00:00:00 Denmark 0                0.0167           0
##   41 2010-01-01 00:00:00 Denmark 0                0.0087           0
##   42 2010-04-01 00:00:00 Denmark 0                0.0053           0
##   43 2010-07-01 00:00:00 Denmark 0                0.0084           0
```

```
##  44 2010-10-01 00:00:00 Denmark 0                  0.0241          0
##  45 2011-01-01 00:00:00 Denmark 0                  0.0267          0
##  46 2011-04-01 00:00:00 Denmark 0                  0.0077          0
##  47 2011-07-01 00:00:00 Denmark 0                  0.0068          0
##  48 2011-10-01 00:00:00 Denmark 0                  0.0336          0
##  49 2012-01-01 00:00:00 Denmark 0                  0.0493          0
##  50 2012-04-01 00:00:00 Denmark 1                  0.038           0
##  51 2012-07-01 00:00:00 Denmark 0                  0.0653          0
##  52 2012-10-01 00:00:00 Denmark 0                  0.0427          0
##  53 2013-01-01 00:00:00 Denmark 0                  0.0592          0
##  54 2013-04-01 00:00:00 Denmark 0                  0.0203          0
##  55 2013-07-01 00:00:00 Denmark 0                  0.032           0
##  56 2013-10-01 00:00:00 Denmark 0                  0.0125          0
##  57 2014-01-01 00:00:00 Denmark 0                  0.0122          0
##  58 2014-04-01 00:00:00 Denmark 0                  0.0145          0
##  59 2014-07-01 00:00:00 Denmark 0                  0.0212          0
##  60 2014-10-01 00:00:00 Denmark 0                  0.0478          0
##  61 2015-01-01 00:00:00 Denmark 0                  0.0389          0
##  62 2015-04-01 00:00:00 Denmark 0                  0.0799          0
##  63 2015-07-01 00:00:00 Denmark 0                  0.0442          0
##  64 2015-10-01 00:00:00 Denmark 0                  0.0321          0
##  65 2016-01-01 00:00:00 Denmark 0                  0.0292          0
##  66 2016-04-01 00:00:00 Denmark 0                  0.0421          0
##  67 2016-07-01 00:00:00 Denmark 0                  0.0554          0
##  68 2016-10-01 00:00:00 Denmark 0                  0.0978          0
##  69 2017-01-01 00:00:00 Denmark 0                  0.0666          0
##  70 2017-04-01 00:00:00 Denmark 0                  0.0714          0
##  71 2017-07-01 00:00:00 Denmark 0                  0.0435          0
##  72 2017-10-01 00:00:00 Denmark 0                  0.0379          0
##  73 2018-01-01 00:00:00 Denmark 0                  0.0514          0
##  74 2018-04-01 00:00:00 Denmark 0                  0.0301          0
##  75 2018-07-01 00:00:00 Denmark 0                  0.0391          0
##  76 2018-10-01 00:00:00 Denmark 0                  0.0521          0
##  77 2019-01-01 00:00:00 Denmark 0                  0.0459          0
##  78 2019-04-01 00:00:00 Denmark 0                  0.0618          0
##  79 2019-07-01 00:00:00 Denmark 0                  0.0596          0
##  80 2019-10-01 00:00:00 Denmark 0                  0.126           0
##  81 2020-01-01 00:00:00 Denmark 0                  0.0965          0
##  82 2020-04-01 00:00:00 Denmark 1                  0.0958          0
##  83 2020-07-01 00:00:00 Denmark 0                  0.120           0
##  84 2020-10-01 00:00:00 Denmark 0                  0.121           0
##  85 2021-01-01 00:00:00 Denmark 0                  0.155           0
##  86 2021-04-01 00:00:00 Denmark 0                  0.135           0
```

```
##  87 2021-07-01 00:00:00 Denmark 0                 0.0732           0
##  88 2021-10-01 00:00:00 Denmark 0                 0.103            0
##  89 2022-01-01 00:00:00 Denmark 0                 0.101            0
##  90 2022-04-01 00:00:00 Denmark 1                 0.0926           0
##  91 2022-07-01 00:00:00 Denmark 0                 0.0104           0
##  92 2022-10-01 00:00:00 Denmark 0                 0.0262           0
##  93 2023-01-01 00:00:00 Denmark 0                 0.0574           0
##  94 2023-04-01 00:00:00 Denmark 0                 0.142            0
##  95 2023-07-01 00:00:00 Denmark 0                 0.271            0
##  96 2023-10-01 00:00:00 Denmark 0                 0.290            0
##  97 2024-01-01 00:00:00 Denmark 0                 0.316            1
##  98 2024-04-01 00:00:00 Denmark 0                 0.456            1
##  99 2024-07-01 00:00:00 Denmark 0                 0.370            1
## 100 2024-10-01 00:00:00 Denmark 0                 0.397            1
##
## $Estonia
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Estonia 0                     NA          NA
##   2 2000-04-01 00:00:00 Estonia 0                     NA          NA
##   3 2000-07-01 00:00:00 Estonia 0                     NA          NA
##   4 2000-10-01 00:00:00 Estonia 0                     NA          NA
##   5 2001-01-01 00:00:00 Estonia 0                     NA          NA
##   6 2001-04-01 00:00:00 Estonia 0                     NA          NA
##   7 2001-07-01 00:00:00 Estonia 0                     NA          NA
##   8 2001-10-01 00:00:00 Estonia 0                     NA          NA
##   9 2002-01-01 00:00:00 Estonia 0                     NA          NA
##  10 2002-04-01 00:00:00 Estonia 0                     NA          NA
##  11 2002-07-01 00:00:00 Estonia 0                     NA          NA
##  12 2002-10-01 00:00:00 Estonia 0                     NA          NA
##  13 2003-01-01 00:00:00 Estonia 0                     NA          NA
##  14 2003-04-01 00:00:00 Estonia 0                     NA          NA
##  15 2003-07-01 00:00:00 Estonia 0                     NA          NA
##  16 2003-10-01 00:00:00 Estonia 0                     NA          NA
##  17 2004-01-01 00:00:00 Estonia 0                     NA          NA
##  18 2004-04-01 00:00:00 Estonia 0                     NA          NA
##  19 2004-07-01 00:00:00 Estonia 0                     NA          NA
##  20 2004-10-01 00:00:00 Estonia 0                     NA          NA
##  21 2005-01-01 00:00:00 Estonia 0                     NA          NA
##  22 2005-04-01 00:00:00 Estonia 0                     NA          NA
##  23 2005-07-01 00:00:00 Estonia 0                     NA          NA
##  24 2005-10-01 00:00:00 Estonia 0                     NA          NA
```

```
## 25 2006-01-01 00:00:00 Estonia 0                    NA         NA
## 26 2006-04-01 00:00:00 Estonia 0                    NA         NA
## 27 2006-07-01 00:00:00 Estonia 0                    NA         NA
## 28 2006-10-01 00:00:00 Estonia 0                    NA         NA
## 29 2007-01-01 00:00:00 Estonia 0                    NA         NA
## 30 2007-04-01 00:00:00 Estonia 0                    NA         NA
## 31 2007-07-01 00:00:00 Estonia 0                    NA         NA
## 32 2007-10-01 00:00:00 Estonia 0                    NA         NA
## 33 2008-01-01 00:00:00 Estonia 1                    NA         NA
## 34 2008-04-01 00:00:00 Estonia 0                    NA         NA
## 35 2008-07-01 00:00:00 Estonia 0                    NA         NA
## 36 2008-10-01 00:00:00 Estonia 0                    NA         NA
## 37 2009-01-01 00:00:00 Estonia 1                    NA         NA
## 38 2009-04-01 00:00:00 Estonia 1                    NA         NA
## 39 2009-07-01 00:00:00 Estonia 1                    NA         NA
## 40 2009-10-01 00:00:00 Estonia 0                    NA         NA
## 41 2010-01-01 00:00:00 Estonia 0                    NA         NA
## 42 2010-04-01 00:00:00 Estonia 0                    NA         NA
## 43 2010-07-01 00:00:00 Estonia 0                    NA         NA
## 44 2010-10-01 00:00:00 Estonia 0                    NA         NA
## 45 2011-01-01 00:00:00 Estonia 0                    NA         NA
## 46 2011-04-01 00:00:00 Estonia 0                    NA         NA
## 47 2011-07-01 00:00:00 Estonia 0                    NA         NA
## 48 2011-10-01 00:00:00 Estonia 0                    NA         NA
## 49 2012-01-01 00:00:00 Estonia 0                    NA         NA
## 50 2012-04-01 00:00:00 Estonia 0                    NA         NA
## 51 2012-07-01 00:00:00 Estonia 0                    NA         NA
## 52 2012-10-01 00:00:00 Estonia 0                    NA         NA
## 53 2013-01-01 00:00:00 Estonia 0                    NA         NA
## 54 2013-04-01 00:00:00 Estonia 0                    NA         NA
## 55 2013-07-01 00:00:00 Estonia 1                    NA         NA
## 56 2013-10-01 00:00:00 Estonia 1                    NA         NA
## 57 2014-01-01 00:00:00 Estonia 0                    NA         NA
## 58 2014-04-01 00:00:00 Estonia 0                    NA         NA
## 59 2014-07-01 00:00:00 Estonia 0                    NA         NA
## 60 2014-10-01 00:00:00 Estonia 0                    NA         NA
## 61 2015-01-01 00:00:00 Estonia 0                    NA         NA
## 62 2015-04-01 00:00:00 Estonia 0                    NA         NA
## 63 2015-07-01 00:00:00 Estonia 0                    NA         NA
## 64 2015-10-01 00:00:00 Estonia 0                    NA         NA
## 65 2016-01-01 00:00:00 Estonia 0                    NA         NA
## 66 2016-04-01 00:00:00 Estonia 0                    NA         NA
## 67 2016-07-01 00:00:00 Estonia 0                    NA         NA
```

```
##  68 2016-10-01 00:00:00 Estonia 0                        NA          NA
##  69 2017-01-01 00:00:00 Estonia 0                        NA          NA
##  70 2017-04-01 00:00:00 Estonia 0                        NA          NA
##  71 2017-07-01 00:00:00 Estonia 0                        NA          NA
##  72 2017-10-01 00:00:00 Estonia 0                        NA          NA
##  73 2018-01-01 00:00:00 Estonia 0                        NA          NA
##  74 2018-04-01 00:00:00 Estonia 0                        NA          NA
##  75 2018-07-01 00:00:00 Estonia 0                        NA          NA
##  76 2018-10-01 00:00:00 Estonia 0                        NA          NA
##  77 2019-01-01 00:00:00 Estonia 0                        NA          NA
##  78 2019-04-01 00:00:00 Estonia 0                        NA          NA
##  79 2019-07-01 00:00:00 Estonia 0                        NA          NA
##  80 2019-10-01 00:00:00 Estonia 0                        NA          NA
##  81 2020-01-01 00:00:00 Estonia 0                        NA          NA
##  82 2020-04-01 00:00:00 Estonia 1                        NA          NA
##  83 2020-07-01 00:00:00 Estonia 0                        NA          NA
##  84 2020-10-01 00:00:00 Estonia 0                         0           0
##  85 2021-01-01 00:00:00 Estonia 0                         0           0
##  86 2021-04-01 00:00:00 Estonia 0                         0           0
##  87 2021-07-01 00:00:00 Estonia 0                         0           0
##  88 2021-10-01 00:00:00 Estonia 0                         0           0
##  89 2022-01-01 00:00:00 Estonia 0                         0           0
##  90 2022-04-01 00:00:00 Estonia 0                         0           0
##  91 2022-07-01 00:00:00 Estonia 1                         1           1
##  92 2022-10-01 00:00:00 Estonia 1                         1           1
##  93 2023-01-01 00:00:00 Estonia 1                         1           1
##  94 2023-04-01 00:00:00 Estonia 1                         1           1
##  95 2023-07-01 00:00:00 Estonia 1                         1           1
##  96 2023-10-01 00:00:00 Estonia 1                         1           1
##  97 2024-01-01 00:00:00 Estonia 1                         1           1
##  98 2024-04-01 00:00:00 Estonia 0                         0           0
##  99 2024-07-01 00:00:00 Estonia 0                         0           0
## 100 2024-10-01 00:00:00 Estonia 0                         0           0
##
## $Finland
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Finland 0                   NA            NA
##   2 2000-04-01 00:00:00 Finland 0                     0.0218       0
##   3 2000-07-01 00:00:00 Finland 0                     0.0399       0
##   4 2000-10-01 00:00:00 Finland 0                     0.0456       0
##   5 2001-01-01 00:00:00 Finland 0                     0.0728       0
```

```
##    6 2001-04-01 00:00:00 Finland 0                0.106            0
##    7 2001-07-01 00:00:00 Finland 0                0.0896           0
##    8 2001-10-01 00:00:00 Finland 0                0.129            0
##    9 2002-01-01 00:00:00 Finland 0                0.104            0
##   10 2002-04-01 00:00:00 Finland 0                0.07             0
##   11 2002-07-01 00:00:00 Finland 0                0.0463           0
##   12 2002-10-01 00:00:00 Finland 0                0.0787           0
##   13 2003-01-01 00:00:00 Finland 0                0.0871           0
##   14 2003-04-01 00:00:00 Finland 0                0.109            0
##   15 2003-07-01 00:00:00 Finland 0                0.137            0
##   16 2003-10-01 00:00:00 Finland 0                0.102            0
##   17 2004-01-01 00:00:00 Finland 0                0.0733           0
##   18 2004-04-01 00:00:00 Finland 0                0.102            0
##   19 2004-07-01 00:00:00 Finland 0                0.0786           0
##   20 2004-10-01 00:00:00 Finland 0                0.0623           0
##   21 2005-01-01 00:00:00 Finland 0                0.0872           0
##   22 2005-04-01 00:00:00 Finland 0                0.0898           0
##   23 2005-07-01 00:00:00 Finland 0                0.106            0
##   24 2005-10-01 00:00:00 Finland 0                0.122            0
##   25 2006-01-01 00:00:00 Finland 0                0.112            0
##   26 2006-04-01 00:00:00 Finland 0                0.137            0
##   27 2006-07-01 00:00:00 Finland 0                0.0776           0
##   28 2006-10-01 00:00:00 Finland 0                0.0706           0
##   29 2007-01-01 00:00:00 Finland 0                0.114            0
##   30 2007-04-01 00:00:00 Finland 0                0.112            0
##   31 2007-07-01 00:00:00 Finland 0                0.0723           0
##   32 2007-10-01 00:00:00 Finland 0                0.0862           0
##   33 2008-01-01 00:00:00 Finland 0                0.125            0
##   34 2008-04-01 00:00:00 Finland 1                0.128            0
##   35 2008-07-01 00:00:00 Finland 0                0.111            0
##   36 2008-10-01 00:00:00 Finland 0                0.156            0
##   37 2009-01-01 00:00:00 Finland 1                0.462            1
##   38 2009-04-01 00:00:00 Finland 1                0.182            0
##   39 2009-07-01 00:00:00 Finland 0                0.104            0
##   40 2009-10-01 00:00:00 Finland 0                0.0813           0
##   41 2010-01-01 00:00:00 Finland 0                0.077            0
##   42 2010-04-01 00:00:00 Finland 0                0.068            0
##   43 2010-07-01 00:00:00 Finland 0                0.0609           0
##   44 2010-10-01 00:00:00 Finland 0                0.124            0
##   45 2011-01-01 00:00:00 Finland 0                0.153            0
##   46 2011-04-01 00:00:00 Finland 0                0.0756           0
##   47 2011-07-01 00:00:00 Finland 0                0.0536           0
##   48 2011-10-01 00:00:00 Finland 0                0.126            0
```

```
## 49 2012-01-01 00:00:00 Finland 0                 0.180           0
## 50 2012-04-01 00:00:00 Finland 1                 0.141           0
## 51 2012-07-01 00:00:00 Finland 1                 0.162           0
## 52 2012-10-01 00:00:00 Finland 1                 0.174           0
## 53 2013-01-01 00:00:00 Finland 1                 0.146           0
## 54 2013-04-01 00:00:00 Finland 0                 0.138           0
## 55 2013-07-01 00:00:00 Finland 0                 0.181           0
## 56 2013-10-01 00:00:00 Finland 0                 0.121           0
## 57 2014-01-01 00:00:00 Finland 1                 0.121           0
## 58 2014-04-01 00:00:00 Finland 0                 0.117           0
## 59 2014-07-01 00:00:00 Finland 0                 0.123           0
## 60 2014-10-01 00:00:00 Finland 0                 0.154           0
## 61 2015-01-01 00:00:00 Finland 1                 0.147           0
## 62 2015-04-01 00:00:00 Finland 0                 0.236           0
## 63 2015-07-01 00:00:00 Finland 0                 0.227           0
## 64 2015-10-01 00:00:00 Finland 0                 0.181           0
## 65 2016-01-01 00:00:00 Finland 0                 0.176           0
## 66 2016-04-01 00:00:00 Finland 0                 0.185           0
## 67 2016-07-01 00:00:00 Finland 0                 0.176           0
## 68 2016-10-01 00:00:00 Finland 0                 0.258           0
## 69 2017-01-01 00:00:00 Finland 0                 0.228           0
## 70 2017-04-01 00:00:00 Finland 0                 0.193           0
## 71 2017-07-01 00:00:00 Finland 0                 0.219           0
## 72 2017-10-01 00:00:00 Finland 0                 0.174           0
## 73 2018-01-01 00:00:00 Finland 0                 0.217           0
## 74 2018-04-01 00:00:00 Finland 0                 0.175           0
## 75 2018-07-01 00:00:00 Finland 1                 0.176           0
## 76 2018-10-01 00:00:00 Finland 0                 0.198           0
## 77 2019-01-01 00:00:00 Finland 0                 0.165           0
## 78 2019-04-01 00:00:00 Finland 0                 0.182           0
## 79 2019-07-01 00:00:00 Finland 0                 0.175           0
## 80 2019-10-01 00:00:00 Finland 0                 0.264           0
## 81 2020-01-01 00:00:00 Finland 1                 0.232           0
## 82 2020-04-01 00:00:00 Finland 1                 0.231           0
## 83 2020-07-01 00:00:00 Finland 0                 0.242           0
## 84 2020-10-01 00:00:00 Finland 0                 0.230           0
## 85 2021-01-01 00:00:00 Finland 0                 0.269           0
## 86 2021-04-01 00:00:00 Finland 0                 0.262           0
## 87 2021-07-01 00:00:00 Finland 0                 0.208           0
## 88 2021-10-01 00:00:00 Finland 0                 0.247           0
## 89 2022-01-01 00:00:00 Finland 0                 0.269           0
## 90 2022-04-01 00:00:00 Finland 0                 0.304           1
## 91 2022-07-01 00:00:00 Finland 0                 0.0885          0
```

```
##  92 2022-10-01 00:00:00 Finland 1                 0.0688            0
##  93 2023-01-01 00:00:00 Finland 0                 0.058             0
##  94 2023-04-01 00:00:00 Finland 0                 0.0573            0
##  95 2023-07-01 00:00:00 Finland 0                 0.0854            0
##  96 2023-10-01 00:00:00 Finland 1                 0.0872            0
##  97 2024-01-01 00:00:00 Finland 0                 0.0939            0
##  98 2024-04-01 00:00:00 Finland 0                 0.145             0
##  99 2024-07-01 00:00:00 Finland 0                 0.125             0
## 100 2024-10-01 00:00:00 Finland 0                 0.172             0
##
## $France
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 France  0                 NA              NA
##   2 2000-04-01 00:00:00 France  0                  0               0
##   3 2000-07-01 00:00:00 France  0                  0               0
##   4 2000-10-01 00:00:00 France  0                  0               0
##   5 2001-01-01 00:00:00 France  0                  0.0015          0
##   6 2001-04-01 00:00:00 France  0                  0.0046          0
##   7 2001-07-01 00:00:00 France  0                  0.0004          0
##   8 2001-10-01 00:00:00 France  0                  0.0007          0
##   9 2002-01-01 00:00:00 France  0                  0               0
##  10 2002-04-01 00:00:00 France  0                  0               0
##  11 2002-07-01 00:00:00 France  0                  0               0
##  12 2002-10-01 00:00:00 France  0                  0               0
##  13 2003-01-01 00:00:00 France  0                  0               0
##  14 2003-04-01 00:00:00 France  0                  0               0
##  15 2003-07-01 00:00:00 France  0                  0               0
##  16 2003-10-01 00:00:00 France  0                  0               0
##  17 2004-01-01 00:00:00 France  0                  0               0
##  18 2004-04-01 00:00:00 France  0                  0               0
##  19 2004-07-01 00:00:00 France  0                  0               0
##  20 2004-10-01 00:00:00 France  0                  0               0
##  21 2005-01-01 00:00:00 France  0                  0               0
##  22 2005-04-01 00:00:00 France  0                  0               0
##  23 2005-07-01 00:00:00 France  0                  0.0001          0
##  24 2005-10-01 00:00:00 France  0                  0.0003          0
##  25 2006-01-01 00:00:00 France  0                  0.0002          0
##  26 2006-04-01 00:00:00 France  0                  0.0008          0
##  27 2006-07-01 00:00:00 France  0                  0               0
##  28 2006-10-01 00:00:00 France  0                  0.0004          0
##  29 2007-01-01 00:00:00 France  0                  0.0126          0
```

