Lab 3 - Data Tidying and Joining

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Introduction

In this lab you'll build the data wrangling and visualization skills you've developed so far and data tidying and joining to your repertoire.

> **Note**
>
> This lab assumes you've completed the labs so far and doesn't repeat setup and overview content from those labs. If you have not yet done those, you should go back and review the previous labs before starting on this one.

Learning objectives

By the end of the lab, you will

- Be able to pivot/reshape data using `tidyr`
- Continue developing your data wrangling skills using `dplyr`
- Build on your mastery of data visualizations using `ggplot2`
- Get more experience with data science workflow using R, RStudio, Git, and GitHub
- Further your reproducible authoring skills with Quarto
- Improve your familiarity with version control using Git and GitHub

Getting started

Log in to RStudio, clone your `lab-3` repo from GitHub, open your `lab-3.qmd` document, and get started!

Click here if you prefer to see step-by-step instructions

Log in to RStudio

- Go to https://cmgr.oit.duke.edu/containers and log in with your Duke NetID and Password.
- Click `STA198-199` under My reservations to log into your container. You should now see the RStudio environment.

Clone the repo & start new RStudio project

- Go to the course organization at github.com/renr213 organization on GitHub. Click on the repo with the prefix **lab-3**. It contains the starter documents you need to complete the lab.
- Click on the green **CODE** button, select **Use SSH** (this might already be selected by default, and if it is, you'll see the text **Clone with SSH**). Click on the clipboard icon to copy the repo URL.
- In RStudio, go to *File* *New Project* *Version Control* *Git*.
- Copy and paste the URL of your assignment repo into the dialog box *Repository URL*. Again, please make sure to have *SSH* highlighted under *Clone* when you copy the address.
- Click *Create Project*, and the files from your GitHub repo will be displayed in the *Files* pane in RStudio.
- Click *lab-3.qmd* to open the template Quarto file. This is where you will write up your code and narrative for the lab.

First steps

In `lab-3.qmd`, update the `author` field to your name, render your document and examine the changes. Then, in the Git pane, click on **Diff** to view your changes, add a commit message (e.g., "Added author name"), and click **Commit**. Then, push the changes to your GitHub repository, and in your browser confirm that these changes have indeed propagated to your repository.

! Important

If you run into any issues with the first steps outlined above, flag a TA for help before proceeding.

Packages

In this lab we will work with the **tidyverse** package, which is a collection of packages for doing data analysis in a "tidy" way.

```
library(tidyverse)
```

Render the document which loads this package with the `library()` function.

Guidelines

As we've discussed in lecture, your plots should include an informative title, axes should be labeled, and careful consideration should be given to aesthetic choices.

In addition, the code should all the code should be be able to be read (not run off the page) when you render to PDF. Make sure that is the case, and add line breaks where the code is running off the page.[1]

> **Note**
>
> Continuing to develop a sound workflow for reproducible data analysis is important as you complete the lab and other assignments in this course. There will be periodic reminders in this assignment to remind you to **render, commit, and push** your changes to GitHub. You should have at least 3 commits with meaningful commit messages by the end of the assignment.

Questions

Part 1

Inflation across the world

For this part of the analysis you will work with inflation data from various countries in the world over the last 30 years.

```
country_inflation <- read_csv("data/country-inflation.csv")
```

[1] Remember, haikus not novellas when writing code!

Question 1

Get to know the data.

a. `glimpse()` at the `country_inflation` data frame and answer the following questions based on the output. How many rows does `country_inflation` have and what does each row represent? How many columns does `country_inflation` have and what does each column represent?

```
glimpse(country_inflation)
```

```
Rows: 44
Columns: 30
$ country <chr> "Australia", "Austria", "Belgium", "Canada", "Czech Republic",~
$ `1993`  <dbl> 1.753653, 3.631786, 2.754426, 1.865079, 20.813026, 1.257862, 2~
$ `1994`  <dbl> 1.9696348, 2.9534065, 2.3775445, 0.1655629, 10.0394242, 1.9920~
$ `1995`  <dbl> 4.6277666, 2.2433638, 1.4679612, 2.1487603, 8.9905306, 2.08360~
$ `1996`  <dbl> 2.6153846, 1.8609741, 2.0770246, 1.5705311, 8.7587747, 2.12629~
$ `1997`  <dbl> 0.2248876, 1.3059833, 1.6281605, 1.6212164, 8.5961567, 2.18216~
$ `1998`  <dbl> 0.8601346, 0.9224669, 0.9492503, 0.9959425, 10.6983655, 1.8456~
$ `1999`  <dbl> 1.4831294, 0.5689865, 1.1208482, 1.7348430, 2.1354484, 2.49779~
$ `2000`  <dbl> 4.4574351, 2.3448684, 2.5445178, 2.7194400, 3.7753883, 2.90327~
$ `2001`  <dbl> 4.407135, 2.650000, 2.469258, 2.525120, 4.662676, 2.337875, 2.~
$ `2002`  <dbl> 2.981575, 1.810359, 1.645214, 2.258394, 1.902981, 2.424437, 1.~
$ `2003`  <dbl> 2.7325960, 1.3555538, 1.5889640, 2.7585632, 0.1187392, 2.07507~
$ `2004`  <dbl> 2.3432552, 2.0612068, 2.0972831, 1.8572587, 2.7601078, 1.15435~
$ `2005`  <dbl> 2.6918317, 2.2991377, 2.7814326, 2.2135520, 1.8570979, 1.81781~
$ `2006`  <dbl> 3.555288, 1.441547, 1.791208, 2.002025, 2.533993, 1.924221, 1.~
$ `2007`  <dbl> 2.3276113, 2.1685559, 1.8230563, 2.1383840, 2.8531244, 1.69326~
$ `2008`  <dbl> 4.350299, 3.215951, 4.489444, 2.370271, 6.358664, 3.416268, 4.~
$ `2009`  <dbl> 1.771117e+00, 5.063094e-01, -5.314567e-02, 2.994668e-01, 1.019~
$ `2010`  <dbl> 2.9183400, 1.8135317, 2.1892992, 1.7768715, 1.4727273, 2.31092~
$ `2011`  <dbl> 3.303850, 3.286583, 3.532082, 2.912135, 1.917219, 2.758682, 3.~
$ `2012`  <dbl> 1.7627802, 2.4856751, 2.8396634, 1.5156782, 3.2876231, 2.39791~
$ `2013`  <dbl> 2.44988864, 2.00015749, 1.11309594, 0.93829190, 1.43829787, 0.~
$ `2014`  <dbl> 2.48792271, 1.60580560, 0.34000283, 1.90663591, 0.34398859, 0.~
$ `2015`  <dbl> 1.50836672, 0.89656529, 0.56142915, 1.12524136, 0.30936455, 0.~
$ `2016`  <dbl> 1.276990945, 0.891592367, 1.973852647, 1.428759547, 0.68350420~
$ `2017`  <dbl> 1.9486474, 2.0812686, 2.1259709, 1.5968841, 2.4505340, 1.14713~
$ `2018`  <dbl> 1.9114009, 1.9983819, 2.0531650, 2.2682257, 2.1494949, 0.81360~
$ `2019`  <dbl> 1.6107679, 1.5308955, 1.4368196, 1.9492690, 2.8478760, 0.75813~
$ `2020`  <dbl> 0.84690554, 1.38190955, 0.74079181, 0.71699963, 3.16129528, 0.~
$ `2021`  <dbl> 2.863910, 2.766667, 2.440249, 3.395193, 3.839845, 1.853045, 2.~
```

There are 44 rows and 30 columns. Columns represent country and rows represent years. Each row indicates the inflation of each country in that specific year. Each column indicates the inflation of a single country for all the years listed.