```
## 30 2007-04-01 00:00:00 France  0                 0.0075           0
## 31 2007-07-01 00:00:00 France  0                 0.0016           0
## 32 2007-10-01 00:00:00 France  0                 0.0187           0
## 33 2008-01-01 00:00:00 France  0                 0.118            0
## 34 2008-04-01 00:00:00 France  0                 0.122            0
## 35 2008-07-01 00:00:00 France  1                 0.0826           0
## 36 2008-10-01 00:00:00 France  1                 0.224            0
## 37 2009-01-01 00:00:00 France  1                 0.694            1
## 38 2009-04-01 00:00:00 France  0                 0.0001           0
## 39 2009-07-01 00:00:00 France  0                 0                0
## 40 2009-10-01 00:00:00 France  0                 0                0
## 41 2010-01-01 00:00:00 France  0                 0                0
## 42 2010-04-01 00:00:00 France  0                 0                0
## 43 2010-07-01 00:00:00 France  0                 0                0
## 44 2010-10-01 00:00:00 France  0                 0                0
## 45 2011-01-01 00:00:00 France  0                 0                0
## 46 2011-04-01 00:00:00 France  0                 0                0
## 47 2011-07-01 00:00:00 France  0                 0                0
## 48 2011-10-01 00:00:00 France  0                 0.0001           0
## 49 2012-01-01 00:00:00 France  0                 0                0
## 50 2012-04-01 00:00:00 France  0                 0                0
## 51 2012-07-01 00:00:00 France  0                 0                0
## 52 2012-10-01 00:00:00 France  0                 0                0
## 53 2013-01-01 00:00:00 France  0                 0                0
## 54 2013-04-01 00:00:00 France  0                 0                0
## 55 2013-07-01 00:00:00 France  0                 0                0
## 56 2013-10-01 00:00:00 France  0                 0                0
## 57 2014-01-01 00:00:00 France  0                 0                0
## 58 2014-04-01 00:00:00 France  0                 0                0
## 59 2014-07-01 00:00:00 France  0                 0                0
## 60 2014-10-01 00:00:00 France  0                 0.0006           0
## 61 2015-01-01 00:00:00 France  0                 0.0029           0
## 62 2015-04-01 00:00:00 France  0                 0.0864           0
## 63 2015-07-01 00:00:00 France  0                 0.0196           0
## 64 2015-10-01 00:00:00 France  0                 0.0038           0
## 65 2016-01-01 00:00:00 France  0                 0.007            0
## 66 2016-04-01 00:00:00 France  0                 0.0193           0
## 67 2016-07-01 00:00:00 France  0                 0.0287           0
## 68 2016-10-01 00:00:00 France  0                 0.153            0
## 69 2017-01-01 00:00:00 France  0                 0.0238           0
## 70 2017-04-01 00:00:00 France  0                 0.0009           0
## 71 2017-07-01 00:00:00 France  0                 0.004            0
## 72 2017-10-01 00:00:00 France  0                 0.0051           0
```

```
##  73 2018-01-01 00:00:00 France  0                 0.0068           0
##  74 2018-04-01 00:00:00 France  0                 0.0017           0
##  75 2018-07-01 00:00:00 France  0                 0.0042           0
##  76 2018-10-01 00:00:00 France  0                 0.0073           0
##  77 2019-01-01 00:00:00 France  0                 0.004            0
##  78 2019-04-01 00:00:00 France  0                 0.0144           0
##  79 2019-07-01 00:00:00 France  0                 0.0549           0
##  80 2019-10-01 00:00:00 France  0                 0.341            1
##  81 2020-01-01 00:00:00 France  1                 0.179            0
##  82 2020-04-01 00:00:00 France  1                 0.197            0
##  83 2020-07-01 00:00:00 France  0                 0.220            0
##  84 2020-10-01 00:00:00 France  0                 0.207            0
##  85 2021-01-01 00:00:00 France  0                 0.308            1
##  86 2021-04-01 00:00:00 France  0                 0.210            0
##  87 2021-07-01 00:00:00 France  0                 0.0505           0
##  88 2021-10-01 00:00:00 France  0                 0.116            0
##  89 2022-01-01 00:00:00 France  0                 0.0746           0
##  90 2022-04-01 00:00:00 France  0                 0.0127           0
##  91 2022-07-01 00:00:00 France  0                 0                0
##  92 2022-10-01 00:00:00 France  0                 0                0
##  93 2023-01-01 00:00:00 France  0                 0                0
##  94 2023-04-01 00:00:00 France  0                 0.0021           0
##  95 2023-07-01 00:00:00 France  0                 0.0566           0
##  96 2023-10-01 00:00:00 France  0                 0.101            0
##  97 2024-01-01 00:00:00 France  0                 0.204            0
##  98 2024-04-01 00:00:00 France  0                 0.517            1
##  99 2024-07-01 00:00:00 France  0                 0.245            0
## 100 2024-10-01 00:00:00 France  0                 0.224            0
##
## $Germany
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Germany 0                NA             NA
##   2 2000-04-01 00:00:00 Germany 0                 0.0291           0
##   3 2000-07-01 00:00:00 Germany 0                 0.0833           0
##   4 2000-10-01 00:00:00 Germany 0                 0.103            0
##   5 2001-01-01 00:00:00 Germany 0                 0.191            0
##   6 2001-04-01 00:00:00 Germany 0                 0.312            1
##   7 2001-07-01 00:00:00 Germany 1                 0.258            0
##   8 2001-10-01 00:00:00 Germany 1                 0.302            1
##   9 2002-01-01 00:00:00 Germany 1                 0.266            0
##  10 2002-04-01 00:00:00 Germany 0                 0.149            0
```

```
##   11 2002-07-01 00:00:00 Germany 0                 0.0682           0
##   12 2002-10-01 00:00:00 Germany 0                 0.147            0
##   13 2003-01-01 00:00:00 Germany 1                 0.128            0
##   14 2003-04-01 00:00:00 Germany 0                 0.136            0
##   15 2003-07-01 00:00:00 Germany 0                 0.197            0
##   16 2003-10-01 00:00:00 Germany 0                 0.132            0
##   17 2004-01-01 00:00:00 Germany 0                 0.0756           0
##   18 2004-04-01 00:00:00 Germany 0                 0.122            0
##   19 2004-07-01 00:00:00 Germany 0                 0.0747           0
##   20 2004-10-01 00:00:00 Germany 1                 0.0448           0
##   21 2005-01-01 00:00:00 Germany 0                 0.0778           0
##   22 2005-04-01 00:00:00 Germany 0                 0.0582           0
##   23 2005-07-01 00:00:00 Germany 0                 0.0763           0
##   24 2005-10-01 00:00:00 Germany 0                 0.0937           0
##   25 2006-01-01 00:00:00 Germany 0                 0.0859           0
##   26 2006-04-01 00:00:00 Germany 0                 0.154            0
##   27 2006-07-01 00:00:00 Germany 0                 0.064            0
##   28 2006-10-01 00:00:00 Germany 0                 0.0591           0
##   29 2007-01-01 00:00:00 Germany 0                 0.158            0
##   30 2007-04-01 00:00:00 Germany 0                 0.184            0
##   31 2007-07-01 00:00:00 Germany 0                 0.0864           0
##   32 2007-10-01 00:00:00 Germany 0                 0.095            0
##   33 2008-01-01 00:00:00 Germany 0                 0.168            0
##   34 2008-04-01 00:00:00 Germany 0                 0.160            0
##   35 2008-07-01 00:00:00 Germany 1                 0.156            0
##   36 2008-10-01 00:00:00 Germany 1                 0.165            0
##   37 2009-01-01 00:00:00 Germany 1                 0.686            1
##   38 2009-04-01 00:00:00 Germany 0                 0.316            1
##   39 2009-07-01 00:00:00 Germany 0                 0.155            0
##   40 2009-10-01 00:00:00 Germany 0                 0.0812           0
##   41 2010-01-01 00:00:00 Germany 0                 0.0833           0
##   42 2010-04-01 00:00:00 Germany 0                 0.0328           0
##   43 2010-07-01 00:00:00 Germany 0                 0.0249           0
##   44 2010-10-01 00:00:00 Germany 0                 0.082            0
##   45 2011-01-01 00:00:00 Germany 0                 0.169            0
##   46 2011-04-01 00:00:00 Germany 0                 0.0405           0
##   47 2011-07-01 00:00:00 Germany 0                 0.0105           0
##   48 2011-10-01 00:00:00 Germany 0                 0.053            0
##   49 2012-01-01 00:00:00 Germany 0                 0.143            0
##   50 2012-04-01 00:00:00 Germany 0                 0.0696           0
##   51 2012-07-01 00:00:00 Germany 0                 0.119            0
##   52 2012-10-01 00:00:00 Germany 0                 0.0988           0
##   53 2013-01-01 00:00:00 Germany 1                 0.0846           0
```

```
##  54 2013-04-01 00:00:00 Germany 0                0.0568           0
##  55 2013-07-01 00:00:00 Germany 0                0.137            0
##  56 2013-10-01 00:00:00 Germany 0                0.0717           0
##  57 2014-01-01 00:00:00 Germany 0                0.0494           0
##  58 2014-04-01 00:00:00 Germany 0                0.0427           0
##  59 2014-07-01 00:00:00 Germany 0                0.0454           0
##  60 2014-10-01 00:00:00 Germany 0                0.0447           0
##  61 2015-01-01 00:00:00 Germany 0                0.0331           0
##  62 2015-04-01 00:00:00 Germany 0                0.105            0
##  63 2015-07-01 00:00:00 Germany 0                0.0966           0
##  64 2015-10-01 00:00:00 Germany 0                0.0593           0
##  65 2016-01-01 00:00:00 Germany 0                0.047            0
##  66 2016-04-01 00:00:00 Germany 0                0.0527           0
##  67 2016-07-01 00:00:00 Germany 0                0.0464           0
##  68 2016-10-01 00:00:00 Germany 0                0.108            0
##  69 2017-01-01 00:00:00 Germany 0                0.0855           0
##  70 2017-04-01 00:00:00 Germany 0                0.0626           0
##  71 2017-07-01 00:00:00 Germany 0                0.0791           0
##  72 2017-10-01 00:00:00 Germany 0                0.0573           0
##  73 2018-01-01 00:00:00 Germany 0                0.0972           0
##  74 2018-04-01 00:00:00 Germany 0                0.0486           0
##  75 2018-07-01 00:00:00 Germany 0                0.0513           0
##  76 2018-10-01 00:00:00 Germany 0                0.0622           0
##  77 2019-01-01 00:00:00 Germany 0                0.0396           0
##  78 2019-04-01 00:00:00 Germany 0                0.0414           0
##  79 2019-07-01 00:00:00 Germany 0                0.035            0
##  80 2019-10-01 00:00:00 Germany 0                0.0874           0
##  81 2020-01-01 00:00:00 Germany 1                0.0555           0
##  82 2020-04-01 00:00:00 Germany 1                0.0485           0
##  83 2020-07-01 00:00:00 Germany 0                0.0781           0
##  84 2020-10-01 00:00:00 Germany 0                0.0583           0
##  85 2021-01-01 00:00:00 Germany 0                0.0861           0
##  86 2021-04-01 00:00:00 Germany 0                0.0881           0
##  87 2021-07-01 00:00:00 Germany 0                0.0449           0
##  88 2021-10-01 00:00:00 Germany 0                0.0861           0
##  89 2022-01-01 00:00:00 Germany 0                0.120            0
##  90 2022-04-01 00:00:00 Germany 0                0.217            0
##  91 2022-07-01 00:00:00 Germany 0                0.0211           0
##  92 2022-10-01 00:00:00 Germany 0                0.0436           0
##  93 2023-01-01 00:00:00 Germany 0                0.0443           0
##  94 2023-04-01 00:00:00 Germany 0                0.057            0
##  95 2023-07-01 00:00:00 Germany 0                0.149            0
##  96 2023-10-01 00:00:00 Germany 0                0.162            0
```

```
##  97 2024-01-01 00:00:00 Germany 0                 0.171            0
##  98 2024-04-01 00:00:00 Germany 0                 0.321            1
##  99 2024-07-01 00:00:00 Germany 0                 0.221            0
## 100 2024-10-01 00:00:00 Germany 0                 0.352            1
##
## $Greece
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Greece  0                 NA              NA
##   2 2000-04-01 00:00:00 Greece  0                  0.0085          0
##   3 2000-07-01 00:00:00 Greece  0                  0.0124          0
##   4 2000-10-01 00:00:00 Greece  0                  0.0304          0
##   5 2001-01-01 00:00:00 Greece  0                  0.0456          0
##   6 2001-04-01 00:00:00 Greece  0                  0.0477          0
##   7 2001-07-01 00:00:00 Greece  0                  0.0526          0
##   8 2001-10-01 00:00:00 Greece  0                  0.0674          0
##   9 2002-01-01 00:00:00 Greece  0                  0.0772          0
##  10 2002-04-01 00:00:00 Greece  0                  0.0751          0
##  11 2002-07-01 00:00:00 Greece  0                  0.0628          0
##  12 2002-10-01 00:00:00 Greece  0                  0.066           0
##  13 2003-01-01 00:00:00 Greece  0                  0.0689          0
##  14 2003-04-01 00:00:00 Greece  0                  0.0727          0
##  15 2003-07-01 00:00:00 Greece  0                  0.087           0
##  16 2003-10-01 00:00:00 Greece  0                  0.0907          0
##  17 2004-01-01 00:00:00 Greece  0                  0.0866          0
##  18 2004-04-01 00:00:00 Greece  0                  0.0925          0
##  19 2004-07-01 00:00:00 Greece  0                  0.0847          0
##  20 2004-10-01 00:00:00 Greece  0                  0.0728          0
##  21 2005-01-01 00:00:00 Greece  0                  0.0709          0
##  22 2005-04-01 00:00:00 Greece  0                  0.0675          0
##  23 2005-07-01 00:00:00 Greece  0                  0.063           0
##  24 2005-10-01 00:00:00 Greece  0                  0.0623          0
##  25 2006-01-01 00:00:00 Greece  0                  0.06            0
##  26 2006-04-01 00:00:00 Greece  0                  0.0657          0
##  27 2006-07-01 00:00:00 Greece  0                  0.052           0
##  28 2006-10-01 00:00:00 Greece  0                  0.0412          0
##  29 2007-01-01 00:00:00 Greece  0                  0.0428          0
##  30 2007-04-01 00:00:00 Greece  0                  0.0434          0
##  31 2007-07-01 00:00:00 Greece  0                  0.0358          0
##  32 2007-10-01 00:00:00 Greece  1                  0.0312          0
##  33 2008-01-01 00:00:00 Greece  0                  0.0345          0
##  34 2008-04-01 00:00:00 Greece  0                  0.0348          0
```

```
## 35 2008-07-01 00:00:00 Greece 0                0.0345          0
## 36 2008-10-01 00:00:00 Greece 0                0.0526          0
## 37 2009-01-01 00:00:00 Greece 1                0.168           0
## 38 2009-04-01 00:00:00 Greece 0                0.157           0
## 39 2009-07-01 00:00:00 Greece 0                0.14            0
## 40 2009-10-01 00:00:00 Greece 1                0.167           0
## 41 2010-01-01 00:00:00 Greece 1                0.244           0
## 42 2010-04-01 00:00:00 Greece 1                0.377           1
## 43 2010-07-01 00:00:00 Greece 1                0.537           1
## 44 2010-10-01 00:00:00 Greece 1                0.497           1
## 45 2011-01-01 00:00:00 Greece 1                0.562           1
## 46 2011-04-01 00:00:00 Greece 1                0.801           1
## 47 2011-07-01 00:00:00 Greece 1                0.809           1
## 48 2011-10-01 00:00:00 Greece 1                0.917           1
## 49 2012-01-01 00:00:00 Greece 1                0.998           1
## 50 2012-04-01 00:00:00 Greece 1                0.993           1
## 51 2012-07-01 00:00:00 Greece 1                0.986           1
## 52 2012-10-01 00:00:00 Greece 1                0.734           1
## 53 2013-01-01 00:00:00 Greece 1                0.456           1
## 54 2013-04-01 00:00:00 Greece 0                0.482           1
## 55 2013-07-01 00:00:00 Greece 0                0.498           1
## 56 2013-10-01 00:00:00 Greece 0                0.356           1
## 57 2014-01-01 00:00:00 Greece 0                0.302           1
## 58 2014-04-01 00:00:00 Greece 0                0.218           0
## 59 2014-07-01 00:00:00 Greece 0                0.241           0
## 60 2014-10-01 00:00:00 Greece 0                0.398           1
## 61 2015-01-01 00:00:00 Greece 0                0.533           1
## 62 2015-04-01 00:00:00 Greece 0                0.631           1
## 63 2015-07-01 00:00:00 Greece 1                0.420           1
## 64 2015-10-01 00:00:00 Greece 0                0.333           1
## 65 2016-01-01 00:00:00 Greece 0                0.522           1
## 66 2016-04-01 00:00:00 Greece 1                0.375           1
## 67 2016-07-01 00:00:00 Greece 0                0.402           1
## 68 2016-10-01 00:00:00 Greece 0                0.349           1
## 69 2017-01-01 00:00:00 Greece 0                0.339           1
## 70 2017-04-01 00:00:00 Greece 0                0.257           0
## 71 2017-07-01 00:00:00 Greece 0                0.232           0
## 72 2017-10-01 00:00:00 Greece 0                0.215           0
## 73 2018-01-01 00:00:00 Greece 0                0.160           0
## 74 2018-04-01 00:00:00 Greece 0                0.183           0
## 75 2018-07-01 00:00:00 Greece 0                0.171           0
## 76 2018-10-01 00:00:00 Greece 0                0.190           0
## 77 2019-01-01 00:00:00 Greece 0                0.162           0
```

```
##  78 2019-04-01 00:00:00 Greece  0                0.128            0
##  79 2019-07-01 00:00:00 Greece  0                0.0866           0
##  80 2019-10-01 00:00:00 Greece  1                0.0797           0
##  81 2020-01-01 00:00:00 Greece  1                0.0867           0
##  82 2020-04-01 00:00:00 Greece  1                0.0932           0
##  83 2020-07-01 00:00:00 Greece  0                0.0747           0
##  84 2020-10-01 00:00:00 Greece  0                0.0695           0
##  85 2021-01-01 00:00:00 Greece  0                0.073            0
##  86 2021-04-01 00:00:00 Greece  0                0.0758           0
##  87 2021-07-01 00:00:00 Greece  0                0.0692           0
##  88 2021-10-01 00:00:00 Greece  0                0.0861           0
##  89 2022-01-01 00:00:00 Greece  0                0.123            0
##  90 2022-04-01 00:00:00 Greece  0                0.163            0
##  91 2022-07-01 00:00:00 Greece  0                0.121            0
##  92 2022-10-01 00:00:00 Greece  0                0.0946           0
##  93 2023-01-01 00:00:00 Greece  0                0.0591           0
##  94 2023-04-01 00:00:00 Greece  0                0.0387           0
##  95 2023-07-01 00:00:00 Greece  0                0.0335           0
##  96 2023-10-01 00:00:00 Greece  0                0.0297           0
##  97 2024-01-01 00:00:00 Greece  0                0.0249           0
##  98 2024-04-01 00:00:00 Greece  0                0.0308           0
##  99 2024-07-01 00:00:00 Greece  0                0.0306           0
## 100 2024-10-01 00:00:00 Greece  0                0.0377           0
##
## $Hungary
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Hungary 0               NA                NA
##   2 2000-04-01 00:00:00 Hungary 0                0.130             0
##   3 2000-07-01 00:00:00 Hungary 0                0.159             0
##   4 2000-10-01 00:00:00 Hungary 0                0.169             0
##   5 2001-01-01 00:00:00 Hungary 0                0.158             0
##   6 2001-04-01 00:00:00 Hungary 0                0.164             0
##   7 2001-07-01 00:00:00 Hungary 0                0.172             0
##   8 2001-10-01 00:00:00 Hungary 0                0.142             0
##   9 2002-01-01 00:00:00 Hungary 0                0.100             0
##  10 2002-04-01 00:00:00 Hungary 0                0.117             0
##  11 2002-07-01 00:00:00 Hungary 0                0.152             0
##  12 2002-10-01 00:00:00 Hungary 0                0.142             0
##  13 2003-01-01 00:00:00 Hungary 0                0.0389            0
##  14 2003-04-01 00:00:00 Hungary 0                0.123             0
##  15 2003-07-01 00:00:00 Hungary 0                0.193             0
```