b. Display a list of the countries included in the dataset.

```
country_inflation %>%
  pull(country)
```

```
 [1] "Australia"                  "Austria"
 [3] "Belgium"                    "Canada"
 [5] "Czech Republic"             "Denmark"
 [7] "Finland"                    "France"
 [9] "Germany"                    "Greece"
[11] "Hungary"                    "Iceland"
[13] "Ireland"                    "Italy"
[15] "Japan"                      "Korea"
[17] "Luxembourg"                 "Mexico"
[19] "Netherlands"                "New Zealand"
[21] "Norway"                     "Poland"
[23] "Portugal"                   "Slovak Republic"
[25] "Spain"                      "Sweden"
[27] "Switzerland"                "Türkiye"
[29] "United Kingdom"             "United States"
[31] "Argentina"                  "Brazil"
[33] "Chile"                      "China (People's Republic of)"
[35] "Estonia"                    "India"
[37] "Indonesia"                  "Israel"
[39] "Russia"                     "Saudi Arabia"
[41] "Slovenia"                   "South Africa"
[43] "Colombia"                   "Costa Rica"
```

Question 2

Which countries had the top three highest inflation rates in 2021? Your output should be a data frame with two columns, `country` and `2021`, with inflation rates in descending order, and three rows for the top three countries. Briefly comment on how the inflation rates for these countries compare to the inflation rate for United States in that year.

```r
country_inflation %>%
  select(country,`2021`) %>%
  arrange(desc(`2021`))%>%
  slice_head(n=3)
```

```
# A tibble: 3 x 2
  country   `2021`
  <chr>      <dbl>
1 Argentina  48.4
2 Türkiye    19.6
3 Brazil      8.30
```

```r
country_inflation %>%
  filter(country=="United States") %>%
  select(`2021`)
```

```
# A tibble: 1 x 1
  `2021`
   <dbl>
1   4.70
```

ANSWER Inflation for other 3 countries much higher

Question 3

In a single pipeline,

- calculate the ratio of the inflation in 2021 and inflation in 1993 for each country and store this information in a new column called `inf_ratio`,
- arrange the data frame in decreasing order of `inf_ratio`, and
- select the variables `country` and `inf_ratio` to display as the result of the pipeline.

Do not save this new variable in `inf_ratio`, only calculate and display it so you can answer the following question based on the output of the pipeline.

Which country's inflation change is the largest over this time period? Did inflation increase of decrease between 1993 and 2021 in this country?

```r
country_inflation %>%
  mutate(inf_ratio=`2021`/`1993`) %>%
  arrange(desc(inf_ratio)) %>%
  select(country, inf_ratio) %>%
  print(n=Inf)
```

```
# A tibble: 44 x 2
   country                inf_ratio
   <chr>                      <dbl>
 1 New Zealand                3.06
 2 Canada                     1.82
 3 Australia                  1.63
 4 Ireland                    1.60
 5 United States              1.59
 6 Norway                     1.52
 7 Denmark                    1.47
 8 Iceland                    1.10
 9 Netherlands                1.04
10 Finland                    1.00
11 United Kingdom             0.962
12 Belgium                    0.886
13 France                     0.780
14 India                      0.773
15 Austria                    0.762
16 Luxembourg                 0.704
17 Germany                    0.702
18 Spain                      0.677
19 Mexico                     0.583
20 Korea                      0.520
21 South Africa               0.475
22 Sweden                     0.458
23 Italy                      0.405
24 Chile                      0.355
25 Türkiye                    0.296
26 Hungary                    0.228
27 Portugal                   0.187
28 Czech Republic             0.184
29 Switzerland                0.177
30 Costa Rica                 0.177
31 Indonesia                  0.161
32 Colombia                   0.156
33 Poland                     0.144
```

```
34 Israel                          0.136
35 Slovak Republic                 0.135
36 Greece                          0.0849
37 China (People's Republic of)    0.0612
38 Slovenia                        0.0604
39 Russia                          0.00766
40 Brazil                          0.00431
41 Japan                          NA
42 Argentina                      NA
43 Estonia                        NA
44 Saudi Arabia                   NA
```

Brazil had the largest change in inlfaction , below 1 means negative change, decrease

> **Tip**
>
> For this question you'll once again need to use variables whose names are numbers (years) in your pipeline. Make sure to surround the names of such variables with backticks (`).

Question 4

Reshape (pivot) `country_inflation` such that each row represents a country/year combination, with columns `country`, `year`, and `annual_inflation`. Then, display the resulting data frame and state how many rows and columns it has.

Requirements:

- Your code must use one of `pivot_longer()` or `pivot_wider()`. There are other ways you can do this reshaping move in R, but this question requires solving this problem by pivoting.
- In your `pivot_*()` function, you must use `names_transform = as.numeric` as an argument to transform the variable type to numeric as you pivot the data so that in the resulting data frame the year variable is numeric.
- The resulting data frame must be saved as something other than `country_inflation` so you (1) can refer to this data frame later in your analysis and (2) do not overwrite `country_inflation`. Use a short but informative name.

```
inf_long<-country_inflation %>%
  pivot_longer(
    cols = -country,
    names_to = "year",
    values_to = "annual_inflation",
```

```
    names_transform = as.numeric
  )
  inf_long %>%
    print(n=Inf)
```

```
# A tibble: 1,276 x 3
     country                      year annual_inflation
     <chr>                       <dbl>            <dbl>
   1 Australia                    1993        1.75 e+ 0
   2 Australia                    1994        1.97 e+ 0
   3 Australia                    1995        4.63 e+ 0
   4 Australia                    1996        2.62 e+ 0
   5 Australia                    1997        2.25 e- 1
   6 Australia                    1998        8.60 e- 1
   7 Australia                    1999        1.48 e+ 0
   8 Australia                    2000        4.46 e+ 0
   9 Australia                    2001        4.41 e+ 0
  10 Australia                    2002        2.98 e+ 0
  11 Australia                    2003        2.73 e+ 0
  12 Australia                    2004        2.34 e+ 0
  13 Australia                    2005        2.69 e+ 0
  14 Australia                    2006        3.56 e+ 0
  15 Australia                    2007        2.33 e+ 0
  16 Australia                    2008        4.35 e+ 0
  17 Australia                    2009        1.77 e+ 0
  18 Australia                    2010        2.92 e+ 0
  19 Australia                    2011        3.30 e+ 0
  20 Australia                    2012        1.76 e+ 0
  21 Australia                    2013        2.45 e+ 0
  22 Australia                    2014        2.49 e+ 0
  23 Australia                    2015        1.51 e+ 0
  24 Australia                    2016        1.28 e+ 0
  25 Australia                    2017        1.95 e+ 0
  26 Australia                    2018        1.91 e+ 0
  27 Australia                    2019        1.61 e+ 0
  28 Australia                    2020        8.47 e- 1
  29 Australia                    2021        2.86 e+ 0
  30 Austria                      1993        3.63 e+ 0
  31 Austria                      1994        2.95 e+ 0
  32 Austria                      1995        2.24 e+ 0
  33 Austria                      1996        1.86 e+ 0
  34 Austria                      1997        1.31 e+ 0
```

35	Austria	1998	9.22 e- 1
36	Austria	1999	5.69 e- 1
37	Austria	2000	2.34 e+ 0
38	Austria	2001	2.65 e+ 0
39	Austria	2002	1.81 e+ 0
40	Austria	2003	1.36 e+ 0
41	Austria	2004	2.06 e+ 0
42	Austria	2005	2.30 e+ 0
43	Austria	2006	1.44 e+ 0
44	Austria	2007	2.17 e+ 0
45	Austria	2008	3.22 e+ 0
46	Austria	2009	5.06 e- 1
47	Austria	2010	1.81 e+ 0
48	Austria	2011	3.29 e+ 0
49	Austria	2012	2.49 e+ 0
50	Austria	2013	2.00 e+ 0
51	Austria	2014	1.61 e+ 0
52	Austria	2015	8.97 e- 1
53	Austria	2016	8.92 e- 1
54	Austria	2017	2.08 e+ 0
55	Austria	2018	2.00 e+ 0
56	Austria	2019	1.53 e+ 0
57	Austria	2020	1.38 e+ 0
58	Austria	2021	2.77 e+ 0
59	Belgium	1993	2.75 e+ 0
60	Belgium	1994	2.38 e+ 0
61	Belgium	1995	1.47 e+ 0
62	Belgium	1996	2.08 e+ 0
63	Belgium	1997	1.63 e+ 0
64	Belgium	1998	9.49 e- 1
65	Belgium	1999	1.12 e+ 0
66	Belgium	2000	2.54 e+ 0
67	Belgium	2001	2.47 e+ 0
68	Belgium	2002	1.65 e+ 0
69	Belgium	2003	1.59 e+ 0
70	Belgium	2004	2.10 e+ 0
71	Belgium	2005	2.78 e+ 0
72	Belgium	2006	1.79 e+ 0
73	Belgium	2007	1.82 e+ 0
74	Belgium	2008	4.49 e+ 0
75	Belgium	2009	-5.31 e- 2
76	Belgium	2010	2.19 e+ 0
77	Belgium	2011	3.53 e+ 0

78	Belgium	2012	2.84 e+ 0
79	Belgium	2013	1.11 e+ 0
80	Belgium	2014	3.40 e- 1
81	Belgium	2015	5.61 e- 1
82	Belgium	2016	1.97 e+ 0
83	Belgium	2017	2.13 e+ 0
84	Belgium	2018	2.05 e+ 0
85	Belgium	2019	1.44 e+ 0
86	Belgium	2020	7.41 e- 1
87	Belgium	2021	2.44 e+ 0
88	Canada	1993	1.87 e+ 0
89	Canada	1994	1.66 e- 1
90	Canada	1995	2.15 e+ 0
91	Canada	1996	1.57 e+ 0
92	Canada	1997	1.62 e+ 0
93	Canada	1998	9.96 e- 1
94	Canada	1999	1.73 e+ 0
95	Canada	2000	2.72 e+ 0
96	Canada	2001	2.53 e+ 0
97	Canada	2002	2.26 e+ 0
98	Canada	2003	2.76 e+ 0
99	Canada	2004	1.86 e+ 0
100	Canada	2005	2.21 e+ 0
101	Canada	2006	2.00 e+ 0
102	Canada	2007	2.14 e+ 0
103	Canada	2008	2.37 e+ 0
104	Canada	2009	2.99 e- 1
105	Canada	2010	1.78 e+ 0
106	Canada	2011	2.91 e+ 0
107	Canada	2012	1.52 e+ 0
108	Canada	2013	9.38 e- 1
109	Canada	2014	1.91 e+ 0
110	Canada	2015	1.13 e+ 0
111	Canada	2016	1.43 e+ 0
112	Canada	2017	1.60 e+ 0
113	Canada	2018	2.27 e+ 0
114	Canada	2019	1.95 e+ 0
115	Canada	2020	7.17 e- 1
116	Canada	2021	3.40 e+ 0
117	Czech Republic	1993	2.08 e+ 1
118	Czech Republic	1994	1.00 e+ 1
119	Czech Republic	1995	8.99 e+ 0
120	Czech Republic	1996	8.76 e+ 0

121	Czech Republic	1997	8.60 e+ 0
122	Czech Republic	1998	1.07 e+ 1
123	Czech Republic	1999	2.14 e+ 0
124	Czech Republic	2000	3.78 e+ 0
125	Czech Republic	2001	4.66 e+ 0
126	Czech Republic	2002	1.90 e+ 0
127	Czech Republic	2003	1.19 e- 1
128	Czech Republic	2004	2.76 e+ 0
129	Czech Republic	2005	1.86 e+ 0
130	Czech Republic	2006	2.53 e+ 0
131	Czech Republic	2007	2.85 e+ 0
132	Czech Republic	2008	6.36 e+ 0
133	Czech Republic	2009	1.02 e+ 0
134	Czech Republic	2010	1.47 e+ 0
135	Czech Republic	2011	1.92 e+ 0
136	Czech Republic	2012	3.29 e+ 0
137	Czech Republic	2013	1.44 e+ 0
138	Czech Republic	2014	3.44 e- 1
139	Czech Republic	2015	3.09 e- 1
140	Czech Republic	2016	6.84 e- 1
141	Czech Republic	2017	2.45 e+ 0
142	Czech Republic	2018	2.15 e+ 0
143	Czech Republic	2019	2.85 e+ 0
144	Czech Republic	2020	3.16 e+ 0
145	Czech Republic	2021	3.84 e+ 0
146	Denmark	1993	1.26 e+ 0
147	Denmark	1994	1.99 e+ 0
148	Denmark	1995	2.08 e+ 0
149	Denmark	1996	2.13 e+ 0
150	Denmark	1997	2.18 e+ 0
151	Denmark	1998	1.85 e+ 0
152	Denmark	1999	2.50 e+ 0
153	Denmark	2000	2.90 e+ 0
154	Denmark	2001	2.34 e+ 0
155	Denmark	2002	2.42 e+ 0
156	Denmark	2003	2.08 e+ 0
157	Denmark	2004	1.15 e+ 0
158	Denmark	2005	1.82 e+ 0
159	Denmark	2006	1.92 e+ 0
160	Denmark	2007	1.69 e+ 0
161	Denmark	2008	3.42 e+ 0
162	Denmark	2009	1.30 e+ 0
163	Denmark	2010	2.31 e+ 0

164	Denmark	2011	2.76 e+ 0
165	Denmark	2012	2.40 e+ 0
166	Denmark	2013	7.89 e- 1
167	Denmark	2014	5.64 e- 1
168	Denmark	2015	4.52 e- 1
169	Denmark	2016	2.50 e- 1
170	Denmark	2017	1.15 e+ 0
171	Denmark	2018	8.14 e- 1
172	Denmark	2019	7.58 e- 1
173	Denmark	2020	4.21 e- 1
174	Denmark	2021	1.85 e+ 0
175	Finland	1993	2.19 e+ 0
176	Finland	1994	1.09 e+ 0
177	Finland	1995	7.91 e- 1
178	Finland	1996	6.29 e- 1
179	Finland	1997	1.19 e+ 0
180	Finland	1998	1.40 e+ 0
181	Finland	1999	1.16 e+ 0
182	Finland	2000	3.04 e+ 0
183	Finland	2001	2.58 e+ 0
184	Finland	2002	1.57 e+ 0
185	Finland	2003	8.77 e- 1
186	Finland	2004	1.87 e- 1
187	Finland	2005	6.24 e- 1
188	Finland	2006	1.57 e+ 0
189	Finland	2007	2.51 e+ 0
190	Finland	2008	4.07 e+ 0
191	Finland	2009	-1.22 e-14
192	Finland	2010	1.18 e+ 0
193	Finland	2011	3.42 e+ 0
194	Finland	2012	2.81 e+ 0
195	Finland	2013	1.48 e+ 0
196	Finland	2014	1.04 e+ 0
197	Finland	2015	-2.08 e- 1
198	Finland	2016	3.57 e- 1
199	Finland	2017	7.54 e- 1
200	Finland	2018	1.08 e+ 0
201	Finland	2019	1.02 e+ 0
202	Finland	2020	2.91 e- 1
203	Finland	2021	2.19 e+ 0
204	France	1993	2.10 e+ 0
205	France	1994	1.66 e+ 0
206	France	1995	1.80 e+ 0