```
## 16 2003-10-01 00:00:00 Hungary 0                0.212            0
## 17 2004-01-01 00:00:00 Hungary 0                0.216            0
## 18 2004-04-01 00:00:00 Hungary 0                0.145            0
## 19 2004-07-01 00:00:00 Hungary 0                0.149            0
## 20 2004-10-01 00:00:00 Hungary 0                0.120            0
## 21 2005-01-01 00:00:00 Hungary 0                0.0944           0
## 22 2005-04-01 00:00:00 Hungary 0                0.08             0
## 23 2005-07-01 00:00:00 Hungary 0                0.0765           0
## 24 2005-10-01 00:00:00 Hungary 0                0.061            0
## 25 2006-01-01 00:00:00 Hungary 0                0.0636           0
## 26 2006-04-01 00:00:00 Hungary 0                0.0692           0
## 27 2006-07-01 00:00:00 Hungary 0                0.0913           0
## 28 2006-10-01 00:00:00 Hungary 0                0.136            0
## 29 2007-01-01 00:00:00 Hungary 0                0.109            0
## 30 2007-04-01 00:00:00 Hungary 1                0.115            0
## 31 2007-07-01 00:00:00 Hungary 0                0.0951           0
## 32 2007-10-01 00:00:00 Hungary 0                0.091            0
## 33 2008-01-01 00:00:00 Hungary 0                0.0805           0
## 34 2008-04-01 00:00:00 Hungary 0                0.0999           0
## 35 2008-07-01 00:00:00 Hungary 0                0.108            0
## 36 2008-10-01 00:00:00 Hungary 1                0.150            0
## 37 2009-01-01 00:00:00 Hungary 1                0.0597           0
## 38 2009-04-01 00:00:00 Hungary 0                0.120            0
## 39 2009-07-01 00:00:00 Hungary 0                0.116            0
## 40 2009-10-01 00:00:00 Hungary 1                0.065            0
## 41 2010-01-01 00:00:00 Hungary 0                0.0559           0
## 42 2010-04-01 00:00:00 Hungary 0                0.0565           0
## 43 2010-07-01 00:00:00 Hungary 0                0.0636           0
## 44 2010-10-01 00:00:00 Hungary 0                0.0547           0
## 45 2011-01-01 00:00:00 Hungary 0                0.0755           0
## 46 2011-04-01 00:00:00 Hungary 0                0.0719           0
## 47 2011-07-01 00:00:00 Hungary 0                0.0668           0
## 48 2011-10-01 00:00:00 Hungary 0                0.0479           0
## 49 2012-01-01 00:00:00 Hungary 0                0.111            0
## 50 2012-04-01 00:00:00 Hungary 1                0.08             0
## 51 2012-07-01 00:00:00 Hungary 0                0.102            0
## 52 2012-10-01 00:00:00 Hungary 0                0.0535           0
## 53 2013-01-01 00:00:00 Hungary 0                0.0564           0
## 54 2013-04-01 00:00:00 Hungary 0                0.0595           0
## 55 2013-07-01 00:00:00 Hungary 0                0.0376           0
## 56 2013-10-01 00:00:00 Hungary 0                0.037            0
## 57 2014-01-01 00:00:00 Hungary 0                0.0348           0
## 58 2014-04-01 00:00:00 Hungary 0                0.0454           0
```

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##   59 2014-07-01 00:00:00 Hungary 0                 0.0359           0
##   60 2014-10-01 00:00:00 Hungary 0                 0.0483           0
##   61 2015-01-01 00:00:00 Hungary 0                 0.0519           0
##   62 2015-04-01 00:00:00 Hungary 0                 0.0322           0
##   63 2015-07-01 00:00:00 Hungary 0                 0.0325           0
##   64 2015-10-01 00:00:00 Hungary 0                 0.0408           0
##   65 2016-01-01 00:00:00 Hungary 0                 0.0377           0
##   66 2016-04-01 00:00:00 Hungary 0                 0.0341           0
##   67 2016-07-01 00:00:00 Hungary 0                 0.0376           0
##   68 2016-10-01 00:00:00 Hungary 0                 0.0302           0
##   69 2017-01-01 00:00:00 Hungary 0                 0.0246           0
##   70 2017-04-01 00:00:00 Hungary 0                 0.0337           0
##   71 2017-07-01 00:00:00 Hungary 0                 0.0342           0
##   72 2017-10-01 00:00:00 Hungary 0                 0.0392           0
##   73 2018-01-01 00:00:00 Hungary 0                 0.0331           0
##   74 2018-04-01 00:00:00 Hungary 0                 0.0283           0
##   75 2018-07-01 00:00:00 Hungary 0                 0.0257           0
##   76 2018-10-01 00:00:00 Hungary 0                 0.0285           0
##   77 2019-01-01 00:00:00 Hungary 0                 0.0379           0
##   78 2019-04-01 00:00:00 Hungary 0                 0.0304           0
##   79 2019-07-01 00:00:00 Hungary 0                 0.0485           0
##   80 2019-10-01 00:00:00 Hungary 0                 0.0388           0
##   81 2020-01-01 00:00:00 Hungary 0                 0.0365           0
##   82 2020-04-01 00:00:00 Hungary 1                 0.0478           0
##   83 2020-07-01 00:00:00 Hungary 0                 0.0356           0
##   84 2020-10-01 00:00:00 Hungary 0                 0.0403           0
##   85 2021-01-01 00:00:00 Hungary 0                 0.0355           0
##   86 2021-04-01 00:00:00 Hungary 0                 0.0329           0
##   87 2021-07-01 00:00:00 Hungary 0                 0.0414           0
##   88 2021-10-01 00:00:00 Hungary 0                 0.0521           0
##   89 2022-01-01 00:00:00 Hungary 0                 0.0744           0
##   90 2022-04-01 00:00:00 Hungary 0                 0.0715           0
##   91 2022-07-01 00:00:00 Hungary 0                 0.319            1
##   92 2022-10-01 00:00:00 Hungary 1                 0.433            1
##   93 2023-01-01 00:00:00 Hungary 1                 0.373            1
##   94 2023-04-01 00:00:00 Hungary 0                 0.304            1
##   95 2023-07-01 00:00:00 Hungary 0                 0.148            0
##   96 2023-10-01 00:00:00 Hungary 0                 0.095            0
##   97 2024-01-01 00:00:00 Hungary 0                 0.102            0
##   98 2024-04-01 00:00:00 Hungary 0                 0.0733           0
##   99 2024-07-01 00:00:00 Hungary 1                 0.0836           0
## 100 2024-10-01 00:00:00 Hungary 0                 0.0718           0
##
```

```
## $Ireland
## # A tibble: 100 x 5
##    year                country recession predicted_prob Predicted_Y
##    <dttm>              <chr>   <fct>              <dbl>       <dbl>
##  1 2000-01-01 00:00:00 Ireland 0                NA             NA
##  2 2000-04-01 00:00:00 Ireland 0                  0.162         0
##  3 2000-07-01 00:00:00 Ireland 0                  0.269         0
##  4 2000-10-01 00:00:00 Ireland 0                  0.323         1
##  5 2001-01-01 00:00:00 Ireland 0                  0.376         1
##  6 2001-04-01 00:00:00 Ireland 0                  0.421         1
##  7 2001-07-01 00:00:00 Ireland 0                  0.360         1
##  8 2001-10-01 00:00:00 Ireland 0                  0.276         0
##  9 2002-01-01 00:00:00 Ireland 0                  0.255         0
## 10 2002-04-01 00:00:00 Ireland 0                  0.204         0
## 11 2002-07-01 00:00:00 Ireland 0                  0.156         0
## 12 2002-10-01 00:00:00 Ireland 0                  0.178         0
## 13 2003-01-01 00:00:00 Ireland 0                  0.131         0
## 14 2003-04-01 00:00:00 Ireland 0                  0.117         0
## 15 2003-07-01 00:00:00 Ireland 0                  0.112         0
## 16 2003-10-01 00:00:00 Ireland 0                  0.0997        0
## 17 2004-01-01 00:00:00 Ireland 0                  0.079         0
## 18 2004-04-01 00:00:00 Ireland 0                  0.0969        0
## 19 2004-07-01 00:00:00 Ireland 0                  0.0764        0
## 20 2004-10-01 00:00:00 Ireland 0                  0.0633        0
## 21 2005-01-01 00:00:00 Ireland 0                  0.0716        0
## 22 2005-04-01 00:00:00 Ireland 0                  0.0682        0
## 23 2005-07-01 00:00:00 Ireland 0                  0.0718        0
## 24 2005-10-01 00:00:00 Ireland 0                  0.0816        0
## 25 2006-01-01 00:00:00 Ireland 0                  0.0941        0
## 26 2006-04-01 00:00:00 Ireland 0                  0.133         0
## 27 2006-07-01 00:00:00 Ireland 0                  0.116         0
## 28 2006-10-01 00:00:00 Ireland 0                  0.137         0
## 29 2007-01-01 00:00:00 Ireland 0                  0.220         0
## 30 2007-04-01 00:00:00 Ireland 0                  0.258         0
## 31 2007-07-01 00:00:00 Ireland 1                  0.227         0
## 32 2007-10-01 00:00:00 Ireland 0                  0.231         0
## 33 2008-01-01 00:00:00 Ireland 0                  0.274         0
## 34 2008-04-01 00:00:00 Ireland 1                  0.272         0
## 35 2008-07-01 00:00:00 Ireland 1                  0.288         0
## 36 2008-10-01 00:00:00 Ireland 1                  0.325         1
## 37 2009-01-01 00:00:00 Ireland 1                  0.465         1
## 38 2009-04-01 00:00:00 Ireland 1                  0.0877        0
## 39 2009-07-01 00:00:00 Ireland 1                  0.0607        0
```

```
## 40 2009-10-01 00:00:00 Ireland 1              0.0516          0
## 41 2010-01-01 00:00:00 Ireland 0              0.0528          0
## 42 2010-04-01 00:00:00 Ireland 0              0.0687          0
## 43 2010-07-01 00:00:00 Ireland 0              0.0802          0
## 44 2010-10-01 00:00:00 Ireland 0              0.224           0
## 45 2011-01-01 00:00:00 Ireland 0              0.186           0
## 46 2011-04-01 00:00:00 Ireland 0              0.192           0
## 47 2011-07-01 00:00:00 Ireland 0              0.0792          0
## 48 2011-10-01 00:00:00 Ireland 0              0.0256          0
## 49 2012-01-01 00:00:00 Ireland 0              0.037           0
## 50 2012-04-01 00:00:00 Ireland 0              0.0763          0
## 51 2012-07-01 00:00:00 Ireland 0              0.0251          0
## 52 2012-10-01 00:00:00 Ireland 0              0.0219          0
## 53 2013-01-01 00:00:00 Ireland 0              0.0234          0
## 54 2013-04-01 00:00:00 Ireland 0              0.0379          0
## 55 2013-07-01 00:00:00 Ireland 0              0.0488          0
## 56 2013-10-01 00:00:00 Ireland 0              0.0311          0
## 57 2014-01-01 00:00:00 Ireland 0              0.0298          0
## 58 2014-04-01 00:00:00 Ireland 0              0.0243          0
## 59 2014-07-01 00:00:00 Ireland 0              0.021           0
## 60 2014-10-01 00:00:00 Ireland 0              0.0212          0
## 61 2015-01-01 00:00:00 Ireland 0              0.0189          0
## 62 2015-04-01 00:00:00 Ireland 0              0.034           0
## 63 2015-07-01 00:00:00 Ireland 0              0.0339          0
## 64 2015-10-01 00:00:00 Ireland 0              0.024           0
## 65 2016-01-01 00:00:00 Ireland 0              0.0243          0
## 66 2016-04-01 00:00:00 Ireland 0              0.0219          0
## 67 2016-07-01 00:00:00 Ireland 0              0.0166          0
## 68 2016-10-01 00:00:00 Ireland 0              0.0303          0
## 69 2017-01-01 00:00:00 Ireland 0              0.0316          0
## 70 2017-04-01 00:00:00 Ireland 0              0.0195          0
## 71 2017-07-01 00:00:00 Ireland 0              0.0225          0
## 72 2017-10-01 00:00:00 Ireland 0              0.0197          0
## 73 2018-01-01 00:00:00 Ireland 0              0.0343          0
## 74 2018-04-01 00:00:00 Ireland 0              0.0225          0
## 75 2018-07-01 00:00:00 Ireland 0              0.0221          0
## 76 2018-10-01 00:00:00 Ireland 0              0.0258          0
## 77 2019-01-01 00:00:00 Ireland 0              0.0205          0
## 78 2019-04-01 00:00:00 Ireland 0              0.0164          0
## 79 2019-07-01 00:00:00 Ireland 0              0.016           0
## 80 2019-10-01 00:00:00 Ireland 0              0.0203          0
## 81 2020-01-01 00:00:00 Ireland 0              0.0187          0
## 82 2020-04-01 00:00:00 Ireland 0              0.0206          0
```

```
##  83 2020-07-01 00:00:00 Ireland 0                 0.0187           0
##  84 2020-10-01 00:00:00 Ireland 0                 0.0178           0
##  85 2021-01-01 00:00:00 Ireland 0                 0.0233           0
##  86 2021-04-01 00:00:00 Ireland 0                 0.0254           0
##  87 2021-07-01 00:00:00 Ireland 0                 0.0175           0
##  88 2021-10-01 00:00:00 Ireland 0                 0.024            0
##  89 2022-01-01 00:00:00 Ireland 0                 0.0325           0
##  90 2022-04-01 00:00:00 Ireland 0                 0.047            0
##  91 2022-07-01 00:00:00 Ireland 0                 0.0215           0
##  92 2022-10-01 00:00:00 Ireland 0                 0.0639           0
##  93 2023-01-01 00:00:00 Ireland 1                 0.129            0
##  94 2023-04-01 00:00:00 Ireland 1                 0.201            0
##  95 2023-07-01 00:00:00 Ireland 1                 0.330            1
##  96 2023-10-01 00:00:00 Ireland 1                 0.370            1
##  97 2024-01-01 00:00:00 Ireland 0                 0.378            1
##  98 2024-04-01 00:00:00 Ireland 0                 0.444            1
##  99 2024-07-01 00:00:00 Ireland 0                 0.364            1
## 100 2024-10-01 00:00:00 Ireland 0                 0.360            1
##
## $Italy
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Italy   0                NA               NA
##   2 2000-04-01 00:00:00 Italy   0                 0.0681           0
##   3 2000-07-01 00:00:00 Italy   0                 0.106            0
##   4 2000-10-01 00:00:00 Italy   0                 0.0908           0
##   5 2001-01-01 00:00:00 Italy   0                 0.143            0
##   6 2001-04-01 00:00:00 Italy   0                 0.269            0
##   7 2001-07-01 00:00:00 Italy   1                 0.249            0
##   8 2001-10-01 00:00:00 Italy   1                 0.320            1
##   9 2002-01-01 00:00:00 Italy   0                 0.35             1
##  10 2002-04-01 00:00:00 Italy   0                 0.256            0
##  11 2002-07-01 00:00:00 Italy   0                 0.115            0
##  12 2002-10-01 00:00:00 Italy   0                 0.204            0
##  13 2003-01-01 00:00:00 Italy   0                 0.153            0
##  14 2003-04-01 00:00:00 Italy   1                 0.178            0
##  15 2003-07-01 00:00:00 Italy   1                 0.274            0
##  16 2003-10-01 00:00:00 Italy   0                 0.254            0
##  17 2004-01-01 00:00:00 Italy   0                 0.179            0
##  18 2004-04-01 00:00:00 Italy   0                 0.261            0
##  19 2004-07-01 00:00:00 Italy   0                 0.162            0
##  20 2004-10-01 00:00:00 Italy   0                 0.0867           0
```

```
## 21 2005-01-01 00:00:00 Italy   0                 0.0917           0
## 22 2005-04-01 00:00:00 Italy   0                 0.0784           0
## 23 2005-07-01 00:00:00 Italy   0                 0.0711           0
## 24 2005-10-01 00:00:00 Italy   0                 0.0802           0
## 25 2006-01-01 00:00:00 Italy   0                 0.0779           0
## 26 2006-04-01 00:00:00 Italy   0                 0.172            0
## 27 2006-07-01 00:00:00 Italy   0                 0.0553           0
## 28 2006-10-01 00:00:00 Italy   0                 0.0335           0
## 29 2007-01-01 00:00:00 Italy   0                 0.0834           0
## 30 2007-04-01 00:00:00 Italy   0                 0.110            0
## 31 2007-07-01 00:00:00 Italy   0                 0.0492           0
## 32 2007-10-01 00:00:00 Italy   0                 0.0337           0
## 33 2008-01-01 00:00:00 Italy   0                 0.0729           0
## 34 2008-04-01 00:00:00 Italy   0                 0.0673           0
## 35 2008-07-01 00:00:00 Italy   1                 0.0739           0
## 36 2008-10-01 00:00:00 Italy   1                 0.185            0
## 37 2009-01-01 00:00:00 Italy   1                 0.815            1
## 38 2009-04-01 00:00:00 Italy   1                 0.463            1
## 39 2009-07-01 00:00:00 Italy   0                 0.366            1
## 40 2009-10-01 00:00:00 Italy   0                 0.323            1
## 41 2010-01-01 00:00:00 Italy   0                 0.333            1
## 42 2010-04-01 00:00:00 Italy   0                 0.316            1
## 43 2010-07-01 00:00:00 Italy   0                 0.192            0
## 44 2010-10-01 00:00:00 Italy   0                 0.332            1
## 45 2011-01-01 00:00:00 Italy   0                 0.541            1
## 46 2011-04-01 00:00:00 Italy   0                 0.276            0
## 47 2011-07-01 00:00:00 Italy   1                 0.648            1
## 48 2011-10-01 00:00:00 Italy   1                 0.926            1
## 49 2012-01-01 00:00:00 Italy   1                 0.460            1
## 50 2012-04-01 00:00:00 Italy   1                 0.782            1
## 51 2012-07-01 00:00:00 Italy   1                 0.760            1
## 52 2012-10-01 00:00:00 Italy   1                 0.333            1
## 53 2013-01-01 00:00:00 Italy   1                 0.374            1
## 54 2013-04-01 00:00:00 Italy   1                 0.360            1
## 55 2013-07-01 00:00:00 Italy   0                 0.546            1
## 56 2013-10-01 00:00:00 Italy   0                 0.318            1
## 57 2014-01-01 00:00:00 Italy   1                 0.170            0
## 58 2014-04-01 00:00:00 Italy   0                 0.108            0
## 59 2014-07-01 00:00:00 Italy   0                 0.0973           0
## 60 2014-10-01 00:00:00 Italy   0                 0.0763           0
## 61 2015-01-01 00:00:00 Italy   0                 0.0187           0
## 62 2015-04-01 00:00:00 Italy   0                 0.123            0
## 63 2015-07-01 00:00:00 Italy   0                 0.117            0
```

```
##  64 2015-10-01 00:00:00 Italy   0                 0.0494           0
##  65 2016-01-01 00:00:00 Italy   0                 0.0643           0
##  66 2016-04-01 00:00:00 Italy   0                 0.0739           0
##  67 2016-07-01 00:00:00 Italy   0                 0.0393           0
##  68 2016-10-01 00:00:00 Italy   0                 0.185            0
##  69 2017-01-01 00:00:00 Italy   0                 0.252            0
##  70 2017-04-01 00:00:00 Italy   0                 0.126            0
##  71 2017-07-01 00:00:00 Italy   0                 0.134            0
##  72 2017-10-01 00:00:00 Italy   0                 0.0759           0
##  73 2018-01-01 00:00:00 Italy   0                 0.141            0
##  74 2018-04-01 00:00:00 Italy   0                 0.187            0
##  75 2018-07-01 00:00:00 Italy   0                 0.427            1
##  76 2018-10-01 00:00:00 Italy   0                 0.404            1
##  77 2019-01-01 00:00:00 Italy   0                 0.119            0
##  78 2019-04-01 00:00:00 Italy   0                 0.139            0
##  79 2019-07-01 00:00:00 Italy   0                 0.0098           0
##  80 2019-10-01 00:00:00 Italy   1                 0.0491           0
##  81 2020-01-01 00:00:00 Italy   1                 0.0649           0
##  82 2020-04-01 00:00:00 Italy   1                 0.123            0
##  83 2020-07-01 00:00:00 Italy   0                 0.0262           0
##  84 2020-10-01 00:00:00 Italy   0                 0.0196           0
##  85 2021-01-01 00:00:00 Italy   0                 0.0344           0
##  86 2021-04-01 00:00:00 Italy   0                 0.0676           0
##  87 2021-07-01 00:00:00 Italy   0                 0.0297           0
##  88 2021-10-01 00:00:00 Italy   0                 0.0849           0
##  89 2022-01-01 00:00:00 Italy   0                 0.210            0
##  90 2022-04-01 00:00:00 Italy   0                 0.594            1
##  91 2022-07-01 00:00:00 Italy   0                 0.199            0
##  92 2022-10-01 00:00:00 Italy   0                 0.161            0
##  93 2023-01-01 00:00:00 Italy   0                 0.0654           0
##  94 2023-04-01 00:00:00 Italy   0                 0.0604           0
##  95 2023-07-01 00:00:00 Italy   0                 0.105            0
##  96 2023-10-01 00:00:00 Italy   0                 0.147            0
##  97 2024-01-01 00:00:00 Italy   0                 0.0466           0
##  98 2024-04-01 00:00:00 Italy   0                 0.154            0
##  99 2024-07-01 00:00:00 Italy   0                 0.124            0
## 100 2024-10-01 00:00:00 Italy   0                 0.183            0
##
## $Latvia
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Latvia  0                 NA              NA
```

```
##    2 2000-04-01 00:00:00 Latvia  0                NA                NA
##    3 2000-07-01 00:00:00 Latvia  0                NA                NA
##    4 2000-10-01 00:00:00 Latvia  0                NA                NA
##    5 2001-01-01 00:00:00 Latvia  0                NA                NA
##    6 2001-04-01 00:00:00 Latvia  0                 0.263             0
##    7 2001-07-01 00:00:00 Latvia  0                 0.281             0
##    8 2001-10-01 00:00:00 Latvia  0                 0.233             0
##    9 2002-01-01 00:00:00 Latvia  0                 0.131             0
##   10 2002-04-01 00:00:00 Latvia  0                 0.134             0
##   11 2002-07-01 00:00:00 Latvia  0                 0.139             0
##   12 2002-10-01 00:00:00 Latvia  0                 0.135             0
##   13 2003-01-01 00:00:00 Latvia  0                 0.134             0
##   14 2003-04-01 00:00:00 Latvia  0                 0.136             0
##   15 2003-07-01 00:00:00 Latvia  0                 0.141             0
##   16 2003-10-01 00:00:00 Latvia  0                 0.149             0
##   17 2004-01-01 00:00:00 Latvia  0                 0.153             0
##   18 2004-04-01 00:00:00 Latvia  0                 0.139             0
##   19 2004-07-01 00:00:00 Latvia  0                 0.133             0
##   20 2004-10-01 00:00:00 Latvia  0                 0.139             0
##   21 2005-01-01 00:00:00 Latvia  0                 0.103             0
##   22 2005-04-01 00:00:00 Latvia  0                 0.0777            0
##   23 2005-07-01 00:00:00 Latvia  0                 0.0849            0
##   24 2005-10-01 00:00:00 Latvia  0                 0.0922            0
##   25 2006-01-01 00:00:00 Latvia  0                 0.138             0
##   26 2006-04-01 00:00:00 Latvia  0                 0.128             0
##   27 2006-07-01 00:00:00 Latvia  0                 0.142             0
##   28 2006-10-01 00:00:00 Latvia  0                 0.111             0
##   29 2007-01-01 00:00:00 Latvia  0                 0.142             0
##   30 2007-04-01 00:00:00 Latvia  0                 0.379             1
##   31 2007-07-01 00:00:00 Latvia  0                 0.221             0
##   32 2007-10-01 00:00:00 Latvia  0                 0.503             1
##   33 2008-01-01 00:00:00 Latvia  0                 0.118             0
##   34 2008-04-01 00:00:00 Latvia  0                 0.104             0
##   35 2008-07-01 00:00:00 Latvia  1                 0.148             0
##   36 2008-10-01 00:00:00 Latvia  1                 0.604             1
##   37 2009-01-01 00:00:00 Latvia  1                 0.390             1
##   38 2009-04-01 00:00:00 Latvia  1                 0.812             1
##   39 2009-07-01 00:00:00 Latvia  1                 0.567             1
##   40 2009-10-01 00:00:00 Latvia  0                 0.387             1
##   41 2010-01-01 00:00:00 Latvia  0                 0.0307            0
##   42 2010-04-01 00:00:00 Latvia  0                 0.0673            0
##   43 2010-07-01 00:00:00 Latvia  1                 0.058             0
##   44 2010-10-01 00:00:00 Latvia  0                 0.0543            0
```

```
## 45 2011-01-01 00:00:00 Latvia 0                0.0544          0
## 46 2011-04-01 00:00:00 Latvia 0                0.0532          0
## 47 2011-07-01 00:00:00 Latvia 0                0.0558          0
## 48 2011-10-01 00:00:00 Latvia 0                0.0703          0
## 49 2012-01-01 00:00:00 Latvia 0                0.0665          0
## 50 2012-04-01 00:00:00 Latvia 0                0.0527          0
## 51 2012-07-01 00:00:00 Latvia 0                0.0582          0
## 52 2012-10-01 00:00:00 Latvia 0                0.0626          0
## 53 2013-01-01 00:00:00 Latvia 0                0.0625          0
## 54 2013-04-01 00:00:00 Latvia 0                0.0609          0
## 55 2013-07-01 00:00:00 Latvia 0                0.0683          0
## 56 2013-10-01 00:00:00 Latvia 0                0.0885          0
## 57 2014-01-01 00:00:00 Latvia 0                0.104           0
## 58 2014-04-01 00:00:00 Latvia 0                0.104           0
## 59 2014-07-01 00:00:00 Latvia 0                0.101           0
## 60 2014-10-01 00:00:00 Latvia 0                0.101           0
## 61 2015-01-01 00:00:00 Latvia 0                0.101           0
## 62 2015-04-01 00:00:00 Latvia 0                0.0991          0
## 63 2015-07-01 00:00:00 Latvia 0                0.099           0
## 64 2015-10-01 00:00:00 Latvia 0                0.0975          0
## 65 2016-01-01 00:00:00 Latvia 0                0.0963          0
## 66 2016-04-01 00:00:00 Latvia 0                0.0964          0
## 67 2016-07-01 00:00:00 Latvia 0                0.0958          0
## 68 2016-10-01 00:00:00 Latvia 0                0.0958          0
## 69 2017-01-01 00:00:00 Latvia 0                0.0954          0
## 70 2017-04-01 00:00:00 Latvia 0                0.0955          0
## 71 2017-07-01 00:00:00 Latvia 0                0.0955          0
## 72 2017-10-01 00:00:00 Latvia 0                0.0956          0
## 73 2018-01-01 00:00:00 Latvia 0                0.0956          0
## 74 2018-04-01 00:00:00 Latvia 0                0.0957          0
## 75 2018-07-01 00:00:00 Latvia 0                0.0959          0
## 76 2018-10-01 00:00:00 Latvia 0                0.096           0
## 77 2019-01-01 00:00:00 Latvia 0                0.0962          0
## 78 2019-04-01 00:00:00 Latvia 1                0.0957          0
## 79 2019-07-01 00:00:00 Latvia 0                0.093           0
## 80 2019-10-01 00:00:00 Latvia 0                0.0956          0
## 81 2020-01-01 00:00:00 Latvia 1                0.0956          0
## 82 2020-04-01 00:00:00 Latvia 1                0.0998          0
## 83 2020-07-01 00:00:00 Latvia 0                0.0917          0
## 84 2020-10-01 00:00:00 Latvia 0                0.092           0
## 85 2021-01-01 00:00:00 Latvia 0                0.0919          0
## 86 2021-04-01 00:00:00 Latvia 0                0.0922          0
## 87 2021-07-01 00:00:00 Latvia 0                0.092           0
```

```
##  88 2021-10-01 00:00:00 Latvia  0                0.0913          0
##  89 2022-01-01 00:00:00 Latvia  1                0.093           0
##  90 2022-04-01 00:00:00 Latvia  0                0.0992          0
##  91 2022-07-01 00:00:00 Latvia  0                0.122           0
##  92 2022-10-01 00:00:00 Latvia  0                0.138           0
##  93 2023-01-01 00:00:00 Latvia  0                0.132           0
##  94 2023-04-01 00:00:00 Latvia  0                0.132           0
##  95 2023-07-01 00:00:00 Latvia  0                0.127           0
##  96 2023-10-01 00:00:00 Latvia  0                0.121           0
##  97 2024-01-01 00:00:00 Latvia  1                0.117           0
##  98 2024-04-01 00:00:00 Latvia  1                0.113           0
##  99 2024-07-01 00:00:00 Latvia  1                0.109           0
## 100 2024-10-01 00:00:00 Latvia  0                0.099           0
##
## $Lithuania
## # A tibble: 100 x 5
##     year                country   recession predicted_prob Predicted_Y
##     <dttm>              <chr>     <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Lithuania 0                 NA              NA
##   2 2000-04-01 00:00:00 Lithuania 0                 NA              NA
##   3 2000-07-01 00:00:00 Lithuania 0                 NA              NA
##   4 2000-10-01 00:00:00 Lithuania 0                 NA              NA
##   5 2001-01-01 00:00:00 Lithuania 0                 NA              NA
##   6 2001-04-01 00:00:00 Lithuania 0                  0.0399          0
##   7 2001-07-01 00:00:00 Lithuania 0                  0.0746          0
##   8 2001-10-01 00:00:00 Lithuania 0                  0.016           0
##   9 2002-01-01 00:00:00 Lithuania 0                  0.0225          0
##  10 2002-04-01 00:00:00 Lithuania 0                  0.110           0
##  11 2002-07-01 00:00:00 Lithuania 0                  0.0295          0
##  12 2002-10-01 00:00:00 Lithuania 0                  0.0315          0
##  13 2003-01-01 00:00:00 Lithuania 0                  0.0298          0
##  14 2003-04-01 00:00:00 Lithuania 0                  0.0692          0
##  15 2003-07-01 00:00:00 Lithuania 0                  0.0326          0
##  16 2003-10-01 00:00:00 Lithuania 0                  0.0252          0
##  17 2004-01-01 00:00:00 Lithuania 0                  0.034           0
##  18 2004-04-01 00:00:00 Lithuania 0                  0.0296          0
##  19 2004-07-01 00:00:00 Lithuania 0                  0.046           0
##  20 2004-10-01 00:00:00 Lithuania 0                  0.0268          0
##  21 2005-01-01 00:00:00 Lithuania 0                  0.029           0
##  22 2005-04-01 00:00:00 Lithuania 0                  0.0509          0
##  23 2005-07-01 00:00:00 Lithuania 0                  0.0323          0
##  24 2005-10-01 00:00:00 Lithuania 0                  0.0413          0
##  25 2006-01-01 00:00:00 Lithuania 0                  0.0305          0
```