207	France	1996	1.98 e+ 0
208	France	1997	1.20 e+ 0
209	France	1998	6.51 e- 1
210	France	1999	5.37 e- 1
211	France	2000	1.68 e+ 0
212	France	2001	1.63 e+ 0
213	France	2002	1.92 e+ 0
214	France	2003	2.10 e+ 0
215	France	2004	2.14 e+ 0
216	France	2005	1.75 e+ 0
217	France	2006	1.68 e+ 0
218	France	2007	1.49 e+ 0
219	France	2008	2.81 e+ 0
220	France	2009	8.76 e- 2
221	France	2010	1.53 e+ 0
222	France	2011	2.11 e+ 0
223	France	2012	1.95 e+ 0
224	France	2013	8.64 e- 1
225	France	2014	5.08 e- 1
226	France	2015	3.75 e- 2
227	France	2016	1.83 e- 1
228	France	2017	1.03 e+ 0
229	France	2018	1.85 e+ 0
230	France	2019	1.11 e+ 0
231	France	2020	4.76 e- 1
232	France	2021	1.64 e+ 0
233	Germany	1993	4.47 e+ 0
234	Germany	1994	2.69 e+ 0
235	Germany	1995	1.71 e+ 0
236	Germany	1996	1.45 e+ 0
237	Germany	1997	1.94 e+ 0
238	Germany	1998	9.11 e- 1
239	Germany	1999	5.85 e- 1
240	Germany	2000	1.44 e+ 0
241	Germany	2001	1.98 e+ 0
242	Germany	2002	1.42 e+ 0
243	Germany	2003	1.03 e+ 0
244	Germany	2004	1.67 e+ 0
245	Germany	2005	1.55 e+ 0
246	Germany	2006	1.58 e+ 0
247	Germany	2007	2.30 e+ 0
248	Germany	2008	2.63 e+ 0
249	Germany	2009	3.13 e- 1

250	Germany	2010	1.10 e+ 0
251	Germany	2011	2.08 e+ 0
252	Germany	2012	2.01 e+ 0
253	Germany	2013	1.50 e+ 0
254	Germany	2014	9.07 e- 1
255	Germany	2015	5.14 e- 1
256	Germany	2016	4.92 e- 1
257	Germany	2017	1.51 e+ 0
258	Germany	2018	1.73 e+ 0
259	Germany	2019	1.45 e+ 0
260	Germany	2020	5.07 e- 1
261	Germany	2021	3.14 e+ 0
262	Greece	1993	1.44 e+ 1
263	Greece	1994	1.09 e+ 1
264	Greece	1995	8.93 e+ 0
265	Greece	1996	8.19 e+ 0
266	Greece	1997	5.54 e+ 0
267	Greece	1998	4.77 e+ 0
268	Greece	1999	2.64 e+ 0
269	Greece	2000	3.15 e+ 0
270	Greece	2001	3.37 e+ 0
271	Greece	2002	3.63 e+ 0
272	Greece	2003	3.53 e+ 0
273	Greece	2004	2.90 e+ 0
274	Greece	2005	3.55 e+ 0
275	Greece	2006	3.20 e+ 0
276	Greece	2007	2.90 e+ 0
277	Greece	2008	4.15 e+ 0
278	Greece	2009	1.21 e+ 0
279	Greece	2010	4.71 e+ 0
280	Greece	2011	3.33 e+ 0
281	Greece	2012	1.50 e+ 0
282	Greece	2013	-9.21 e- 1
283	Greece	2014	-1.31 e+ 0
284	Greece	2015	-1.74 e+ 0
285	Greece	2016	-8.26 e- 1
286	Greece	2017	1.12 e+ 0
287	Greece	2018	6.26 e- 1
288	Greece	2019	2.53 e- 1
289	Greece	2020	-1.25 e+ 0
290	Greece	2021	1.22 e+ 0
291	Hungary	1993	2.25 e+ 1
292	Hungary	1994	1.89 e+ 1

293	Hungary	1995	2.83 e+ 1
294	Hungary	1996	2.35 e+ 1
295	Hungary	1997	1.83 e+ 1
296	Hungary	1998	1.42 e+ 1
297	Hungary	1999	1.000e+ 1
298	Hungary	2000	9.80 e+ 0
299	Hungary	2001	9.12 e+ 0
300	Hungary	2002	5.27 e+ 0
301	Hungary	2003	4.66 e+ 0
302	Hungary	2004	6.74 e+ 0
303	Hungary	2005	3.56 e+ 0
304	Hungary	2006	3.93 e+ 0
305	Hungary	2007	7.96 e+ 0
306	Hungary	2008	6.04 e+ 0
307	Hungary	2009	4.21 e+ 0
308	Hungary	2010	4.86 e+ 0
309	Hungary	2011	3.93 e+ 0
310	Hungary	2012	5.65 e+ 0
311	Hungary	2013	1.73 e+ 0
312	Hungary	2014	-2.28 e- 1
313	Hungary	2015	-6.16 e- 2
314	Hungary	2016	3.95 e- 1
315	Hungary	2017	2.35 e+ 0
316	Hungary	2018	2.85 e+ 0
317	Hungary	2019	3.34 e+ 0
318	Hungary	2020	3.33 e+ 0
319	Hungary	2021	5.11 e+ 0
320	Iceland	1993	4.04 e+ 0
321	Iceland	1994	1.55 e+ 0
322	Iceland	1995	1.65 e+ 0
323	Iceland	1996	2.26 e+ 0
324	Iceland	1997	1.82 e+ 0
325	Iceland	1998	1.66 e+ 0
326	Iceland	1999	3.23 e+ 0
327	Iceland	2000	5.14 e+ 0
328	Iceland	2001	6.41 e+ 0
329	Iceland	2002	5.20 e+ 0
330	Iceland	2003	2.06 e+ 0
331	Iceland	2004	3.16 e+ 0
332	Iceland	2005	3.99 e+ 0
333	Iceland	2006	6.69 e+ 0
334	Iceland	2007	5.05 e+ 0
335	Iceland	2008	1.27 e+ 1

336	Iceland	2009	1.20 e+ 1
337	Iceland	2010	5.40 e+ 0
338	Iceland	2011	4.00 e+ 0
339	Iceland	2012	5.19 e+ 0
340	Iceland	2013	3.87 e+ 0
341	Iceland	2014	2.04 e+ 0
342	Iceland	2015	1.63 e+ 0
343	Iceland	2016	1.70 e+ 0
344	Iceland	2017	1.76 e+ 0
345	Iceland	2018	2.68 e+ 0
346	Iceland	2019	3.01 e+ 0
347	Iceland	2020	2.85 e+ 0
348	Iceland	2021	4.44 e+ 0
349	Ireland	1993	1.47 e+ 0
350	Ireland	1994	2.31 e+ 0
351	Ireland	1995	2.52 e+ 0
352	Ireland	1996	1.75 e+ 0
353	Ireland	1997	1.53 e+ 0
354	Ireland	1998	2.42 e+ 0
355	Ireland	1999	1.63 e+ 0
356	Ireland	2000	5.59 e+ 0
357	Ireland	2001	4.87 e+ 0
358	Ireland	2002	4.61 e+ 0
359	Ireland	2003	3.49 e+ 0
360	Ireland	2004	2.20 e+ 0
361	Ireland	2005	2.43 e+ 0
362	Ireland	2006	3.93 e+ 0
363	Ireland	2007	4.90 e+ 0
364	Ireland	2008	4.06 e+ 0
365	Ireland	2009	-4.48 e+ 0
366	Ireland	2010	-9.22 e- 1
367	Ireland	2011	2.56 e+ 0
368	Ireland	2012	1.70 e+ 0
369	Ireland	2013	5.09 e- 1
370	Ireland	2014	1.83 e- 1
371	Ireland	2015	-2.90 e- 1
372	Ireland	2016	8.31 e- 3
373	Ireland	2017	3.41 e- 1
374	Ireland	2018	4.88 e- 1
375	Ireland	2019	9.39 e- 1
376	Ireland	2020	-3.35 e- 1
377	Ireland	2021	2.36 e+ 0
378	Italy	1993	4.63 e+ 0

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379 Italy      1994        4.05 e+ 0
380 Italy      1995        5.24 e+ 0
381 Italy      1996        4.01 e+ 0
382 Italy      1997        2.04 e+ 0
383 Italy      1998        1.96 e+ 0
384 Italy      1999        1.66 e+ 0
385 Italy      2000        2.54 e+ 0
386 Italy      2001        2.79 e+ 0
387 Italy      2002        2.47 e+ 0
388 Italy      2003        2.67 e+ 0
389 Italy      2004        2.21 e+ 0
390 Italy      2005        1.99 e+ 0
391 Italy      2006        2.09 e+ 0
392 Italy      2007        1.83 e+ 0
393 Italy      2008        3.35 e+ 0
394 Italy      2009        7.75 e- 1
395 Italy      2010        1.53 e+ 0
396 Italy      2011        2.78 e+ 0
397 Italy      2012        3.04 e+ 0
398 Italy      2013        1.22 e+ 0
399 Italy      2014        2.41 e- 1
400 Italy      2015        3.88 e- 2
401 Italy      2016       -9.40 e- 2
402 Italy      2017        1.23 e+ 0
403 Italy      2018        1.14 e+ 0
404 Italy      2019        6.11 e- 1
405 Italy      2020       -1.38 e- 1
406 Italy      2021        1.87 e+ 0
407 Japan      1993        1.3  e+ 0
408 Japan      1994        7    e- 1
409 Japan      1995       -1    e- 1
410 Japan      1996        1    e- 1
411 Japan      1997        1.8  e+ 0
412 Japan      1998        6    e- 1
413 Japan      1999       -3    e- 1
414 Japan      2000       -7    e- 1
415 Japan      2001       -7    e- 1
416 Japan      2002       -9    e- 1
417 Japan      2003       -3    e- 1
418 Japan      2004        0
419 Japan      2005       -3    e- 1
420 Japan      2006        3    e- 1
421 Japan      2007        0
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422	Japan	2008	1.4 e+ 0
423	Japan	2009	-1.4 e+ 0
424	Japan	2010	-7 e- 1
425	Japan	2011	-3 e- 1
426	Japan	2012	0
427	Japan	2013	4 e- 1
428	Japan	2014	2.7 e+ 0
429	Japan	2015	8 e- 1
430	Japan	2016	-1 e- 1
431	Japan	2017	4.84 e- 1
432	Japan	2018	9.89 e- 1
433	Japan	2019	4.69 e- 1
434	Japan	2020	-2.50 e- 2
435	Japan	2021	NA
436	Korea	1993	4.80 e+ 0
437	Korea	1994	6.27 e+ 0
438	Korea	1995	4.48 e+ 0
439	Korea	1996	4.92 e+ 0
440	Korea	1997	4.44 e+ 0
441	Korea	1998	7.51 e+ 0
442	Korea	1999	8.13 e- 1
443	Korea	2000	2.26 e+ 0
444	Korea	2001	4.07 e+ 0
445	Korea	2002	2.76 e+ 0
446	Korea	2003	3.51 e+ 0
447	Korea	2004	3.59 e+ 0
448	Korea	2005	2.75 e+ 0
449	Korea	2006	2.24 e+ 0
450	Korea	2007	2.53 e+ 0
451	Korea	2008	4.67 e+ 0
452	Korea	2009	2.76 e+ 0
453	Korea	2010	2.94 e+ 0
454	Korea	2011	4.03 e+ 0
455	Korea	2012	2.19 e+ 0
456	Korea	2013	1.30 e+ 0
457	Korea	2014	1.27 e+ 0
458	Korea	2015	7.06 e- 1
459	Korea	2016	9.72 e- 1
460	Korea	2017	1.94 e+ 0
461	Korea	2018	1.48 e+ 0
462	Korea	2019	3.83 e- 1
463	Korea	2020	5.37 e- 1
464	Korea	2021	2.50 e+ 0

465	Luxembourg	1993	3.59 e+ 0
466	Luxembourg	1994	2.19 e+ 0
467	Luxembourg	1995	1.87 e+ 0
468	Luxembourg	1996	1.18 e+ 0
469	Luxembourg	1997	1.37 e+ 0
470	Luxembourg	1998	9.59 e- 1
471	Luxembourg	1999	1.03 e+ 0
472	Luxembourg	2000	3.15 e+ 0
473	Luxembourg	2001	2.66 e+ 0
474	Luxembourg	2002	2.07 e+ 0
475	Luxembourg	2003	2.05 e+ 0
476	Luxembourg	2004	2.23 e+ 0
477	Luxembourg	2005	2.49 e+ 0
478	Luxembourg	2006	2.67 e+ 0
479	Luxembourg	2007	2.31 e+ 0
480	Luxembourg	2008	3.40 e+ 0
481	Luxembourg	2009	3.68 e- 1
482	Luxembourg	2010	2.27 e+ 0
483	Luxembourg	2011	3.41 e+ 0
484	Luxembourg	2012	2.66 e+ 0
485	Luxembourg	2013	1.73 e+ 0
486	Luxembourg	2014	6.29 e- 1
487	Luxembourg	2015	4.75 e- 1
488	Luxembourg	2016	2.91 e- 1
489	Luxembourg	2017	1.73 e+ 0
490	Luxembourg	2018	1.53 e+ 0
491	Luxembourg	2019	1.74 e+ 0
492	Luxembourg	2020	8.20 e- 1
493	Luxembourg	2021	2.53 e+ 0
494	Mexico	1993	9.75 e+ 0
495	Mexico	1994	6.97 e+ 0
496	Mexico	1995	3.50 e+ 1
497	Mexico	1996	3.44 e+ 1
498	Mexico	1997	2.06 e+ 1
499	Mexico	1998	1.59 e+ 1
500	Mexico	1999	1.66 e+ 1
501	Mexico	2000	9.49 e+ 0
502	Mexico	2001	6.37 e+ 0
503	Mexico	2002	5.03 e+ 0
504	Mexico	2003	4.55 e+ 0
505	Mexico	2004	4.69 e+ 0
506	Mexico	2005	3.99 e+ 0
507	Mexico	2006	3.63 e+ 0

508	Mexico	2007	3.97 e+ 0
509	Mexico	2008	5.12 e+ 0
510	Mexico	2009	5.30 e+ 0
511	Mexico	2010	4.16 e+ 0
512	Mexico	2011	3.41 e+ 0
513	Mexico	2012	4.11 e+ 0
514	Mexico	2013	3.81 e+ 0
515	Mexico	2014	4.02 e+ 0
516	Mexico	2015	2.72 e+ 0
517	Mexico	2016	2.82 e+ 0
518	Mexico	2017	6.04 e+ 0
519	Mexico	2018	4.90 e+ 0
520	Mexico	2019	3.64 e+ 0
521	Mexico	2020	3.40 e+ 0
522	Mexico	2021	5.69 e+ 0
523	Netherlands	1993	2.58 e+ 0
524	Netherlands	1994	2.80 e+ 0
525	Netherlands	1995	1.92 e+ 0
526	Netherlands	1996	1.95 e+ 0
527	Netherlands	1997	2.11 e+ 0
528	Netherlands	1998	1.96 e+ 0
529	Netherlands	1999	2.16 e+ 0
530	Netherlands	2000	2.36 e+ 0
531	Netherlands	2001	4.16 e+ 0
532	Netherlands	2002	3.29 e+ 0
533	Netherlands	2003	2.09 e+ 0
534	Netherlands	2004	1.26 e+ 0
535	Netherlands	2005	1.69 e+ 0
536	Netherlands	2006	1.10 e+ 0
537	Netherlands	2007	1.61 e+ 0
538	Netherlands	2008	2.49 e+ 0
539	Netherlands	2009	1.19 e+ 0
540	Netherlands	2010	1.28 e+ 0
541	Netherlands	2011	2.34 e+ 0
542	Netherlands	2012	2.46 e+ 0
543	Netherlands	2013	2.51 e+ 0
544	Netherlands	2014	9.76 e- 1
545	Netherlands	2015	6.00 e- 1
546	Netherlands	2016	3.17 e- 1
547	Netherlands	2017	1.38 e+ 0
548	Netherlands	2018	1.70 e+ 0
549	Netherlands	2019	2.63 e+ 0
550	Netherlands	2020	1.27 e+ 0