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## 26 2006-04-01 00:00:00 Lithuania 0                 0.0515          0
## 27 2006-07-01 00:00:00 Lithuania 0                 0.0304          0
## 28 2006-10-01 00:00:00 Lithuania 0                 0.0243          0
## 29 2007-01-01 00:00:00 Lithuania 0                 0.0257          0
## 30 2007-04-01 00:00:00 Lithuania 0                 0.0138          0
## 31 2007-07-01 00:00:00 Lithuania 0                 0.031           0
## 32 2007-10-01 00:00:00 Lithuania 0                 0.0056          0
## 33 2008-01-01 00:00:00 Lithuania 0                 0.117           0
## 34 2008-04-01 00:00:00 Lithuania 0                 0.0486          0
## 35 2008-07-01 00:00:00 Lithuania 0                 0.0356          0
## 36 2008-10-01 00:00:00 Lithuania 1                 0.0288          0
## 37 2009-01-01 00:00:00 Lithuania 1                 0.987           1
## 38 2009-04-01 00:00:00 Lithuania 1                 0.0938          0
## 39 2009-07-01 00:00:00 Lithuania 0                 0.0289          0
## 40 2009-10-01 00:00:00 Lithuania 0                 0.0919          0
## 41 2010-01-01 00:00:00 Lithuania 0                 0.0008          0
## 42 2010-04-01 00:00:00 Lithuania 0                 0.0171          0
## 43 2010-07-01 00:00:00 Lithuania 0                 0.041           0
## 44 2010-10-01 00:00:00 Lithuania 0                 0.0527          0
## 45 2011-01-01 00:00:00 Lithuania 0                 0.0596          0
## 46 2011-04-01 00:00:00 Lithuania 0                 0.0324          0
## 47 2011-07-01 00:00:00 Lithuania 0                 0.0351          0
## 48 2011-10-01 00:00:00 Lithuania 0                 0.0643          0
## 49 2012-01-01 00:00:00 Lithuania 0                 0.0693          0
## 50 2012-04-01 00:00:00 Lithuania 0                 0.0534          0
## 51 2012-07-01 00:00:00 Lithuania 0                 0.0399          0
## 52 2012-10-01 00:00:00 Lithuania 0                 0.031           0
## 53 2013-01-01 00:00:00 Lithuania 0                 0.0572          0
## 54 2013-04-01 00:00:00 Lithuania 0                 0.0234          0
## 55 2013-07-01 00:00:00 Lithuania 0                 0.0645          0
## 56 2013-10-01 00:00:00 Lithuania 0                 0.0652          0
## 57 2014-01-01 00:00:00 Lithuania 0                 0.0253          0
## 58 2014-04-01 00:00:00 Lithuania 0                 0.0341          0
## 59 2014-07-01 00:00:00 Lithuania 0                 0.0334          0
## 60 2014-10-01 00:00:00 Lithuania 0                 0.0295          0
## 61 2015-01-01 00:00:00 Lithuania 0                 0.0218          0
## 62 2015-04-01 00:00:00 Lithuania 0                 0.0342          0
## 63 2015-07-01 00:00:00 Lithuania 0                 0.0969          0
## 64 2015-10-01 00:00:00 Lithuania 0                 0.0478          0
## 65 2016-01-01 00:00:00 Lithuania 0                 0.0468          0
## 66 2016-04-01 00:00:00 Lithuania 0                 0.0318          0
## 67 2016-07-01 00:00:00 Lithuania 0                 0.0411          0
## 68 2016-10-01 00:00:00 Lithuania 0                 0.0255          0
```

```
##  69 2017-01-01 00:00:00 Lithuania 0                 0.0478           0
##  70 2017-04-01 00:00:00 Lithuania 0                 0.0471           0
##  71 2017-07-01 00:00:00 Lithuania 0                 0.047            0
##  72 2017-10-01 00:00:00 Lithuania 0                 0.047            0
##  73 2018-01-01 00:00:00 Lithuania 0                 0.047            0
##  74 2018-04-01 00:00:00 Lithuania 0                 0.0468           0
##  75 2018-07-01 00:00:00 Lithuania 0                 0.0467           0
##  76 2018-10-01 00:00:00 Lithuania 0                 0.0468           0
##  77 2019-01-01 00:00:00 Lithuania 0                 0.0466           0
##  78 2019-04-01 00:00:00 Lithuania 0                 0.0474           0
##  79 2019-07-01 00:00:00 Lithuania 0                 0.0515           0
##  80 2019-10-01 00:00:00 Lithuania 0                 0.0477           0
##  81 2020-01-01 00:00:00 Lithuania 0                 0.0475           0
##  82 2020-04-01 00:00:00 Lithuania 1                 0.0396           0
##  83 2020-07-01 00:00:00 Lithuania 0                 0.0509           0
##  84 2020-10-01 00:00:00 Lithuania 0                 0.0501           0
##  85 2021-01-01 00:00:00 Lithuania 0                 0.0484           0
##  86 2021-04-01 00:00:00 Lithuania 0                 0.0472           0
##  87 2021-07-01 00:00:00 Lithuania 0                 0.0476           0
##  88 2021-10-01 00:00:00 Lithuania 0                 0.0485           0
##  89 2022-01-01 00:00:00 Lithuania 0                 0.0453           0
##  90 2022-04-01 00:00:00 Lithuania 0                 0.0386           0
##  91 2022-07-01 00:00:00 Lithuania 0                 0.0156           0
##  92 2022-10-01 00:00:00 Lithuania 0                 0.0753           0
##  93 2023-01-01 00:00:00 Lithuania 1                 0.043            0
##  94 2023-04-01 00:00:00 Lithuania 0                 0.0152           0
##  95 2023-07-01 00:00:00 Lithuania 0                 0.0217           0
##  96 2023-10-01 00:00:00 Lithuania 0                 0.0287           0
##  97 2024-01-01 00:00:00 Lithuania 0                 0.0373           0
##  98 2024-04-01 00:00:00 Lithuania 0                 0.0413           0
##  99 2024-07-01 00:00:00 Lithuania 0                 0.0493           0
## 100 2024-10-01 00:00:00 Lithuania 0                 0.0712           0
##
## $Luxembourg
## # A tibble: 100 x 5
##     year                country    recession predicted_prob Predicted_Y
##     <dttm>              <chr>      <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Luxembourg 0                NA             NA
##   2 2000-04-01 00:00:00 Luxembourg 0                 0.0107         0
##   3 2000-07-01 00:00:00 Luxembourg 0                 0.0597         0
##   4 2000-10-01 00:00:00 Luxembourg 0                 0.0781         0
##   5 2001-01-01 00:00:00 Luxembourg 0                 0.142          0
##   6 2001-04-01 00:00:00 Luxembourg 0                 0.252          0
```

```
##   7 2001-07-01 00:00:00 Luxembourg 0                0.147           0
##   8 2001-10-01 00:00:00 Luxembourg 0                0.204           0
##   9 2002-01-01 00:00:00 Luxembourg 0                0.244           0
##  10 2002-04-01 00:00:00 Luxembourg 0                0.0882          0
##  11 2002-07-01 00:00:00 Luxembourg 0                0.0313          0
##  12 2002-10-01 00:00:00 Luxembourg 1                0.0441          0
##  13 2003-01-01 00:00:00 Luxembourg 1                0.0718          0
##  14 2003-04-01 00:00:00 Luxembourg 0                0.0834          0
##  15 2003-07-01 00:00:00 Luxembourg 0                0.0639          0
##  16 2003-10-01 00:00:00 Luxembourg 0                0.0926          0
##  17 2004-01-01 00:00:00 Luxembourg 0                0.0315          0
##  18 2004-04-01 00:00:00 Luxembourg 0                0.0793          0
##  19 2004-07-01 00:00:00 Luxembourg 0                0.0544          0
##  20 2004-10-01 00:00:00 Luxembourg 0                0.035           0
##  21 2005-01-01 00:00:00 Luxembourg 1                0.0764          0
##  22 2005-04-01 00:00:00 Luxembourg 0                0.0487          0
##  23 2005-07-01 00:00:00 Luxembourg 0                0.0757          0
##  24 2005-10-01 00:00:00 Luxembourg 0                0.126           0
##  25 2006-01-01 00:00:00 Luxembourg 0                0.0862          0
##  26 2006-04-01 00:00:00 Luxembourg 0                0.100           0
##  27 2006-07-01 00:00:00 Luxembourg 0                0.142           0
##  28 2006-10-01 00:00:00 Luxembourg 0                0.0799          0
##  29 2007-01-01 00:00:00 Luxembourg 0                0.132           0
##  30 2007-04-01 00:00:00 Luxembourg 0                0.260           0
##  31 2007-07-01 00:00:00 Luxembourg 0                0.0836          0
##  32 2007-10-01 00:00:00 Luxembourg 0                0.0888          0
##  33 2008-01-01 00:00:00 Luxembourg 0                0.176           0
##  34 2008-04-01 00:00:00 Luxembourg 0                0.149           0
##  35 2008-07-01 00:00:00 Luxembourg 1                0.182           0
##  36 2008-10-01 00:00:00 Luxembourg 1                0.233           0
##  37 2009-01-01 00:00:00 Luxembourg 1                0.738           1
##  38 2009-04-01 00:00:00 Luxembourg 0                0.186           0
##  39 2009-07-01 00:00:00 Luxembourg 0                0.0173          0
##  40 2009-10-01 00:00:00 Luxembourg 0                0.0108          0
##  41 2010-01-01 00:00:00 Luxembourg 0                0.015           0
##  42 2010-04-01 00:00:00 Luxembourg 0                0.0061          0
##  43 2010-07-01 00:00:00 Luxembourg 0                0.0049          0
##  44 2010-10-01 00:00:00 Luxembourg 0                0.0408          0
##  45 2011-01-01 00:00:00 Luxembourg 0                0.0642          0
##  46 2011-04-01 00:00:00 Luxembourg 0                0.0123          0
##  47 2011-07-01 00:00:00 Luxembourg 0                0.005           0
##  48 2011-10-01 00:00:00 Luxembourg 0                0.0324          0
##  49 2012-01-01 00:00:00 Luxembourg 0                0.0844          0
```