551	Netherlands	2021	2.68 e+ 0
552	New Zealand	1993	1.29 e+ 0
553	New Zealand	1994	1.75 e+ 0
554	New Zealand	1995	3.75 e+ 0
555	New Zealand	1996	2.29 e+ 0
556	New Zealand	1997	1.19 e+ 0
557	New Zealand	1998	1.27 e+ 0
558	New Zealand	1999	-1.14 e- 1
559	New Zealand	2000	2.62 e+ 0
560	New Zealand	2001	2.63 e+ 0
561	New Zealand	2002	2.68 e+ 0
562	New Zealand	2003	1.75 e+ 0
563	New Zealand	2004	2.29 e+ 0
564	New Zealand	2005	3.04 e+ 0
565	New Zealand	2006	3.37 e+ 0
566	New Zealand	2007	2.38 e+ 0
567	New Zealand	2008	3.96 e+ 0
568	New Zealand	2009	2.12 e+ 0
569	New Zealand	2010	2.30 e+ 0
570	New Zealand	2011	4.03 e+ 0
571	New Zealand	2012	1.06 e+ 0
572	New Zealand	2013	1.13 e+ 0
573	New Zealand	2014	1.23 e+ 0
574	New Zealand	2015	2.93 e- 1
575	New Zealand	2016	6.46 e- 1
576	New Zealand	2017	1.85 e+ 0
577	New Zealand	2018	1.60 e+ 0
578	New Zealand	2019	1.62 e+ 0
579	New Zealand	2020	1.71 e+ 0
580	New Zealand	2021	3.94 e+ 0
581	Norway	1993	2.29 e+ 0
582	Norway	1994	1.38 e+ 0
583	Norway	1995	2.46 e+ 0
584	Norway	1996	1.26 e+ 0
585	Norway	1997	2.57 e+ 0
586	Norway	1998	2.25 e+ 0
587	Norway	1999	2.37 e+ 0
588	Norway	2000	3.09 e+ 0
589	Norway	2001	3.00 e+ 0
590	Norway	2002	1.29 e+ 0
591	Norway	2003	2.49 e+ 0
592	Norway	2004	4.54 e- 1
593	Norway	2005	1.53 e+ 0

594	Norway	2006	2.33 e+ 0
595	Norway	2007	7.13 e- 1
596	Norway	2008	3.75 e+ 0
597	Norway	2009	2.20 e+ 0
598	Norway	2010	2.42 e+ 0
599	Norway	2011	1.28 e+ 0
600	Norway	2012	6.97 e- 1
601	Norway	2013	2.12 e+ 0
602	Norway	2014	2.04 e+ 0
603	Norway	2015	2.17 e+ 0
604	Norway	2016	3.55 e+ 0
605	Norway	2017	1.88 e+ 0
606	Norway	2018	2.76 e+ 0
607	Norway	2019	2.17 e+ 0
608	Norway	2020	1.29 e+ 0
609	Norway	2021	3.48 e+ 0
610	Poland	1993	3.55 e+ 1
611	Poland	1994	3.22 e+ 1
612	Poland	1995	2.81 e+ 1
613	Poland	1996	1.99 e+ 1
614	Poland	1997	1.49 e+ 1
615	Poland	1998	1.19 e+ 1
616	Poland	1999	7.26 e+ 0
617	Poland	2000	1.01 e+ 1
618	Poland	2001	5.48 e+ 0
619	Poland	2002	1.94 e+ 0
620	Poland	2003	8.42 e- 1
621	Poland	2004	3.49 e+ 0
622	Poland	2005	2.13 e+ 0
623	Poland	2006	1.03 e+ 0
624	Poland	2007	2.49 e+ 0
625	Poland	2008	4.22 e+ 0
626	Poland	2009	3.45 e+ 0
627	Poland	2010	2.58 e+ 0
628	Poland	2011	4.27 e+ 0
629	Poland	2012	3.7 e+ 0
630	Poland	2013	9 e- 1
631	Poland	2014	-2.5 e- 2
632	Poland	2015	-9.33 e- 1
633	Poland	2016	-5.83 e- 1
634	Poland	2017	1.98 e+ 0
635	Poland	2018	1.67 e+ 0
636	Poland	2019	2.31 e+ 0

637	Poland	2020	3.4 e+ 0
638	Poland	2021	5.1 e+ 0
639	Portugal	1993	6.78 e+ 0
640	Portugal	1994	5.42 e+ 0
641	Portugal	1995	4.22 e+ 0
642	Portugal	1996	3.07 e+ 0
643	Portugal	1997	2.34 e+ 0
644	Portugal	1998	2.57 e+ 0
645	Portugal	1999	2.34 e+ 0
646	Portugal	2000	2.85 e+ 0
647	Portugal	2001	4.37 e+ 0
648	Portugal	2002	3.60 e+ 0
649	Portugal	2003	3.22 e+ 0
650	Portugal	2004	2.37 e+ 0
651	Portugal	2005	2.28 e+ 0
652	Portugal	2006	3.11 e+ 0
653	Portugal	2007	2.45 e+ 0
654	Portugal	2008	2.59 e+ 0
655	Portugal	2009	-8.36 e- 1
656	Portugal	2010	1.40 e+ 0
657	Portugal	2011	3.65 e+ 0
658	Portugal	2012	2.77 e+ 0
659	Portugal	2013	2.74 e- 1
660	Portugal	2014	-2.78 e- 1
661	Portugal	2015	4.88 e- 1
662	Portugal	2016	6.07 e- 1
663	Portugal	2017	1.37 e+ 0
664	Portugal	2018	9.94 e- 1
665	Portugal	2019	3.38 e- 1
666	Portugal	2020	-1.24 e- 2
667	Portugal	2021	1.27 e+ 0
668	Slovak Republic	1993	2.33 e+ 1
669	Slovak Republic	1994	1.34 e+ 1
670	Slovak Republic	1995	9.84 e+ 0
671	Slovak Republic	1996	5.78 e+ 0
672	Slovak Republic	1997	6.14 e+ 0
673	Slovak Republic	1998	6.67 e+ 0
674	Slovak Republic	1999	1.06 e+ 1
675	Slovak Republic	2000	1.20 e+ 1
676	Slovak Republic	2001	7.33 e+ 0
677	Slovak Republic	2002	3.13 e+ 0
678	Slovak Republic	2003	8.55 e+ 0
679	Slovak Republic	2004	7.55 e+ 0

680	Slovak Republic	2005	2.71 e+ 0
681	Slovak Republic	2006	4.48 e+ 0
682	Slovak Republic	2007	2.76 e+ 0
683	Slovak Republic	2008	4.60 e+ 0
684	Slovak Republic	2009	1.62 e+ 0
685	Slovak Republic	2010	9.57 e- 1
686	Slovak Republic	2011	3.92 e+ 0
687	Slovak Republic	2012	3.61 e+ 0
688	Slovak Republic	2013	1.40 e+ 0
689	Slovak Republic	2014	-7.62 e- 2
690	Slovak Republic	2015	-3.25 e- 1
691	Slovak Republic	2016	-5.20 e- 1
692	Slovak Republic	2017	1.31 e+ 0
693	Slovak Republic	2018	2.51 e+ 0
694	Slovak Republic	2019	2.66 e+ 0
695	Slovak Republic	2020	1.94 e+ 0
696	Slovak Republic	2021	3.15 e+ 0
697	Spain	1993	4.57 e+ 0
698	Spain	1994	4.72 e+ 0
699	Spain	1995	4.67 e+ 0
700	Spain	1996	3.56 e+ 0
701	Spain	1997	1.97 e+ 0
702	Spain	1998	1.83 e+ 0
703	Spain	1999	2.31 e+ 0
704	Spain	2000	3.43 e+ 0
705	Spain	2001	3.59 e+ 0
706	Spain	2002	3.07 e+ 0
707	Spain	2003	3.04 e+ 0
708	Spain	2004	3.04 e+ 0
709	Spain	2005	3.37 e+ 0
710	Spain	2006	3.52 e+ 0
711	Spain	2007	2.79 e+ 0
712	Spain	2008	4.08 e+ 0
713	Spain	2009	-2.88 e- 1
714	Spain	2010	1.80 e+ 0
715	Spain	2011	3.20 e+ 0
716	Spain	2012	2.45 e+ 0
717	Spain	2013	1.41 e+ 0
718	Spain	2014	-1.51 e- 1
719	Spain	2015	-5.00 e- 1
720	Spain	2016	-2.03 e- 1
721	Spain	2017	1.96 e+ 0
722	Spain	2018	1.67 e+ 0

723	Spain	2019	7.00 e- 1
724	Spain	2020	-3.23 e- 1
725	Spain	2021	3.09 e+ 0
726	Sweden	1993	4.73 e+ 0
727	Sweden	1994	2.16 e+ 0
728	Sweden	1995	2.46 e+ 0
729	Sweden	1996	5.33 e- 1
730	Sweden	1997	6.58 e- 1
731	Sweden	1998	-2.67 e- 1
732	Sweden	1999	4.62 e- 1
733	Sweden	2000	8.99 e- 1
734	Sweden	2001	2.41 e+ 0
735	Sweden	2002	2.16 e+ 0
736	Sweden	2003	1.93 e+ 0
737	Sweden	2004	3.74 e- 1
738	Sweden	2005	4.53 e- 1
739	Sweden	2006	1.36 e+ 0
740	Sweden	2007	2.21 e+ 0
741	Sweden	2008	3.44 e+ 0
742	Sweden	2009	-4.94 e- 1
743	Sweden	2010	1.16 e+ 0
744	Sweden	2011	2.96 e+ 0
745	Sweden	2012	8.88 e- 1
746	Sweden	2013	-4.43 e- 2
747	Sweden	2014	-1.80 e- 1
748	Sweden	2015	-4.68 e- 2
749	Sweden	2016	9.84 e- 1
750	Sweden	2017	1.79 e+ 0
751	Sweden	2018	1.95 e+ 0
752	Sweden	2019	1.78 e+ 0
753	Sweden	2020	4.97 e- 1
754	Sweden	2021	2.16 e+ 0
755	Switzerland	1993	3.29 e+ 0
756	Switzerland	1994	8.52 e- 1
757	Switzerland	1995	1.80 e+ 0
758	Switzerland	1996	8.12 e- 1
759	Switzerland	1997	5.20 e- 1
760	Switzerland	1998	1.79 e- 2
761	Switzerland	1999	8.06 e- 1
762	Switzerland	2000	1.56 e+ 0
763	Switzerland	2001	9.89 e- 1
764	Switzerland	2002	6.43 e- 1
765	Switzerland	2003	6.38 e- 1

766	Switzerland	2004	8.03 e- 1
767	Switzerland	2005	1.17 e+ 0
768	Switzerland	2006	1.06 e+ 0
769	Switzerland	2007	7.32 e- 1
770	Switzerland	2008	2.43 e+ 0
771	Switzerland	2009	-4.80 e- 1
772	Switzerland	2010	6.88 e- 1
773	Switzerland	2011	2.31 e- 1
774	Switzerland	2012	-6.93 e- 1
775	Switzerland	2013	-2.17 e- 1
776	Switzerland	2014	-1.32 e- 2
777	Switzerland	2015	-1.14 e+ 0
778	Switzerland	2016	-4.35 e- 1
779	Switzerland	2017	5.34 e- 1
780	Switzerland	2018	9.36 e- 1
781	Switzerland	2019	3.63 e- 1
782	Switzerland	2020	-7.26 e- 1
783	Switzerland	2021	5.82 e- 1
784	Türkiye	1993	6.61 e+ 1
785	Türkiye	1994	1.05 e+ 2
786	Türkiye	1995	8.91 e+ 1
787	Türkiye	1996	8.04 e+ 1
788	Türkiye	1997	8.57 e+ 1
789	Türkiye	1998	8.46 e+ 1
790	Türkiye	1999	6.49 e+ 1
791	Türkiye	2000	5.49 e+ 1
792	Türkiye	2001	5.44 e+ 1
793	Türkiye	2002	4.50 e+ 1
794	Türkiye	2003	2.16 e+ 1
795	Türkiye	2004	8.60 e+ 0
796	Türkiye	2005	8.18 e+ 0
797	Türkiye	2006	9.60 e+ 0
798	Türkiye	2007	8.76 e+ 0
799	Türkiye	2008	1.04 e+ 1
800	Türkiye	2009	6.25 e+ 0
801	Türkiye	2010	8.57 e+ 0
802	Türkiye	2011	6.47 e+ 0
803	Türkiye	2012	8.89 e+ 0
804	Türkiye	2013	7.49 e+ 0
805	Türkiye	2014	8.85 e+ 0
806	Türkiye	2015	7.67 e+ 0
807	Türkiye	2016	7.78 e+ 0
808	Türkiye	2017	1.11 e+ 1

809	Türkiye	2018	1.63 e+ 1
810	Türkiye	2019	1.52 e+ 1
811	Türkiye	2020	1.23 e+ 1
812	Türkiye	2021	1.96 e+ 1
813	United Kingdom	1993	2.6 e+ 0
814	United Kingdom	1994	2.2 e+ 0
815	United Kingdom	1995	2.7 e+ 0
816	United Kingdom	1996	2.9 e+ 0
817	United Kingdom	1997	2.2 e+ 0
818	United Kingdom	1998	1.8 e+ 0
819	United Kingdom	1999	1.7 e+ 0
820	United Kingdom	2000	1.2 e+ 0
821	United Kingdom	2001	1.6 e+ 0
822	United Kingdom	2002	1.5 e+ 0
823	United Kingdom	2003	1.4 e+ 0
824	United Kingdom	2004	1.4 e+ 0
825	United Kingdom	2005	2.1 e+ 0
826	United Kingdom	2006	2.5 e+ 0
827	United Kingdom	2007	2.4 e+ 0
828	United Kingdom	2008	3.5 e+ 0
829	United Kingdom	2009	2 e+ 0
830	United Kingdom	2010	2.5 e+ 0
831	United Kingdom	2011	3.8 e+ 0
832	United Kingdom	2012	2.6 e+ 0
833	United Kingdom	2013	2.3 e+ 0
834	United Kingdom	2014	1.5 e+ 0
835	United Kingdom	2015	4 e- 1
836	United Kingdom	2016	1 e+ 0
837	United Kingdom	2017	2.6 e+ 0
838	United Kingdom	2018	2.3 e+ 0
839	United Kingdom	2019	1.7 e+ 0
840	United Kingdom	2020	1 e+ 0
841	United Kingdom	2021	2.5 e+ 0
842	United States	1993	2.95 e+ 0
843	United States	1994	2.61 e+ 0
844	United States	1995	2.81 e+ 0
845	United States	1996	2.93 e+ 0
846	United States	1997	2.34 e+ 0
847	United States	1998	1.55 e+ 0
848	United States	1999	2.19 e+ 0
849	United States	2000	3.38 e+ 0
850	United States	2001	2.83 e+ 0
851	United States	2002	1.59 e+ 0

```
852 United States              2003        2.27 e+ 0
853 United States              2004        2.68 e+ 0
854 United States              2005        3.39 e+ 0
855 United States              2006        3.23 e+ 0
856 United States              2007        2.85 e+ 0
857 United States              2008        3.84 e+ 0
858 United States              2009       -3.56 e- 1
859 United States              2010        1.64 e+ 0
860 United States              2011        3.16 e+ 0
861 United States              2012        2.07 e+ 0
862 United States              2013        1.46 e+ 0
863 United States              2014        1.62 e+ 0
864 United States              2015        1.19 e- 1
865 United States              2016        1.26 e+ 0
866 United States              2017        2.13 e+ 0
867 United States              2018        2.44 e+ 0
868 United States              2019        1.81 e+ 0
869 United States              2020        1.23 e+ 0
870 United States              2021        4.70 e+ 0
871 Argentina                  1993       NA
872 Argentina                  1994       NA
873 Argentina                  1995       NA
874 Argentina                  1996       NA
875 Argentina                  1997       NA
876 Argentina                  1998       NA
877 Argentina                  1999       NA
878 Argentina                  2000       NA
879 Argentina                  2001       NA
880 Argentina                  2002       NA
881 Argentina                  2003       NA
882 Argentina                  2004       NA
883 Argentina                  2005       NA
884 Argentina                  2006       NA
885 Argentina                  2007       NA
886 Argentina                  2008       NA
887 Argentina                  2009       NA
888 Argentina                  2010       NA
889 Argentina                  2011       NA
890 Argentina                  2012       NA
891 Argentina                  2013       NA
892 Argentina                  2014       NA
893 Argentina                  2015       NA
894 Argentina                  2016       NA
```