```
##   50 2012-04-01 00:00:00 Luxembourg 0                0.0744          0
##   51 2012-07-01 00:00:00 Luxembourg 0                0.0428          0
##   52 2012-10-01 00:00:00 Luxembourg 0                0.0416          0
##   53 2013-01-01 00:00:00 Luxembourg 0                0.0462          0
##   54 2013-04-01 00:00:00 Luxembourg 0                0.0336          0
##   55 2013-07-01 00:00:00 Luxembourg 0                0.119           0
##   56 2013-10-01 00:00:00 Luxembourg 0                0.0243          0
##   57 2014-01-01 00:00:00 Luxembourg 0                0.019           0
##   58 2014-04-01 00:00:00 Luxembourg 0                0.0163          0
##   59 2014-07-01 00:00:00 Luxembourg 0                0.019           0
##   60 2014-10-01 00:00:00 Luxembourg 0                0.0246          0
##   61 2015-01-01 00:00:00 Luxembourg 0                0.0209          0
##   62 2015-04-01 00:00:00 Luxembourg 0                0.071           0
##   63 2015-07-01 00:00:00 Luxembourg 0                0.0697          0
##   64 2015-10-01 00:00:00 Luxembourg 0                0.0395          0
##   65 2016-01-01 00:00:00 Luxembourg 0                0.0993          0
##   66 2016-04-01 00:00:00 Luxembourg 0                0.0317          0
##   67 2016-07-01 00:00:00 Luxembourg 0                0.028           0
##   68 2016-10-01 00:00:00 Luxembourg 0                0.0914          0
##   69 2017-01-01 00:00:00 Luxembourg 0                0.0842          0
##   70 2017-04-01 00:00:00 Luxembourg 0                0.0426          0
##   71 2017-07-01 00:00:00 Luxembourg 0                0.0496          0
##   72 2017-10-01 00:00:00 Luxembourg 0                0.0341          0
##   73 2018-01-01 00:00:00 Luxembourg 0                0.0602          0
##   74 2018-04-01 00:00:00 Luxembourg 0                0.0313          0
##   75 2018-07-01 00:00:00 Luxembourg 0                0.0327          0
##   76 2018-10-01 00:00:00 Luxembourg 0                0.0441          0
##   77 2019-01-01 00:00:00 Luxembourg 0                0.0263          0
##   78 2019-04-01 00:00:00 Luxembourg 0                0.0274          0
##   79 2019-07-01 00:00:00 Luxembourg 0                0.0259          0
##   80 2019-10-01 00:00:00 Luxembourg 0                0.0781          0
##   81 2020-01-01 00:00:00 Luxembourg 0                0.0513          0
##   82 2020-04-01 00:00:00 Luxembourg 1                0.051           0
##   83 2020-07-01 00:00:00 Luxembourg 0                0.0604          0
##   84 2020-10-01 00:00:00 Luxembourg 0                0.0551          0
##   85 2021-01-01 00:00:00 Luxembourg 0                0.0714          0
##   86 2021-04-01 00:00:00 Luxembourg 0                0.0707          0
##   87 2021-07-01 00:00:00 Luxembourg 0                0.0473          0
##   88 2021-10-01 00:00:00 Luxembourg 0                0.0843          0
##   89 2022-01-01 00:00:00 Luxembourg 0                0.118           0
##   90 2022-04-01 00:00:00 Luxembourg 1                0.298           0
##   91 2022-07-01 00:00:00 Luxembourg 0                0.0087          0
##   92 2022-10-01 00:00:00 Luxembourg 0                0.0157          0
```

```
##  93 2023-01-01 00:00:00 Luxembourg 0                 0.0197          0
##  94 2023-04-01 00:00:00 Luxembourg 0                 0.0532          0
##  95 2023-07-01 00:00:00 Luxembourg 1                 0.143           0
##  96 2023-10-01 00:00:00 Luxembourg 0                 0.161           0
##  97 2024-01-01 00:00:00 Luxembourg 0                 0.210           0
##  98 2024-04-01 00:00:00 Luxembourg 0                 0.380           1
##  99 2024-07-01 00:00:00 Luxembourg 0                 0.256           0
## 100 2024-10-01 00:00:00 Luxembourg 0                 0.386           1
##
## $Malta
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Malta   <NA>             NA               NA
##   2 2000-04-01 00:00:00 Malta   0                NA               NA
##   3 2000-07-01 00:00:00 Malta   0                NA               NA
##   4 2000-10-01 00:00:00 Malta   0                NA               NA
##   5 2001-01-01 00:00:00 Malta   0                NA               NA
##   6 2001-04-01 00:00:00 Malta   1                 0.117            0
##   7 2001-07-01 00:00:00 Malta   0                 0.0943           0
##   8 2001-10-01 00:00:00 Malta   0                 0.0536           0
##   9 2002-01-01 00:00:00 Malta   0                 0.0591           0
##  10 2002-04-01 00:00:00 Malta   0                 0.123            0
##  11 2002-07-01 00:00:00 Malta   0                 0.122            0
##  12 2002-10-01 00:00:00 Malta   0                 0.105            0
##  13 2003-01-01 00:00:00 Malta   0                 0.0743           0
##  14 2003-04-01 00:00:00 Malta   0                 0.105            0
##  15 2003-07-01 00:00:00 Malta   0                 0.0672           0
##  16 2003-10-01 00:00:00 Malta   0                 0.0431           0
##  17 2004-01-01 00:00:00 Malta   0                 0.0554           0
##  18 2004-04-01 00:00:00 Malta   0                 0.0572           0
##  19 2004-07-01 00:00:00 Malta   0                 0.0576           0
##  20 2004-10-01 00:00:00 Malta   0                 0.0529           0
##  21 2005-01-01 00:00:00 Malta   0                 0.055            0
##  22 2005-04-01 00:00:00 Malta   0                 0.102            0
##  23 2005-07-01 00:00:00 Malta   0                 0.0639           0
##  24 2005-10-01 00:00:00 Malta   0                 0.0431           0
##  25 2006-01-01 00:00:00 Malta   0                 0.0417           0
##  26 2006-04-01 00:00:00 Malta   0                 0.0664           0
##  27 2006-07-01 00:00:00 Malta   0                 0.0566           0
##  28 2006-10-01 00:00:00 Malta   0                 0.0471           0
##  29 2007-01-01 00:00:00 Malta   0                 0.054            0
##  30 2007-04-01 00:00:00 Malta   0                 0.0317           0
```

```
##   31 2007-07-01 00:00:00 Malta   0                 0.0387           0
##   32 2007-10-01 00:00:00 Malta   0                 0.0583           0
##   33 2008-01-01 00:00:00 Malta   0                 0.0197           0
##   34 2008-04-01 00:00:00 Malta   0                 0.0201           0
##   35 2008-07-01 00:00:00 Malta   0                 0.0147           0
##   36 2008-10-01 00:00:00 Malta   0                 0.0075           0
##   37 2009-01-01 00:00:00 Malta   0                 0.0001           0
##   38 2009-04-01 00:00:00 Malta   0                 0.0023           0
##   39 2009-07-01 00:00:00 Malta   0                 0.0134           0
##   40 2009-10-01 00:00:00 Malta   0                 0.0223           0
##   41 2010-01-01 00:00:00 Malta   0                 0.0106           0
##   42 2010-04-01 00:00:00 Malta   0                 0.0245           0
##   43 2010-07-01 00:00:00 Malta   0                 0.0584           0
##   44 2010-10-01 00:00:00 Malta   0                 0.0238           0
##   45 2011-01-01 00:00:00 Malta   0                 0.0161           0
##   46 2011-04-01 00:00:00 Malta   1                 0.0487           0
##   47 2011-07-01 00:00:00 Malta   0                 0.0943           0
##   48 2011-10-01 00:00:00 Malta   0                 0.0167           0
##   49 2012-01-01 00:00:00 Malta   0                 0.0134           0
##   50 2012-04-01 00:00:00 Malta   0                 0.0425           0
##   51 2012-07-01 00:00:00 Malta   0                 0.0392           0
##   52 2012-10-01 00:00:00 Malta   0                 0.0132           0
##   53 2013-01-01 00:00:00 Malta   0                 0.0166           0
##   54 2013-04-01 00:00:00 Malta   0                 0.0216           0
##   55 2013-07-01 00:00:00 Malta   0                 0.0112           0
##   56 2013-10-01 00:00:00 Malta   0                 0.013            0
##   57 2014-01-01 00:00:00 Malta   0                 0.0159           0
##   58 2014-04-01 00:00:00 Malta   0                 0.0138           0
##   59 2014-07-01 00:00:00 Malta   0                 0.0155           0
##   60 2014-10-01 00:00:00 Malta   0                 0.0111           0
##   61 2015-01-01 00:00:00 Malta   0                 0.0118           0
##   62 2015-04-01 00:00:00 Malta   0                 0.0025           0
##   63 2015-07-01 00:00:00 Malta   0                 0.0017           0
##   64 2015-10-01 00:00:00 Malta   0                 0.0056           0
##   65 2016-01-01 00:00:00 Malta   0                 0.0022           0
##   66 2016-04-01 00:00:00 Malta   0                 0.0018           0
##   67 2016-07-01 00:00:00 Malta   0                 0.0023           0
##   68 2016-10-01 00:00:00 Malta   0                 0.0008           0
##   69 2017-01-01 00:00:00 Malta   0                 0.0003           0
##   70 2017-04-01 00:00:00 Malta   0                 0.003            0
##   71 2017-07-01 00:00:00 Malta   0                 0.0035           0
##   72 2017-10-01 00:00:00 Malta   0                 0.0027           0
##   73 2018-01-01 00:00:00 Malta   0                 0.001            0
```

```
##  74 2018-04-01 00:00:00 Malta   0                 0.0026           0
##  75 2018-07-01 00:00:00 Malta   0                 0.0019           0
##  76 2018-10-01 00:00:00 Malta   0                 0.0026           0
##  77 2019-01-01 00:00:00 Malta   0                 0.0064           0
##  78 2019-04-01 00:00:00 Malta   0                 0.0033           0
##  79 2019-07-01 00:00:00 Malta   0                 0.0048           0
##  80 2019-10-01 00:00:00 Malta   0                 0.0005           0
##  81 2020-01-01 00:00:00 Malta   0                 0.0007           0
##  82 2020-04-01 00:00:00 Malta   0                 0.0004           0
##  83 2020-07-01 00:00:00 Malta   0                 0.0008           0
##  84 2020-10-01 00:00:00 Malta   0                 0.0016           0
##  85 2021-01-01 00:00:00 Malta   0                 0.0007           0
##  86 2021-04-01 00:00:00 Malta   0                 0.0006           0
##  87 2021-07-01 00:00:00 Malta   0                 0.001            0
##  88 2021-10-01 00:00:00 Malta   0                 0.0006           0
##  89 2022-01-01 00:00:00 Malta   0                 0.0004           0
##  90 2022-04-01 00:00:00 Malta   0                 0.0003           0
##  91 2022-07-01 00:00:00 Malta   0                 0.0071           0
##  92 2022-10-01 00:00:00 Malta   0                 0.0491           0
##  93 2023-01-01 00:00:00 Malta   0                 0.123            0
##  94 2023-04-01 00:00:00 Malta   0                 0.0563           0
##  95 2023-07-01 00:00:00 Malta   0                 0.0166           0
##  96 2023-10-01 00:00:00 Malta   0                 0.109            0
##  97 2024-01-01 00:00:00 Malta   0                 0.0334           0
##  98 2024-04-01 00:00:00 Malta   0                 0.04             0
##  99 2024-07-01 00:00:00 Malta   0                 0.0102           0
## 100 2024-10-01 00:00:00 Malta   1                 0.0288           0
##
## $Netherlands
## # A tibble: 100 x 5
##     year                country     recession predicted_prob Predicted_Y
##     <dttm>              <chr>       <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Netherlands 0                 NA              NA
##   2 2000-04-01 00:00:00 Netherlands 0                  0.110           0
##   3 2000-07-01 00:00:00 Netherlands 0                  0.138           0
##   4 2000-10-01 00:00:00 Netherlands 0                  0.148           0
##   5 2001-01-01 00:00:00 Netherlands 0                  0.170           0
##   6 2001-04-01 00:00:00 Netherlands 0                  0.189           0
##   7 2001-07-01 00:00:00 Netherlands 0                  0.174           0
##   8 2001-10-01 00:00:00 Netherlands 0                  0.181           0
##   9 2002-01-01 00:00:00 Netherlands 0                  0.166           0
##  10 2002-04-01 00:00:00 Netherlands 0                  0.146           0
##  11 2002-07-01 00:00:00 Netherlands 0                  0.128           0
```

```
## 12 2002-10-01 00:00:00 Netherlands 0                  0.149            0
## 13 2003-01-01 00:00:00 Netherlands 0                  0.146            0
## 14 2003-04-01 00:00:00 Netherlands 0                  0.155            0
## 15 2003-07-01 00:00:00 Netherlands 0                  0.157            0
## 16 2003-10-01 00:00:00 Netherlands 0                  0.142            0
## 17 2004-01-01 00:00:00 Netherlands 0                  0.128            0
## 18 2004-04-01 00:00:00 Netherlands 0                  0.143            0
## 19 2004-07-01 00:00:00 Netherlands 0                  0.128            0
## 20 2004-10-01 00:00:00 Netherlands 0                  0.121            0
## 21 2005-01-01 00:00:00 Netherlands 0                  0.134            0
## 22 2005-04-01 00:00:00 Netherlands 0                  0.134            0
## 23 2005-07-01 00:00:00 Netherlands 0                  0.144            0
## 24 2005-10-01 00:00:00 Netherlands 0                  0.146            0
## 25 2006-01-01 00:00:00 Netherlands 0                  0.145            0
## 26 2006-04-01 00:00:00 Netherlands 0                  0.161            0
## 27 2006-07-01 00:00:00 Netherlands 0                  0.138            0
## 28 2006-10-01 00:00:00 Netherlands 0                  0.142            0
## 29 2007-01-01 00:00:00 Netherlands 0                  0.168            0
## 30 2007-04-01 00:00:00 Netherlands 0                  0.172            0
## 31 2007-07-01 00:00:00 Netherlands 0                  0.153            0
## 32 2007-10-01 00:00:00 Netherlands 0                  0.160            0
## 33 2008-01-01 00:00:00 Netherlands 0                  0.178            0
## 34 2008-04-01 00:00:00 Netherlands 0                  0.179            0
## 35 2008-07-01 00:00:00 Netherlands 0                  0.177            0
## 36 2008-10-01 00:00:00 Netherlands 1                  0.190            0
## 37 2009-01-01 00:00:00 Netherlands 1                  0.263            0
## 38 2009-04-01 00:00:00 Netherlands 1                  0.169            0
## 39 2009-07-01 00:00:00 Netherlands 0                  0.134            0
## 40 2009-10-01 00:00:00 Netherlands 0                  0.123            0
## 41 2010-01-01 00:00:00 Netherlands 0                  0.122            0
## 42 2010-04-01 00:00:00 Netherlands 0                  0.113            0
## 43 2010-07-01 00:00:00 Netherlands 0                  0.108            0
## 44 2010-10-01 00:00:00 Netherlands 0                  0.138            0
## 45 2011-01-01 00:00:00 Netherlands 0                  0.152            0
## 46 2011-04-01 00:00:00 Netherlands 0                  0.123            0
## 47 2011-07-01 00:00:00 Netherlands 1                  0.107            0
## 48 2011-10-01 00:00:00 Netherlands 1                  0.138            0
## 49 2012-01-01 00:00:00 Netherlands 1                  0.158            0
## 50 2012-04-01 00:00:00 Netherlands 1                  0.152            0
## 51 2012-07-01 00:00:00 Netherlands 1                  0.144            0
## 52 2012-10-01 00:00:00 Netherlands 1                  0.142            0
## 53 2013-01-01 00:00:00 Netherlands 1                  0.142            0
## 54 2013-04-01 00:00:00 Netherlands 0                  0.141            0
```

```
## 55 2013-07-01 00:00:00 Netherlands 0                  0.153          0
## 56 2013-10-01 00:00:00 Netherlands 0                  0.131          0
## 57 2014-01-01 00:00:00 Netherlands 0                  0.126          0
## 58 2014-04-01 00:00:00 Netherlands 0                  0.13           0
## 59 2014-07-01 00:00:00 Netherlands 0                  0.129          0
## 60 2014-10-01 00:00:00 Netherlands 0                  0.136          0
## 61 2015-01-01 00:00:00 Netherlands 0                  0.132          0
## 62 2015-04-01 00:00:00 Netherlands 0                  0.168          0
## 63 2015-07-01 00:00:00 Netherlands 0                  0.158          0
## 64 2015-10-01 00:00:00 Netherlands 0                  0.143          0
## 65 2016-01-01 00:00:00 Netherlands 0                  0.141          0
## 66 2016-04-01 00:00:00 Netherlands 0                  0.149          0
## 67 2016-07-01 00:00:00 Netherlands 0                  0.142          0
## 68 2016-10-01 00:00:00 Netherlands 0                  0.166          0
## 69 2017-01-01 00:00:00 Netherlands 0                  0.157          0
## 70 2017-04-01 00:00:00 Netherlands 0                  0.150          0
## 71 2017-07-01 00:00:00 Netherlands 0                  0.149          0
## 72 2017-10-01 00:00:00 Netherlands 0                  0.143          0
## 73 2018-01-01 00:00:00 Netherlands 0                  0.155          0
## 74 2018-04-01 00:00:00 Netherlands 0                  0.144          0
## 75 2018-07-01 00:00:00 Netherlands 0                  0.140          0
## 76 2018-10-01 00:00:00 Netherlands 0                  0.148          0
## 77 2019-01-01 00:00:00 Netherlands 0                  0.138          0
## 78 2019-04-01 00:00:00 Netherlands 0                  0.146          0
## 79 2019-07-01 00:00:00 Netherlands 0                  0.140          0
## 80 2019-10-01 00:00:00 Netherlands 0                  0.166          0
## 81 2020-01-01 00:00:00 Netherlands 0                  0.154          0
## 82 2020-04-01 00:00:00 Netherlands 1                  0.154          0
## 83 2020-07-01 00:00:00 Netherlands 0                  0.160          0
## 84 2020-10-01 00:00:00 Netherlands 0                  0.156          0
## 85 2021-01-01 00:00:00 Netherlands 0                  0.166          0
## 86 2021-04-01 00:00:00 Netherlands 0                  0.165          0
## 87 2021-07-01 00:00:00 Netherlands 0                  0.149          0
## 88 2021-10-01 00:00:00 Netherlands 0                  0.164          0
## 89 2022-01-01 00:00:00 Netherlands 0                  0.17           0
## 90 2022-04-01 00:00:00 Netherlands 0                  0.186          0
## 91 2022-07-01 00:00:00 Netherlands 0                  0.124          0
## 92 2022-10-01 00:00:00 Netherlands 1                  0.129          0
## 93 2023-01-01 00:00:00 Netherlands 1                  0.136          0
## 94 2023-04-01 00:00:00 Netherlands 1                  0.148          0
## 95 2023-07-01 00:00:00 Netherlands 1                  0.176          0
## 96 2023-10-01 00:00:00 Netherlands 0                  0.179          0
## 97 2024-01-01 00:00:00 Netherlands 0                  0.184          0
```

```
##  98 2024-04-01 00:00:00 Netherlands 0                  0.213           0
##  99 2024-07-01 00:00:00 Netherlands 0                  0.194           0
## 100 2024-10-01 00:00:00 Netherlands 0                  0.211           0
##
## $Poland
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Poland  0                 NA              NA
##   2 2000-04-01 00:00:00 Poland  0                 NA              NA
##   3 2000-07-01 00:00:00 Poland  0                 NA              NA
##   4 2000-10-01 00:00:00 Poland  0                 NA              NA
##   5 2001-01-01 00:00:00 Poland  0                 NA              NA
##   6 2001-04-01 00:00:00 Poland  1                  0.880           1
##   7 2001-07-01 00:00:00 Poland  0                  0.222           0
##   8 2001-10-01 00:00:00 Poland  0                  0.0198          0
##   9 2002-01-01 00:00:00 Poland  0                  0.115           0
##  10 2002-04-01 00:00:00 Poland  0                  0.0116          0
##  11 2002-07-01 00:00:00 Poland  0                  0.0092          0
##  12 2002-10-01 00:00:00 Poland  0                  0.0062          0
##  13 2003-01-01 00:00:00 Poland  0                  0.0087          0
##  14 2003-04-01 00:00:00 Poland  0                  0.0095          0
##  15 2003-07-01 00:00:00 Poland  0                  0.0047          0
##  16 2003-10-01 00:00:00 Poland  0                  0.0001          0
##  17 2004-01-01 00:00:00 Poland  0                  0               0
##  18 2004-04-01 00:00:00 Poland  0                  0               0
##  19 2004-07-01 00:00:00 Poland  0                  0               0
##  20 2004-10-01 00:00:00 Poland  0                  0               0
##  21 2005-01-01 00:00:00 Poland  0                  0.0008          0
##  22 2005-04-01 00:00:00 Poland  0                  0.0082          0
##  23 2005-07-01 00:00:00 Poland  0                  0.004           0
##  24 2005-10-01 00:00:00 Poland  0                  0.0023          0
##  25 2006-01-01 00:00:00 Poland  0                  0.0007          0
##  26 2006-04-01 00:00:00 Poland  0                  0.0007          0
##  27 2006-07-01 00:00:00 Poland  0                  0.0001          0
##  28 2006-10-01 00:00:00 Poland  0                  0               0
##  29 2007-01-01 00:00:00 Poland  0                  0.0001          0
##  30 2007-04-01 00:00:00 Poland  0                  0.0001          0
##  31 2007-07-01 00:00:00 Poland  0                  0               0
##  32 2007-10-01 00:00:00 Poland  0                  0.0001          0
##  33 2008-01-01 00:00:00 Poland  0                  0.0002          0
##  34 2008-04-01 00:00:00 Poland  0                  0.0005          0
##  35 2008-07-01 00:00:00 Poland  0                  0.0013          0
```

```
## 36 2008-10-01 00:00:00 Poland 0                 0.0039           0
## 37 2009-01-01 00:00:00 Poland 0                 0.0228           0
## 38 2009-04-01 00:00:00 Poland 0                 0                0
## 39 2009-07-01 00:00:00 Poland 0                 0                0
## 40 2009-10-01 00:00:00 Poland 0                 0                0
## 41 2010-01-01 00:00:00 Poland 0                 0                0
## 42 2010-04-01 00:00:00 Poland 0                 0                0
## 43 2010-07-01 00:00:00 Poland 0                 0                0
## 44 2010-10-01 00:00:00 Poland 0                 0                0
## 45 2011-01-01 00:00:00 Poland 0                 0                0
## 46 2011-04-01 00:00:00 Poland 0                 0                0
## 47 2011-07-01 00:00:00 Poland 0                 0                0
## 48 2011-10-01 00:00:00 Poland 0                 0                0
## 49 2012-01-01 00:00:00 Poland 0                 0.0001           0
## 50 2012-04-01 00:00:00 Poland 0                 0.0003           0
## 51 2012-07-01 00:00:00 Poland 0                 0.0008           0
## 52 2012-10-01 00:00:00 Poland 0                 0.0067           0
## 53 2013-01-01 00:00:00 Poland 1                 0.0288           0
## 54 2013-04-01 00:00:00 Poland 0                 0.0142           0
## 55 2013-07-01 00:00:00 Poland 0                 0.0051           0
## 56 2013-10-01 00:00:00 Poland 0                 0.0001           0
## 57 2014-01-01 00:00:00 Poland 0                 0.0001           0
## 58 2014-04-01 00:00:00 Poland 0                 0.0001           0
## 59 2014-07-01 00:00:00 Poland 0                 0.0013           0
## 60 2014-10-01 00:00:00 Poland 0                 0.011            0
## 61 2015-01-01 00:00:00 Poland 0                 0.0245           0
## 62 2015-04-01 00:00:00 Poland 0                 0.0519           0
## 63 2015-07-01 00:00:00 Poland 0                 0.006            0
## 64 2015-10-01 00:00:00 Poland 0                 0.0035           0
## 65 2016-01-01 00:00:00 Poland 0                 0.0072           0
## 66 2016-04-01 00:00:00 Poland 0                 0.003            0
## 67 2016-07-01 00:00:00 Poland 0                 0.0025           0
## 68 2016-10-01 00:00:00 Poland 0                 0.0058           0
## 69 2017-01-01 00:00:00 Poland 0                 0.0008           0
## 70 2017-04-01 00:00:00 Poland 0                 0.0001           0
## 71 2017-07-01 00:00:00 Poland 0                 0.0008           0
## 72 2017-10-01 00:00:00 Poland 0                 0.0009           0
## 73 2018-01-01 00:00:00 Poland 0                 0.0007           0
## 74 2018-04-01 00:00:00 Poland 0                 0.0008           0
## 75 2018-07-01 00:00:00 Poland 0                 0.0014           0
## 76 2018-10-01 00:00:00 Poland 0                 0.0014           0
## 77 2019-01-01 00:00:00 Poland 0                 0.002            0
## 78 2019-04-01 00:00:00 Poland 0                 0.0086           0
```

```
##  79 2019-07-01 00:00:00 Poland  0                 0.0144           0
##  80 2019-10-01 00:00:00 Poland  0                 0.0754           0
##  81 2020-01-01 00:00:00 Poland  0                 0.0879           0
##  82 2020-04-01 00:00:00 Poland  0                 0.146            0
##  83 2020-07-01 00:00:00 Poland  0                 0.0576           0
##  84 2020-10-01 00:00:00 Poland  0                 0.0399           0
##  85 2021-01-01 00:00:00 Poland  0                 0.0482           0
##  86 2021-04-01 00:00:00 Poland  0                 0.0356           0
##  87 2021-07-01 00:00:00 Poland  0                 0.0111           0
##  88 2021-10-01 00:00:00 Poland  0                 0.0025           0
##  89 2022-01-01 00:00:00 Poland  0                 0.0004           0
##  90 2022-04-01 00:00:00 Poland  0                 0.0002           0
##  91 2022-07-01 00:00:00 Poland  0                 0.0001           0
##  92 2022-10-01 00:00:00 Poland  0                 0.0047           0
##  93 2023-01-01 00:00:00 Poland  0                 0.0001           0
##  94 2023-04-01 00:00:00 Poland  0                 0.003            0
##  95 2023-07-01 00:00:00 Poland  0                 0.0069           0
##  96 2023-10-01 00:00:00 Poland  0                 0.0149           0
##  97 2024-01-01 00:00:00 Poland  0                 0.0015           0
##  98 2024-04-01 00:00:00 Poland  0                 0.0045           0
##  99 2024-07-01 00:00:00 Poland  0                 0.0011           0
## 100 2024-10-01 00:00:00 Poland  0                 0.0032           0
##
## $Portugal
## # A tibble: 100 x 5
##    year                country  recession predicted_prob Predicted_Y
##    <dttm>              <chr>    <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Portugal 0                 NA               NA
##   2 2000-04-01 00:00:00 Portugal 0                  0.127            0
##   3 2000-07-01 00:00:00 Portugal 0                  0.182            0
##   4 2000-10-01 00:00:00 Portugal 0                  0.195            0
##   5 2001-01-01 00:00:00 Portugal 0                  0.229            0
##   6 2001-04-01 00:00:00 Portugal 0                  0.302            1
##   7 2001-07-01 00:00:00 Portugal 0                  0.268            0
##   8 2001-10-01 00:00:00 Portugal 0                  0.219            0
##   9 2002-01-01 00:00:00 Portugal 0                  0.223            0
##  10 2002-04-01 00:00:00 Portugal 0                  0.196            0
##  11 2002-07-01 00:00:00 Portugal 1                  0.123            0
##  12 2002-10-01 00:00:00 Portugal 1                  0.136            0
##  13 2003-01-01 00:00:00 Portugal 0                  0.0932           0
##  14 2003-04-01 00:00:00 Portugal 0                  0.0883           0
##  15 2003-07-01 00:00:00 Portugal 0                  0.110            0
##  16 2003-10-01 00:00:00 Portugal 0                  0.103            0
```

```
## 17 2004-01-01 00:00:00 Portugal 0                0.0724           0
## 18 2004-04-01 00:00:00 Portugal 0                0.107            0
## 19 2004-07-01 00:00:00 Portugal 0                0.0724           0
## 20 2004-10-01 00:00:00 Portugal 0                0.0449           0
## 21 2005-01-01 00:00:00 Portugal 0                0.0457           0
## 22 2005-04-01 00:00:00 Portugal 0                0.037            0
## 23 2005-07-01 00:00:00 Portugal 0                0.0425           0
## 24 2005-10-01 00:00:00 Portugal 0                0.0425           0
## 25 2006-01-01 00:00:00 Portugal 0                0.0462           0
## 26 2006-04-01 00:00:00 Portugal 0                0.0804           0
## 27 2006-07-01 00:00:00 Portugal 0                0.0598           0
## 28 2006-10-01 00:00:00 Portugal 0                0.0558           0
## 29 2007-01-01 00:00:00 Portugal 0                0.0964           0
## 30 2007-04-01 00:00:00 Portugal 0                0.132            0
## 31 2007-07-01 00:00:00 Portugal 0                0.0977           0
## 32 2007-10-01 00:00:00 Portugal 0                0.0753           0
## 33 2008-01-01 00:00:00 Portugal 0                0.109            0
## 34 2008-04-01 00:00:00 Portugal 1                0.102            0
## 35 2008-07-01 00:00:00 Portugal 1                0.116            0
## 36 2008-10-01 00:00:00 Portugal 1                0.122            0
## 37 2009-01-01 00:00:00 Portugal 1                0.365            1
## 38 2009-04-01 00:00:00 Portugal 0                0.128            0
## 39 2009-07-01 00:00:00 Portugal 0                0.0905           0
## 40 2009-10-01 00:00:00 Portugal 0                0.0832           0
## 41 2010-01-01 00:00:00 Portugal 0                0.165            0
## 42 2010-04-01 00:00:00 Portugal 0                0.261            0
## 43 2010-07-01 00:00:00 Portugal 0                0.249            0
## 44 2010-10-01 00:00:00 Portugal 0                0.391            1
## 45 2011-01-01 00:00:00 Portugal 1                0.513            1
## 46 2011-04-01 00:00:00 Portugal 1                0.923            1
## 47 2011-07-01 00:00:00 Portugal 1                0.962            1
## 48 2011-10-01 00:00:00 Portugal 1                0.962            1
## 49 2012-01-01 00:00:00 Portugal 1                0.991            1
## 50 2012-04-01 00:00:00 Portugal 1                0.788            1
## 51 2012-07-01 00:00:00 Portugal 1                0.596            1
## 52 2012-10-01 00:00:00 Portugal 1                0.341            1
## 53 2013-01-01 00:00:00 Portugal 0                0.148            0
## 54 2013-04-01 00:00:00 Portugal 0                0.260            0
## 55 2013-07-01 00:00:00 Portugal 0                0.525            1
## 56 2013-10-01 00:00:00 Portugal 0                0.221            0
## 57 2014-01-01 00:00:00 Portugal 0                0.075            0
## 58 2014-04-01 00:00:00 Portugal 0                0.0331           0
## 59 2014-07-01 00:00:00 Portugal 0                0.0649           0
```

```
##  60 2014-10-01 00:00:00 Portugal 0                 0.0404           0
##  61 2015-01-01 00:00:00 Portugal 0                 0.013            0
##  62 2015-04-01 00:00:00 Portugal 0                 0.0411           0
##  63 2015-07-01 00:00:00 Portugal 0                 0.0476           0
##  64 2015-10-01 00:00:00 Portugal 0                 0.035            0
##  65 2016-01-01 00:00:00 Portugal 0                 0.0734           0
##  66 2016-04-01 00:00:00 Portugal 0                 0.0722           0
##  67 2016-07-01 00:00:00 Portugal 0                 0.0549           0
##  68 2016-10-01 00:00:00 Portugal 0                 0.105            0
##  69 2017-01-01 00:00:00 Portugal 0                 0.141            0
##  70 2017-04-01 00:00:00 Portugal 0                 0.044            0
##  71 2017-07-01 00:00:00 Portugal 0                 0.0327           0
##  72 2017-10-01 00:00:00 Portugal 0                 0.0132           0
##  73 2018-01-01 00:00:00 Portugal 0                 0.0202           0
##  74 2018-04-01 00:00:00 Portugal 0                 0.0193           0
##  75 2018-07-01 00:00:00 Portugal 0                 0.0219           0
##  76 2018-10-01 00:00:00 Portugal 0                 0.0228           0
##  77 2019-01-01 00:00:00 Portugal 0                 0.0118           0
##  78 2019-04-01 00:00:00 Portugal 0                 0.0054           0
##  79 2019-07-01 00:00:00 Portugal 0                 0.0029           0
##  80 2019-10-01 00:00:00 Portugal 0                 0.0053           0
##  81 2020-01-01 00:00:00 Portugal 0                 0.0065           0
##  82 2020-04-01 00:00:00 Portugal 1                 0.0088           0
##  83 2020-07-01 00:00:00 Portugal 0                 0.0044           0
##  84 2020-10-01 00:00:00 Portugal 0                 0.0036           0
##  85 2021-01-01 00:00:00 Portugal 0                 0.0051           0
##  86 2021-04-01 00:00:00 Portugal 0                 0.0086           0
##  87 2021-07-01 00:00:00 Portugal 0                 0.0042           0
##  88 2021-10-01 00:00:00 Portugal 0                 0.0075           0
##  89 2022-01-01 00:00:00 Portugal 0                 0.0166           0
##  90 2022-04-01 00:00:00 Portugal 0                 0.0611           0
##  91 2022-07-01 00:00:00 Portugal 0                 0.0174           0
##  92 2022-10-01 00:00:00 Portugal 0                 0.042            0
##  93 2023-01-01 00:00:00 Portugal 0                 0.0577           0
##  94 2023-04-01 00:00:00 Portugal 0                 0.0686           0
##  95 2023-07-01 00:00:00 Portugal 0                 0.128            0
##  96 2023-10-01 00:00:00 Portugal 0                 0.138            0
##  97 2024-01-01 00:00:00 Portugal 0                 0.128            0
##  98 2024-04-01 00:00:00 Portugal 0                 0.182            0
##  99 2024-07-01 00:00:00 Portugal 0                 0.135            0
## 100 2024-10-01 00:00:00 Portugal 0                 0.148            0
##
## $Romania
```

```
## # A tibble: 100 x 5
##    year                country recession predicted_prob Predicted_Y
##    <dttm>              <chr>   <fct>              <dbl>       <dbl>
##  1 2000-01-01 00:00:00 Romania 0               NA               NA
##  2 2000-04-01 00:00:00 Romania 0               NA               NA
##  3 2000-07-01 00:00:00 Romania 0               NA               NA
##  4 2000-10-01 00:00:00 Romania 0               NA               NA
##  5 2001-01-01 00:00:00 Romania 0               NA               NA
##  6 2001-04-01 00:00:00 Romania 0               NA               NA
##  7 2001-07-01 00:00:00 Romania 0               NA               NA
##  8 2001-10-01 00:00:00 Romania 0               NA               NA
##  9 2002-01-01 00:00:00 Romania 0               NA               NA
## 10 2002-04-01 00:00:00 Romania 0               NA               NA
## 11 2002-07-01 00:00:00 Romania 0               NA               NA
## 12 2002-10-01 00:00:00 Romania 0               NA               NA
## 13 2003-01-01 00:00:00 Romania 0               NA               NA
## 14 2003-04-01 00:00:00 Romania 0               NA               NA
## 15 2003-07-01 00:00:00 Romania 0               NA               NA
## 16 2003-10-01 00:00:00 Romania 0               NA               NA
## 17 2004-01-01 00:00:00 Romania 0               NA               NA
## 18 2004-04-01 00:00:00 Romania 0               NA               NA
## 19 2004-07-01 00:00:00 Romania 0               NA               NA
## 20 2004-10-01 00:00:00 Romania 0               NA               NA
## 21 2005-01-01 00:00:00 Romania 0               NA               NA
## 22 2005-04-01 00:00:00 Romania 0               NA               NA
## 23 2005-07-01 00:00:00 Romania 0                0.0064           0
## 24 2005-10-01 00:00:00 Romania 0                0.0194           0
## 25 2006-01-01 00:00:00 Romania 0                0.0039           0
## 26 2006-04-01 00:00:00 Romania 0                0.0041           0
## 27 2006-07-01 00:00:00 Romania 0                0.0043           0
## 28 2006-10-01 00:00:00 Romania 0                0.0057           0
## 29 2007-01-01 00:00:00 Romania 0                0.012            0
## 30 2007-04-01 00:00:00 Romania 0                0.0086           0
## 31 2007-07-01 00:00:00 Romania 0                0.0121           0
## 32 2007-10-01 00:00:00 Romania 0                0.0074           0
## 33 2008-01-01 00:00:00 Romania 0                0.0024           0
## 34 2008-04-01 00:00:00 Romania 0                0.0012           0
## 35 2008-07-01 00:00:00 Romania 0                0.0017           0
## 36 2008-10-01 00:00:00 Romania 0                0.0003           0
## 37 2009-01-01 00:00:00 Romania 0                0.0037           0
## 38 2009-04-01 00:00:00 Romania 0                0.0106           0
## 39 2009-07-01 00:00:00 Romania 0                0.0276           0
## 40 2009-10-01 00:00:00 Romania 0                0.0018           0
```

```
## 41 2010-01-01 00:00:00 Romania 0                 0.0245           0
## 42 2010-04-01 00:00:00 Romania 0                 0.0176           0
## 43 2010-07-01 00:00:00 Romania 0                 0.0132           0
## 44 2010-10-01 00:00:00 Romania 0                 0.0174           0
## 45 2011-01-01 00:00:00 Romania 0                 0.0217           0
## 46 2011-04-01 00:00:00 Romania 0                 0.0208           0
## 47 2011-07-01 00:00:00 Romania 0                 0.0171           0
## 48 2011-10-01 00:00:00 Romania 0                 0.0167           0
## 49 2012-01-01 00:00:00 Romania 0                 0.0278           0
## 50 2012-04-01 00:00:00 Romania 0                 0.0238           0
## 51 2012-07-01 00:00:00 Romania 0                 0.0205           0
## 52 2012-10-01 00:00:00 Romania 1                 0.023            0
## 53 2013-01-01 00:00:00 Romania 0                 0.0176           0
## 54 2013-04-01 00:00:00 Romania 0                 0.0308           0
## 55 2013-07-01 00:00:00 Romania 0                 0.0309           0
## 56 2013-10-01 00:00:00 Romania 0                 0.0554           0
## 57 2014-01-01 00:00:00 Romania 0                 0.0451           0
## 58 2014-04-01 00:00:00 Romania 0                 0.0418           0
## 59 2014-07-01 00:00:00 Romania 0                 0.0447           0
## 60 2014-10-01 00:00:00 Romania 0                 0.0536           0
## 61 2015-01-01 00:00:00 Romania 0                 0.0599           0
## 62 2015-04-01 00:00:00 Romania 0                 0.086            0
## 63 2015-07-01 00:00:00 Romania 0                 0.0843           0
## 64 2015-10-01 00:00:00 Romania 1                 0.0754           0
## 65 2016-01-01 00:00:00 Romania 0                 0.0828           0
## 66 2016-04-01 00:00:00 Romania 0                 0.081            0
## 67 2016-07-01 00:00:00 Romania 0                 0.0692           0
## 68 2016-10-01 00:00:00 Romania 0                 0.0867           0
## 69 2017-01-01 00:00:00 Romania 0                 0.0899           0
## 70 2017-04-01 00:00:00 Romania 0                 0.0771           0
## 71 2017-07-01 00:00:00 Romania 0                 0.0819           0
## 72 2017-10-01 00:00:00 Romania 0                 0.0681           0
## 73 2018-01-01 00:00:00 Romania 0                 0.0696           0
## 74 2018-04-01 00:00:00 Romania 0                 0.0584           0
## 75 2018-07-01 00:00:00 Romania 0                 0.0526           0
## 76 2018-10-01 00:00:00 Romania 0                 0.0593           0
## 77 2019-01-01 00:00:00 Romania 0                 0.0604           0
## 78 2019-04-01 00:00:00 Romania 0                 0.0569           0
## 79 2019-07-01 00:00:00 Romania 0                 0.0525           0
## 80 2019-10-01 00:00:00 Romania 0                 0.0596           0
## 81 2020-01-01 00:00:00 Romania 0                 0.0601           0
## 82 2020-04-01 00:00:00 Romania 1                 0.0855           0
## 83 2020-07-01 00:00:00 Romania 0                 0.0716           0
```

```
##  84 2020-10-01 00:00:00 Romania 0                 0.0638          0
##  85 2021-01-01 00:00:00 Romania 0                 0.0829          0
##  86 2021-04-01 00:00:00 Romania 0                 0.0883          0
##  87 2021-07-01 00:00:00 Romania 0                 0.0996          0
##  88 2021-10-01 00:00:00 Romania 0                 0.0891          0
##  89 2022-01-01 00:00:00 Romania 0                 0.058           0
##  90 2022-04-01 00:00:00 Romania 0                 0.0482          0
##  91 2022-07-01 00:00:00 Romania 0                 0.0153          0
##  92 2022-10-01 00:00:00 Romania 0                 0.0107          0
##  93 2023-01-01 00:00:00 Romania 0                 0.0114          0
##  94 2023-04-01 00:00:00 Romania 0                 0.0107          0
##  95 2023-07-01 00:00:00 Romania 0                 0.0135          0
##  96 2023-10-01 00:00:00 Romania 0                 0.0119          0
##  97 2024-01-01 00:00:00 Romania 0                 0.0103          0
##  98 2024-04-01 00:00:00 Romania 0                 0.0124          0
##  99 2024-07-01 00:00:00 Romania 0                 0.0176          0
## 100 2024-10-01 00:00:00 Romania 0                 0.0329          0
##
## $Slovakia
## # A tibble: 100 x 5
##     year                country  recession predicted_prob Predicted_Y
##     <dttm>              <chr>    <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Slovakia 0                 NA              NA
##   2 2000-04-01 00:00:00 Slovakia 0                 NA              NA
##   3 2000-07-01 00:00:00 Slovakia 0                 NA              NA
##   4 2000-10-01 00:00:00 Slovakia 0                  0               0
##   5 2001-01-01 00:00:00 Slovakia 0                  0               0
##   6 2001-04-01 00:00:00 Slovakia 0                  0               0
##   7 2001-07-01 00:00:00 Slovakia 0                  0               0
##   8 2001-10-01 00:00:00 Slovakia 0                  0               0
##   9 2002-01-01 00:00:00 Slovakia 0                  0               0
##  10 2002-04-01 00:00:00 Slovakia 0                  0               0
##  11 2002-07-01 00:00:00 Slovakia 0                  0               0
##  12 2002-10-01 00:00:00 Slovakia 0                  0               0
##  13 2003-01-01 00:00:00 Slovakia 0                  0               0
##  14 2003-04-01 00:00:00 Slovakia 0                  0               0
##  15 2003-07-01 00:00:00 Slovakia 0                  0               0
##  16 2003-10-01 00:00:00 Slovakia 0                  0               0
##  17 2004-01-01 00:00:00 Slovakia 0                  0               0
##  18 2004-04-01 00:00:00 Slovakia 0                  0               0
##  19 2004-07-01 00:00:00 Slovakia 0                  0               0
##  20 2004-10-01 00:00:00 Slovakia 0                  0               0
##  21 2005-01-01 00:00:00 Slovakia 0                  0               0
```

```
##   22 2005-04-01 00:00:00 Slovakia 0                 0                 0
##   23 2005-07-01 00:00:00 Slovakia 0                 0                 0
##   24 2005-10-01 00:00:00 Slovakia 0                 0                 0
##   25 2006-01-01 00:00:00 Slovakia 0                 0                 0
##   26 2006-04-01 00:00:00 Slovakia 0                 0                 0
##   27 2006-07-01 00:00:00 Slovakia 0                 0                 0
##   28 2006-10-01 00:00:00 Slovakia 0                 0                 0
##   29 2007-01-01 00:00:00 Slovakia 0                 0                 0
##   30 2007-04-01 00:00:00 Slovakia 0                 0                 0
##   31 2007-07-01 00:00:00 Slovakia 0                 0                 0
##   32 2007-10-01 00:00:00 Slovakia 0                 0                 0
##   33 2008-01-01 00:00:00 Slovakia 0                 0                 0
##   34 2008-04-01 00:00:00 Slovakia 0                 0                 0
##   35 2008-07-01 00:00:00 Slovakia 0                 0                 0
##   36 2008-10-01 00:00:00 Slovakia 0                 0                 0
##   37 2009-01-01 00:00:00 Slovakia 0                 0                 0
##   38 2009-04-01 00:00:00 Slovakia 0                 0                 0
##   39 2009-07-01 00:00:00 Slovakia 0                 0                 0
##   40 2009-10-01 00:00:00 Slovakia 0                 0                 0
##   41 2010-01-01 00:00:00 Slovakia 0                 0                 0
##   42 2010-04-01 00:00:00 Slovakia 0                 0                 0
##   43 2010-07-01 00:00:00 Slovakia 0                 0                 0
##   44 2010-10-01 00:00:00 Slovakia 0                 0                 0
##   45 2011-01-01 00:00:00 Slovakia 0                 0                 0
##   46 2011-04-01 00:00:00 Slovakia 0                 0                 0
##   47 2011-07-01 00:00:00 Slovakia 0                 0                 0
##   48 2011-10-01 00:00:00 Slovakia 0                 0                 0
##   49 2012-01-01 00:00:00 Slovakia 0                 0                 0
##   50 2012-04-01 00:00:00 Slovakia 0                 0                 0
##   51 2012-07-01 00:00:00 Slovakia 0                 0                 0
##   52 2012-10-01 00:00:00 Slovakia 0                 0                 0
##   53 2013-01-01 00:00:00 Slovakia 0                 0                 0
##   54 2013-04-01 00:00:00 Slovakia 0                 0                 0
##   55 2013-07-01 00:00:00 Slovakia 0                 0                 0
##   56 2013-10-01 00:00:00 Slovakia 0                 0                 0
##   57 2014-01-01 00:00:00 Slovakia 0                 0                 0
##   58 2014-04-01 00:00:00 Slovakia 0                 0                 0
##   59 2014-07-01 00:00:00 Slovakia 0                 0                 0
##   60 2014-10-01 00:00:00 Slovakia 0                 0                 0
##   61 2015-01-01 00:00:00 Slovakia 0                 0                 0
##   62 2015-04-01 00:00:00 Slovakia 0                 0                 0
##   63 2015-07-01 00:00:00 Slovakia 0                 0                 0
##   64 2015-10-01 00:00:00 Slovakia 0                 0                 0
```

```
##  65 2016-01-01 00:00:00 Slovakia 0                 0              0
##  66 2016-04-01 00:00:00 Slovakia 0                 0              0
##  67 2016-07-01 00:00:00 Slovakia 0                 0              0
##  68 2016-10-01 00:00:00 Slovakia 0                 0              0
##  69 2017-01-01 00:00:00 Slovakia 0                 0              0
##  70 2017-04-01 00:00:00 Slovakia 0                 0              0
##  71 2017-07-01 00:00:00 Slovakia 0                 0              0
##  72 2017-10-01 00:00:00 Slovakia 0                 0              0
##  73 2018-01-01 00:00:00 Slovakia 0                 0              0
##  74 2018-04-01 00:00:00 Slovakia 0                 0              0
##  75 2018-07-01 00:00:00 Slovakia 0                 0              0
##  76 2018-10-01 00:00:00 Slovakia 0                 0              0
##  77 2019-01-01 00:00:00 Slovakia 0                 0              0
##  78 2019-04-01 00:00:00 Slovakia 0                 0              0
##  79 2019-07-01 00:00:00 Slovakia 0                 0              0
##  80 2019-10-01 00:00:00 Slovakia 0                 0.044          0
##  81 2020-01-01 00:00:00 Slovakia 0                 0.0621         0
##  82 2020-04-01 00:00:00 Slovakia 1                 0.153          0
##  83 2020-07-01 00:00:00 Slovakia 0                 0.0344         0
##  84 2020-10-01 00:00:00 Slovakia 0                 0.0122         0
##  85 2021-01-01 00:00:00 Slovakia 0                 0.029          0
##  86 2021-04-01 00:00:00 Slovakia 0                 0.0815         0
##  87 2021-07-01 00:00:00 Slovakia 0                 0.0525         0
##  88 2021-10-01 00:00:00 Slovakia 0                 0.103          0
##  89 2022-01-01 00:00:00 Slovakia 0                 0.442          1
##  90 2022-04-01 00:00:00 Slovakia 1                 0.981          1
##  91 2022-07-01 00:00:00 Slovakia 0                 0              0
##  92 2022-10-01 00:00:00 Slovakia 0                 0              0
##  93 2023-01-01 00:00:00 Slovakia 0                 0              0
##  94 2023-04-01 00:00:00 Slovakia 0                 0              0
##  95 2023-07-01 00:00:00 Slovakia 0                 0              0
##  96 2023-10-01 00:00:00 Slovakia 0                 0              0
##  97 2024-01-01 00:00:00 Slovakia 0                 0              0
##  98 2024-04-01 00:00:00 Slovakia 0                 0              0
##  99 2024-07-01 00:00:00 Slovakia 0                 0              0
## 100 2024-10-01 00:00:00 Slovakia 0                 0              0
##
## $Slovenia
## # A tibble: 100 x 5
##     year                country  recession predicted_prob Predicted_Y
##     <dttm>              <chr>    <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Slovenia 0                    NA          NA
##   2 2000-04-01 00:00:00 Slovenia 0                    NA          NA
```

```
##   3 2000-07-01 00:00:00 Slovenia 0                NA               NA
##   4 2000-10-01 00:00:00 Slovenia 0                NA               NA
##   5 2001-01-01 00:00:00 Slovenia 0                NA               NA
##   6 2001-04-01 00:00:00 Slovenia 0                NA               NA
##   7 2001-07-01 00:00:00 Slovenia 0                NA               NA
##   8 2001-10-01 00:00:00 Slovenia 0                NA               NA
##   9 2002-01-01 00:00:00 Slovenia 0                NA               NA
##  10 2002-04-01 00:00:00 Slovenia 0                NA               NA
##  11 2002-07-01 00:00:00 Slovenia 0                 0.0095           0
##  12 2002-10-01 00:00:00 Slovenia 0                 0.0304           0
##  13 2003-01-01 00:00:00 Slovenia 0                 0.0007           0
##  14 2003-04-01 00:00:00 Slovenia 0                 0.108            0
##  15 2003-07-01 00:00:00 Slovenia 0                 0.0593           0
##  16 2003-10-01 00:00:00 Slovenia 0                 0.0036           0
##  17 2004-01-01 00:00:00 Slovenia 0                 0.0159           0
##  18 2004-04-01 00:00:00 Slovenia 0                 0.121            0
##  19 2004-07-01 00:00:00 Slovenia 0                 0.0963           0
##  20 2004-10-01 00:00:00 Slovenia 0                 0.0122           0
##  21 2005-01-01 00:00:00 Slovenia 0                 0.0118           0
##  22 2005-04-01 00:00:00 Slovenia 0                 0.0297           0
##  23 2005-07-01 00:00:00 Slovenia 0                 0.02             0
##  24 2005-10-01 00:00:00 Slovenia 0                 0.0208           0
##  25 2006-01-01 00:00:00 Slovenia 0                 0.054            0
##  26 2006-04-01 00:00:00 Slovenia 0                 0.0613           0
##  27 2006-07-01 00:00:00 Slovenia 0                 0.0416           0
##  28 2006-10-01 00:00:00 Slovenia 0                 0.0258           0
##  29 2007-01-01 00:00:00 Slovenia 0                 0.0403           0
##  30 2007-04-01 00:00:00 Slovenia 0                 0.0326           0
##  31 2007-07-01 00:00:00 Slovenia 0                 0.0169           0
##  32 2007-10-01 00:00:00 Slovenia 0                 0.0092           0
##  33 2008-01-01 00:00:00 Slovenia 0                 0.0322           0
##  34 2008-04-01 00:00:00 Slovenia 0                 0.0242           0
##  35 2008-07-01 00:00:00 Slovenia 0                 0.0264           0
##  36 2008-10-01 00:00:00 Slovenia 1                 0.0927           0
##  37 2009-01-01 00:00:00 Slovenia 1                 0.716            1
##  38 2009-04-01 00:00:00 Slovenia 1                 0.182            0
##  39 2009-07-01 00:00:00 Slovenia 0                 0.0425           0
##  40 2009-10-01 00:00:00 Slovenia 0                 0.0492           0
##  41 2010-01-01 00:00:00 Slovenia 0                 0.0727           0
##  42 2010-04-01 00:00:00 Slovenia 0                 0.0499           0
##  43 2010-07-01 00:00:00 Slovenia 0                 0.0287           0
##  44 2010-10-01 00:00:00 Slovenia 0                 0.0487           0
##  45 2011-01-01 00:00:00 Slovenia 0                 0.116            0
```

```
## 46 2011-04-01 00:00:00 Slovenia 0                 0.0489          0
## 47 2011-07-01 00:00:00 Slovenia 1                 0.0937          0
## 48 2011-10-01 00:00:00 Slovenia 0                 0.428           1
## 49 2012-01-01 00:00:00 Slovenia 0                 0.101           0
## 50 2012-04-01 00:00:00 Slovenia 1                 0.0654          0
## 51 2012-07-01 00:00:00 Slovenia 0                 0.529           1
## 52 2012-10-01 00:00:00 Slovenia 0                 0.0173          0
## 53 2013-01-01 00:00:00 Slovenia 0                 0.0254          0
## 54 2013-04-01 00:00:00 Slovenia 0                 0.341           1
## 55 2013-07-01 00:00:00 Slovenia 0                 0.261           0
## 56 2013-10-01 00:00:00 Slovenia 0                 0.0258          0
## 57 2014-01-01 00:00:00 Slovenia 0                 0.0015          0
## 58 2014-04-01 00:00:00 Slovenia 0                 0.0062          0
## 59 2014-07-01 00:00:00 Slovenia 0                 0.034           0
## 60 2014-10-01 00:00:00 Slovenia 0                 0.0191          0
## 61 2015-01-01 00:00:00 Slovenia 0                 0.0033          0
## 62 2015-04-01 00:00:00 Slovenia 0                 0.0735          0
## 63 2015-07-01 00:00:00 Slovenia 0                 0.138           0
## 64 2015-10-01 00:00:00 Slovenia 0                 0.0177          0
## 65 2016-01-01 00:00:00 Slovenia 0                 0.0412          0
## 66 2016-04-01 00:00:00 Slovenia 0                 0.0346          0
## 67 2016-07-01 00:00:00 Slovenia 0                 0.0126          0
## 68 2016-10-01 00:00:00 Slovenia 0                 0.0389          0
## 69 2017-01-01 00:00:00 Slovenia 0                 0.0578          0
## 70 2017-04-01 00:00:00 Slovenia 0                 0.0361          0
## 71 2017-07-01 00:00:00 Slovenia 0                 0.0523          0
## 72 2017-10-01 00:00:00 Slovenia 0                 0.0228          0
## 73 2018-01-01 00:00:00 Slovenia 0                 0.0618          0
## 74 2018-04-01 00:00:00 Slovenia 0                 0.0324          0
## 75 2018-07-01 00:00:00 Slovenia 0                 0.0261          0
## 76 2018-10-01 00:00:00 Slovenia 0                 0.0573          0
## 77 2019-01-01 00:00:00 Slovenia 0                 0.0295          0
## 78 2019-04-01 00:00:00 Slovenia 0                 0.0122          0
## 79 2019-07-01 00:00:00 Slovenia 0                 0.0144          0
## 80 2019-10-01 00:00:00 Slovenia 0                 0.0365          0
## 81 2020-01-01 00:00:00 Slovenia 0                 0.0389          0
## 82 2020-04-01 00:00:00 Slovenia 1                 0.0662          0
## 83 2020-07-01 00:00:00 Slovenia 0                 0.0158          0
## 84 2020-10-01 00:00:00 Slovenia 0                 0.0262          0
## 85 2021-01-01 00:00:00 Slovenia 0                 0.0461          0
## 86 2021-04-01 00:00:00 Slovenia 0                 0.0482          0
## 87 2021-07-01 00:00:00 Slovenia 0                 0.0283          0
## 88 2021-10-01 00:00:00 Slovenia 0                 0.0476          0
```

```
##  89 2022-01-01 00:00:00 Slovenia 0                 0.100           0
##  90 2022-04-01 00:00:00 Slovenia 0                 0.214           0
##  91 2022-07-01 00:00:00 Slovenia 0                 0.006           0
##  92 2022-10-01 00:00:00 Slovenia 0                 0.0457          0
##  93 2023-01-01 00:00:00 Slovenia 0                 0.0072          0
##  94 2023-04-01 00:00:00 Slovenia 0                 0.0036          0
##  95 2023-07-01 00:00:00 Slovenia 0                 0.0142          0
##  96 2023-10-01 00:00:00 Slovenia 0                 0.0179          0
##  97 2024-01-01 00:00:00 Slovenia 0                 0.0117          0
##  98 2024-04-01 00:00:00 Slovenia 0                 0.0379          0
##  99 2024-07-01 00:00:00 Slovenia 0                 0.027           0
## 100 2024-10-01 00:00:00 Slovenia 0                 0.0717          0
##
## $Spain
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Spain   0                NA             NA
##   2 2000-04-01 00:00:00 Spain   0                 0.0244         0
##   3 2000-07-01 00:00:00 Spain   0                 0.0279         0
##   4 2000-10-01 00:00:00 Spain   0                 0.0164         0
##   5 2001-01-01 00:00:00 Spain   0                 0.0294         0
##   6 2001-04-01 00:00:00 Spain   0                 0.0813         0
##   7 2001-07-01 00:00:00 Spain   0                 0.0892         0
##   8 2001-10-01 00:00:00 Spain   0                 0.150          0
##   9 2002-01-01 00:00:00 Spain   0                 0.188          0
##  10 2002-04-01 00:00:00 Spain   0                 0.152          0
##  11 2002-07-01 00:00:00 Spain   0                 0.0497         0
##  12 2002-10-01 00:00:00 Spain   0                 0.0761         0
##  13 2003-01-01 00:00:00 Spain   0                 0.0578         0
##  14 2003-04-01 00:00:00 Spain   0                 0.0761         0
##  15 2003-07-01 00:00:00 Spain   0                 0.163          0
##  16 2003-10-01 00:00:00 Spain   0                 0.155          0
##  17 2004-01-01 00:00:00 Spain   0                 0.0946         0
##  18 2004-04-01 00:00:00 Spain   0                 0.161          0
##  19 2004-07-01 00:00:00 Spain   0                 0.0907         0
##  20 2004-10-01 00:00:00 Spain   0                 0.0369         0
##  21 2005-01-01 00:00:00 Spain   0                 0.0392         0
##  22 2005-04-01 00:00:00 Spain   0                 0.0215         0
##  23 2005-07-01 00:00:00 Spain   0                 0.0172         0
##  24 2005-10-01 00:00:00 Spain   0                 0.0222         0
##  25 2006-01-01 00:00:00 Spain   0                 0.0158         0
##  26 2006-04-01 00:00:00 Spain   0                 0.0427         0
```

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##   27 2006-07-01 00:00:00 Spain   0                 0.01             0
##   28 2006-10-01 00:00:00 Spain   0                 0.0041           0
##   29 2007-01-01 00:00:00 Spain   0                 0.0137           0
##   30 2007-04-01 00:00:00 Spain   0                 0.0195           0
##   31 2007-07-01 00:00:00 Spain   0                 0.0048           0
##   32 2007-10-01 00:00:00 Spain   0                 0.0023           0
##   33 2008-01-01 00:00:00 Spain   0                 0.0058           0
##   34 2008-04-01 00:00:00 Spain   0                 0.0047           0
##   35 2008-07-01 00:00:00 Spain   0                 0.0061           0
##   36 2008-10-01 00:00:00 Spain   1                 0.0129           0
##   37 2009-01-01 00:00:00 Spain   1                 0.599            1
##   38 2009-04-01 00:00:00 Spain   0                 0.333            1
##   39 2009-07-01 00:00:00 Spain   0                 0.288            0
##   40 2009-10-01 00:00:00 Spain   0                 0.277            0
##   41 2010-01-01 00:00:00 Spain   1                 0.362            1
##   42 2010-04-01 00:00:00 Spain   0                 0.433            1
##   43 2010-07-01 00:00:00 Spain   0                 0.287            0
##   44 2010-10-01 00:00:00 Spain   0                 0.525            1
##   45 2011-01-01 00:00:00 Spain   0                 0.714            1
##   46 2011-04-01 00:00:00 Spain   1                 0.482            1
##   47 2011-07-01 00:00:00 Spain   1                 0.509            1
##   48 2011-10-01 00:00:00 Spain   1                 0.675            1
##   49 2012-01-01 00:00:00 Spain   1                 0.594            1
##   50 2012-04-01 00:00:00 Spain   1                 0.978            1
##   51 2012-07-01 00:00:00 Spain   1                 0.977            1
##   52 2012-10-01 00:00:00 Spain   1                 0.729            1
##   53 2013-01-01 00:00:00 Spain   1                 0.634            1
##   54 2013-04-01 00:00:00 Spain   1                 0.456            1
##   55 2013-07-01 00:00:00 Spain   1                 0.600            1
##   56 2013-10-01 00:00:00 Spain   0                 0.382            1
##   57 2014-01-01 00:00:00 Spain   0                 0.166            0
##   58 2014-04-01 00:00:00 Spain   0                 0.0731           0
##   59 2014-07-01 00:00:00 Spain   0                 0.0585           0
##   60 2014-10-01 00:00:00 Spain   0                 0.0313           0
##   61 2015-01-01 00:00:00 Spain   0                 0.0088           0
##   62 2015-04-01 00:00:00 Spain   0                 0.0693           0
##   63 2015-07-01 00:00:00 Spain   0                 0.0889           0
##   64 2015-10-01 00:00:00 Spain   0                 0.0299           0
##   65 2016-01-01 00:00:00 Spain   0                 0.0471           0
##   66 2016-04-01 00:00:00 Spain   0                 0.0335           0
##   67 2016-07-01 00:00:00 Spain   0                 0.0094           0
##   68 2016-10-01 00:00:00 Spain   0                 0.0407           0
##   69 2017-01-01 00:00:00 Spain   0                 0.0756           0
```

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##  70 2017-04-01 00:00:00 Spain   0                 0.0393           0
##  71 2017-07-01 00:00:00 Spain   0                 0.0431           0
##  72 2017-10-01 00:00:00 Spain   0                 0.0401           0
##  73 2018-01-01 00:00:00 Spain   0                 0.0337           0
##  74 2018-04-01 00:00:00 Spain   0                 0.025            0
##  75 2018-07-01 00:00:00 Spain   0                 0.0347           0
##  76 2018-10-01 00:00:00 Spain   0                 0.0504           0
##  77 2019-01-01 00:00:00 Spain   0                 0.0172           0
##  78 2019-04-01 00:00:00 Spain   0                 0.0053           0
##  79 2019-07-01 00:00:00 Spain   0                 0.0014           0
##  80 2019-10-01 00:00:00 Spain   0                 0.0058           0
##  81 2020-01-01 00:00:00 Spain   0                 0.006            0
##  82 2020-04-01 00:00:00 Spain   1                 0.0111           0
##  83 2020-07-01 00:00:00 Spain   0                 0.0035           0
##  84 2020-10-01 00:00:00 Spain   0                 0.0026           0
##  85 2021-01-01 00:00:00 Spain   0                 0.0059           0
##  86 2021-04-01 00:00:00 Spain   0                 0.0117           0
##  87 2021-07-01 00:00:00 Spain   0                 0.0044           0
##  88 2021-10-01 00:00:00 Spain   0                 0.0115           0
##  89 2022-01-01 00:00:00 Spain   0                 0.047            0
##  90 2022-04-01 00:00:00 Spain   0                 0.256            0
##  91 2022-07-01 00:00:00 Spain   0                 0.0347           0
##  92 2022-10-01 00:00:00 Spain   0                 0.0209           0
##  93 2023-01-01 00:00:00 Spain   0                 0.0092           0
##  94 2023-04-01 00:00:00 Spain   0                 0.004            0
##  95 2023-07-01 00:00:00 Spain   0                 0.0077           0
##  96 2023-10-01 00:00:00 Spain   0                 0.0066           0
##  97 2024-01-01 00:00:00 Spain   0                 0.0024           0
##  98 2024-04-01 00:00:00 Spain   0                 0.01             0
##  99 2024-07-01 00:00:00 Spain   0                 0.0073           0
## 100 2024-10-01 00:00:00 Spain   0                 0.0226           0
##
## $Sweden
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 Sweden  0                NA             NA
##   2 2000-04-01 00:00:00 Sweden  0                 0              0
##   3 2000-07-01 00:00:00 Sweden  0                 0.0169         0
##   4 2000-10-01 00:00:00 Sweden  0                 0.0028         0
##   5 2001-01-01 00:00:00 Sweden  0                 0.0043         0
##   6 2001-04-01 00:00:00 Sweden  0                 0.536          1
##   7 2001-07-01 00:00:00 Sweden  0                 0.0808         0
```

```
##    8 2001-10-01 00:00:00 Sweden  0                  0.241             0
##    9 2002-01-01 00:00:00 Sweden  0                  0.0563            0
##   10 2002-04-01 00:00:00 Sweden  0                  0.0372            0
##   11 2002-07-01 00:00:00 Sweden  0                  0.006             0
##   12 2002-10-01 00:00:00 Sweden  0                  0.280             0
##   13 2003-01-01 00:00:00 Sweden  0                  0.0082            0
##   14 2003-04-01 00:00:00 Sweden  0                  0.0437            0
##   15 2003-07-01 00:00:00 Sweden  0                  0.0558            0
##   16 2003-10-01 00:00:00 Sweden  0                  0.0005            0
##   17 2004-01-01 00:00:00 Sweden  0                  0                 0
##   18 2004-04-01 00:00:00 Sweden  0                  0.0004            0
##   19 2004-07-01 00:00:00 Sweden  0                  0                 0
##   20 2004-10-01 00:00:00 Sweden  0                  0                 0
##   21 2005-01-01 00:00:00 Sweden  0                  0                 0
##   22 2005-04-01 00:00:00 Sweden  0                  0                 0
##   23 2005-07-01 00:00:00 Sweden  0                  0                 0
##   24 2005-10-01 00:00:00 Sweden  0                  0                 0
##   25 2006-01-01 00:00:00 Sweden  0                  0                 0
##   26 2006-04-01 00:00:00 Sweden  0                  0                 0
##   27 2006-07-01 00:00:00 Sweden  0                  0                 0
##   28 2006-10-01 00:00:00 Sweden  0                  0                 0
##   29 2007-01-01 00:00:00 Sweden  0                  0.0001            0
##   30 2007-04-01 00:00:00 Sweden  0                  0.0147            0
##   31 2007-07-01 00:00:00 Sweden  0                  0.004             0
##   32 2007-10-01 00:00:00 Sweden  0                  0.0007            0
##   33 2008-01-01 00:00:00 Sweden  0                  0.0021            0
##   34 2008-04-01 00:00:00 Sweden  1                  0.606             1
##   35 2008-07-01 00:00:00 Sweden  1                  0.0618            0
##   36 2008-10-01 00:00:00 Sweden  1                  0.611             1
##   37 2009-01-01 00:00:00 Sweden  1                  0.472             1
##   38 2009-04-01 00:00:00 Sweden  0                  0                 0
##   39 2009-07-01 00:00:00 Sweden  0                  0                 0
##   40 2009-10-01 00:00:00 Sweden  0                  0                 0
##   41 2010-01-01 00:00:00 Sweden  0                  0                 0
##   42 2010-04-01 00:00:00 Sweden  0                  0                 0
##   43 2010-07-01 00:00:00 Sweden  0                  0                 0
##   44 2010-10-01 00:00:00 Sweden  0                  0                 0
##   45 2011-01-01 00:00:00 Sweden  0                  0                 0
##   46 2011-04-01 00:00:00 Sweden  0                  0                 0
##   47 2011-07-01 00:00:00 Sweden  0                  0                 0
##   48 2011-10-01 00:00:00 Sweden  0                  0                 0
##   49 2012-01-01 00:00:00 Sweden  0                  0                 0
##   50 2012-04-01 00:00:00 Sweden  0                  0                 0
```

```
## 51 2012-07-01 00:00:00 Sweden  0                  0                  0
## 52 2012-10-01 00:00:00 Sweden  0                  0                  0
## 53 2013-01-01 00:00:00 Sweden  0                  0                  0
## 54 2013-04-01 00:00:00 Sweden  0                  0                  0
## 55 2013-07-01 00:00:00 Sweden  0                  0                  0
## 56 2013-10-01 00:00:00 Sweden  0                  0                  0
## 57 2014-01-01 00:00:00 Sweden  0                  0                  0
## 58 2014-04-01 00:00:00 Sweden  0                  0                  0
## 59 2014-07-01 00:00:00 Sweden  0                  0                  0
## 60 2014-10-01 00:00:00 Sweden  0                  0                  0
## 61 2015-01-01 00:00:00 Sweden  0                  0                  0
## 62 2015-04-01 00:00:00 Sweden  0                  0                  0
## 63 2015-07-01 00:00:00 Sweden  0                  0                  0
## 64 2015-10-01 00:00:00 Sweden  0                  0                  0
## 65 2016-01-01 00:00:00 Sweden  0                  0                  0
## 66 2016-04-01 00:00:00 Sweden  0                  0                  0
## 67 2016-07-01 00:00:00 Sweden  0                  0                  0
## 68 2016-10-01 00:00:00 Sweden  0                  0                  0
## 69 2017-01-01 00:00:00 Sweden  0                  0                  0
## 70 2017-04-01 00:00:00 Sweden  0                  0                  0
## 71 2017-07-01 00:00:00 Sweden  0                  0                  0
## 72 2017-10-01 00:00:00 Sweden  0                  0                  0
## 73 2018-01-01 00:00:00 Sweden  0                  0                  0
## 74 2018-04-01 00:00:00 Sweden  0                  0                  0
## 75 2018-07-01 00:00:00 Sweden  0                  0                  0
## 76 2018-10-01 00:00:00 Sweden  0                  0                  0
## 77 2019-01-01 00:00:00 Sweden  0                  0                  0
## 78 2019-04-01 00:00:00 Sweden  0                  0                  0
## 79 2019-07-01 00:00:00 Sweden  0                  0                  0
## 80 2019-10-01 00:00:00 Sweden  0                  0                  0
## 81 2020-01-01 00:00:00 Sweden  0                  0                  0
## 82 2020-04-01 00:00:00 Sweden  0                  0                  0
## 83 2020-07-01 00:00:00 Sweden  0                  0                  0
## 84 2020-10-01 00:00:00 Sweden  0                  0                  0
## 85 2021-01-01 00:00:00 Sweden  0                  0                  0
## 86 2021-04-01 00:00:00 Sweden  0                  0                  0
## 87 2021-07-01 00:00:00 Sweden  0                  0                  0
## 88 2021-10-01 00:00:00 Sweden  0                  0                  0
## 89 2022-01-01 00:00:00 Sweden  0                  0                  0
## 90 2022-04-01 00:00:00 Sweden  0                  0                  0
## 91 2022-07-01 00:00:00 Sweden  0                  0                  0
## 92 2022-10-01 00:00:00 Sweden  0                  0                  0
## 93 2023-01-01 00:00:00 Sweden  0                  0                  0
```

```
##  94 2023-04-01 00:00:00 Sweden  0                 0                0
##  95 2023-07-01 00:00:00 Sweden  0                 0.076            0
##  96 2023-10-01 00:00:00 Sweden  0                 0.0124           0
##  97 2024-01-01 00:00:00 Sweden  0                 0.0152           0
##  98 2024-04-01 00:00:00 Sweden  0                 0.371            1
##  99 2024-07-01 00:00:00 Sweden  0                 0.0604           0
## 100 2024-10-01 00:00:00 Sweden  0                 0.397            1
##
## $USA
## # A tibble: 100 x 5
##     year                country recession predicted_prob Predicted_Y
##     <dttm>              <chr>   <fct>              <dbl>       <dbl>
##   1 2000-01-01 00:00:00 USA     0                 NA              NA
##   2 2000-04-01 00:00:00 USA     0                  0               0
##   3 2000-07-01 00:00:00 USA     0                  0               0
##   4 2000-10-01 00:00:00 USA     0                  0               0
##   5 2001-01-01 00:00:00 USA     0                  0               0
##   6 2001-04-01 00:00:00 USA     0                  0.0003          0
##   7 2001-07-01 00:00:00 USA     0                  0               0
##   8 2001-10-01 00:00:00 USA     0                  0.0012          0
##   9 2002-01-01 00:00:00 USA     0                  0               0
##  10 2002-04-01 00:00:00 USA     0                  0               0
##  11 2002-07-01 00:00:00 USA     0                  0               0
##  12 2002-10-01 00:00:00 USA     0                  0               0
##  13 2003-01-01 00:00:00 USA     0                  0               0
##  14 2003-04-01 00:00:00 USA     0                  0               0
##  15 2003-07-01 00:00:00 USA     0                  0.0016          0
##  16 2003-10-01 00:00:00 USA     0                  0               0
##  17 2004-01-01 00:00:00 USA     0                  0               0
##  18 2004-04-01 00:00:00 USA     0                  0.0001          0
##  19 2004-07-01 00:00:00 USA     0                  0               0
##  20 2004-10-01 00:00:00 USA     0                  0               0
##  21 2005-01-01 00:00:00 USA     0                  0               0
##  22 2005-04-01 00:00:00 USA     0                  0               0
##  23 2005-07-01 00:00:00 USA     0                  0               0
##  24 2005-10-01 00:00:00 USA     0                  0               0
##  25 2006-01-01 00:00:00 USA     0                  0               0
##  26 2006-04-01 00:00:00 USA     0                  0               0
##  27 2006-07-01 00:00:00 USA     0                  0               0
##  28 2006-10-01 00:00:00 USA     0                  0               0
##  29 2007-01-01 00:00:00 USA     0                  0               0
##  30 2007-04-01 00:00:00 USA     0                  0               0
##  31 2007-07-01 00:00:00 USA     0                  0               0
```

```
## 32 2007-10-01 00:00:00 USA    0                  0                 0
## 33 2008-01-01 00:00:00 USA    0                  0.0502            0
## 34 2008-04-01 00:00:00 USA    0                  0.0151            0
## 35 2008-07-01 00:00:00 USA    0                  0                 0
## 36 2008-10-01 00:00:00 USA    1                  0.0271            0
## 37 2009-01-01 00:00:00 USA    1                  0.774             1
## 38 2009-04-01 00:00:00 USA    1                  0.238             0
## 39 2009-07-01 00:00:00 USA    0                  0.0084            0
## 40 2009-10-01 00:00:00 USA    0                  0.0002            0
## 41 2010-01-01 00:00:00 USA    0                  0.0006            0
## 42 2010-04-01 00:00:00 USA    0                  0                 0
## 43 2010-07-01 00:00:00 USA    0                  0                 0
## 44 2010-10-01 00:00:00 USA    0                  0.0042            0
## 45 2011-01-01 00:00:00 USA    0                  0.0144            0
## 46 2011-04-01 00:00:00 USA    0                  0.0001            0
## 47 2011-07-01 00:00:00 USA    0                  0                 0
## 48 2011-10-01 00:00:00 USA    0                  0.0015            0
## 49 2012-01-01 00:00:00 USA    0                  0.041             0
## 50 2012-04-01 00:00:00 USA    0                  0.0137            0
## 51 2012-07-01 00:00:00 USA    0                  0.025             0
## 52 2012-10-01 00:00:00 USA    0                  0.0622            0
## 53 2013-01-01 00:00:00 USA    0                  0.0772            0
## 54 2013-04-01 00:00:00 USA    0                  0.0299            0
## 55 2013-07-01 00:00:00 USA    0                  0.146             0
## 56 2013-10-01 00:00:00 USA    0                  0.0027            0
## 57 2014-01-01 00:00:00 USA    0                  0.0025            0
## 58 2014-04-01 00:00:00 USA    0                  0.0012            0
## 59 2014-07-01 00:00:00 USA    0                  0.0018            0
## 60 2014-10-01 00:00:00 USA    0                  0.002             0
## 61 2015-01-01 00:00:00 USA    0                  0.0027            0
## 62 2015-04-01 00:00:00 USA    0                  0.0338            0
## 63 2015-07-01 00:00:00 USA    0                  0.0101            0
## 64 2015-10-01 00:00:00 USA    0                  0.0069            0
## 65 2016-01-01 00:00:00 USA    0                  0.0018            0
## 66 2016-04-01 00:00:00 USA    0                  0.0177            0
## 67 2016-07-01 00:00:00 USA    0                  0.0157            0
## 68 2016-10-01 00:00:00 USA    0                  0.192             0
## 69 2017-01-01 00:00:00 USA    0                  0.0181            0
## 70 2017-04-01 00:00:00 USA    0                  0.0008            0
## 71 2017-07-01 00:00:00 USA    0                  0.0021            0
## 72 2017-10-01 00:00:00 USA    0                  0.0056            0
## 73 2018-01-01 00:00:00 USA    0                  0.0019            0
## 74 2018-04-01 00:00:00 USA    0                  0.0004            0
```

```
##  75 2018-07-01 00:00:00 USA      0                 0.0009           0
##  76 2018-10-01 00:00:00 USA      0                 0.0001           0
##  77 2019-01-01 00:00:00 USA      0                 0.0001           0
##  78 2019-04-01 00:00:00 USA      0                 0.0005           0
##  79 2019-07-01 00:00:00 USA      0                 0.0019           0
##  80 2019-10-01 00:00:00 USA      0                 0.0895           0
##  81 2020-01-01 00:00:00 USA      0                 0.0431           0
##  82 2020-04-01 00:00:00 USA      1                 0.800            1
##  83 2020-07-01 00:00:00 USA      0                 0.251            0
##  84 2020-10-01 00:00:00 USA      0                 0.346            1
##  85 2021-01-01 00:00:00 USA      0                 0.388            1
##  86 2021-04-01 00:00:00 USA      0                 0.157            0
##  87 2021-07-01 00:00:00 USA      0                 0.0221           0
##  88 2021-10-01 00:00:00 USA      0                 0.117            0
##  89 2022-01-01 00:00:00 USA      0                 0.0662           0
##  90 2022-04-01 00:00:00 USA      0                 0.0074           0
##  91 2022-07-01 00:00:00 USA      0                 0                0
##  92 2022-10-01 00:00:00 USA      0                 0                0
##  93 2023-01-01 00:00:00 USA      0                 0                0
##  94 2023-04-01 00:00:00 USA      0                 0                0
##  95 2023-07-01 00:00:00 USA      0                 0                0
##  96 2023-10-01 00:00:00 USA      0                 0                0
##  97 2024-01-01 00:00:00 USA      0                 0                0
##  98 2024-04-01 00:00:00 USA      0                 0                0
##  99 2024-07-01 00:00:00 USA      0                 0                0
## 100 2024-10-01 00:00:00 USA      0                 0.0004           0
```