895	Argentina	2017	NA
896	Argentina	2018	3.43 e+ 1
897	Argentina	2019	5.35 e+ 1
898	Argentina	2020	4.20 e+ 1
899	Argentina	2021	4.84 e+ 1
900	Brazil	1993	1.93 e+ 3
901	Brazil	1994	2.08 e+ 3
902	Brazil	1995	6.60 e+ 1
903	Brazil	1996	1.58 e+ 1
904	Brazil	1997	6.93 e+ 0
905	Brazil	1998	3.20 e+ 0
906	Brazil	1999	4.86 e+ 0
907	Brazil	2000	7.04 e+ 0
908	Brazil	2001	6.84 e+ 0
909	Brazil	2002	8.45 e+ 0
910	Brazil	2003	1.47 e+ 1
911	Brazil	2004	6.60 e+ 0
912	Brazil	2005	6.87 e+ 0
913	Brazil	2006	4.18 e+ 0
914	Brazil	2007	3.64 e+ 0
915	Brazil	2008	5.68 e+ 0
916	Brazil	2009	4.89 e+ 0
917	Brazil	2010	5.04 e+ 0
918	Brazil	2011	6.64 e+ 0
919	Brazil	2012	5.40 e+ 0
920	Brazil	2013	6.20 e+ 0
921	Brazil	2014	6.33 e+ 0
922	Brazil	2015	9.03 e+ 0
923	Brazil	2016	8.74 e+ 0
924	Brazil	2017	3.45 e+ 0
925	Brazil	2018	3.66 e+ 0
926	Brazil	2019	3.73 e+ 0
927	Brazil	2020	3.21 e+ 0
928	Brazil	2021	8.30 e+ 0
929	Chile	1993	1.27 e+ 1
930	Chile	1994	1.14 e+ 1
931	Chile	1995	8.23 e+ 0
932	Chile	1996	7.36 e+ 0
933	Chile	1997	6.13 e+ 0
934	Chile	1998	5.11 e+ 0
935	Chile	1999	3.34 e+ 0
936	Chile	2000	3.84 e+ 0
937	Chile	2001	3.57 e+ 0

938	Chile	2002	2.49	e+ 0
939	Chile	2003	2.81	e+ 0
940	Chile	2004	1.05	e+ 0
941	Chile	2005	3.05	e+ 0
942	Chile	2006	3.39	e+ 0
943	Chile	2007	4.41	e+ 0
944	Chile	2008	8.72	e+ 0
945	Chile	2009	3.53	e- 1
946	Chile	2010	1.41	e+ 0
947	Chile	2011	3.34	e+ 0
948	Chile	2012	3.01	e+ 0
949	Chile	2013	1.79	e+ 0
950	Chile	2014	4.72	e+ 0
951	Chile	2015	4.35	e+ 0
952	Chile	2016	3.79	e+ 0
953	Chile	2017	2.18	e+ 0
954	Chile	2018	2.43	e+ 0
955	Chile	2019	2.56	e+ 0
956	Chile	2020	3.05	e+ 0
957	Chile	2021	4.52	e+ 0
958	China (People's Republic of)	1993	1.47	e+ 1
959	China (People's Republic of)	1994	2.41	e+ 1
960	China (People's Republic of)	1995	1.71	e+ 1
961	China (People's Republic of)	1996	8.3	e+ 0
962	China (People's Republic of)	1997	2.8	e+ 0
963	China (People's Republic of)	1998	-8	e- 1
964	China (People's Republic of)	1999	-1.4	e+ 0
965	China (People's Republic of)	2000	4	e- 1
966	China (People's Republic of)	2001	7	e- 1
967	China (People's Republic of)	2002	-8	e- 1
968	China (People's Republic of)	2003	1.2	e+ 0
969	China (People's Republic of)	2004	3.9	e+ 0
970	China (People's Republic of)	2005	1.8	e+ 0
971	China (People's Republic of)	2006	1.5	e+ 0
972	China (People's Republic of)	2007	4.8	e+ 0
973	China (People's Republic of)	2008	5.9	e+ 0
974	China (People's Republic of)	2009	-7	e- 1
975	China (People's Republic of)	2010	3.3	e+ 0
976	China (People's Republic of)	2011	5.4	e+ 0
977	China (People's Republic of)	2012	2.6	e+ 0
978	China (People's Republic of)	2013	2.6	e+ 0
979	China (People's Republic of)	2014	2	e+ 0
980	China (People's Republic of)	2015	1.4	e+ 0

```
 981 China (People's Republic of)  2016        2    e+ 0
 982 China (People's Republic of)  2017        1.6  e+ 0
 983 China (People's Republic of)  2018        2.1  e+ 0
 984 China (People's Republic of)  2019        2.9  e+ 0
 985 China (People's Republic of)  2020        2.5  e+ 0
 986 China (People's Republic of)  2021        9    e- 1
 987 Estonia                       1993       NA
 988 Estonia                       1994       NA
 989 Estonia                       1995       NA
 990 Estonia                       1996       NA
 991 Estonia                       1997       NA
 992 Estonia                       1998        8.74 e+ 0
 993 Estonia                       1999        3.30 e+ 0
 994 Estonia                       2000        4.02 e+ 0
 995 Estonia                       2001        5.75 e+ 0
 996 Estonia                       2002        3.57 e+ 0
 997 Estonia                       2003        1.33 e+ 0
 998 Estonia                       2004        3.05 e+ 0
 999 Estonia                       2005        4.08 e+ 0
1000 Estonia                       2006        4.44 e+ 0
1001 Estonia                       2007        6.60 e+ 0
1002 Estonia                       2008        1.04 e+ 1
1003 Estonia                       2009       -7.84 e- 2
1004 Estonia                       2010        2.97 e+ 0
1005 Estonia                       2011        4.98 e+ 0
1006 Estonia                       2012        3.93 e+ 0
1007 Estonia                       2013        2.78 e+ 0
1008 Estonia                       2014       -1.06 e- 1
1009 Estonia                       2015       -4.92 e- 1
1010 Estonia                       2016        1.49 e- 1
1011 Estonia                       2017        3.42 e+ 0
1012 Estonia                       2018        3.44 e+ 0
1013 Estonia                       2019        2.28 e+ 0
1014 Estonia                       2020       -4.45 e- 1
1015 Estonia                       2021        4.65 e+ 0
1016 India                         1993        6.33 e+ 0
1017 India                         1994        1.02 e+ 1
1018 India                         1995        1.02 e+ 1
1019 India                         1996        8.98 e+ 0
1020 India                         1997        7.16 e+ 0
1021 India                         1998        1.32 e+ 1
1022 India                         1999        4.67 e+ 0
1023 India                         2000        4.01 e+ 0
```

1024	India	2001	3.78 e+ 0
1025	India	2002	4.30 e+ 0
1026	India	2003	3.81 e+ 0
1027	India	2004	3.77 e+ 0
1028	India	2005	4.25 e+ 0
1029	India	2006	5.80 e+ 0
1030	India	2007	6.37 e+ 0
1031	India	2008	8.35 e+ 0
1032	India	2009	1.09 e+ 1
1033	India	2010	1.20 e+ 1
1034	India	2011	8.86 e+ 0
1035	India	2012	9.31 e+ 0
1036	India	2013	1.09 e+ 1
1037	India	2014	6.35 e+ 0
1038	India	2015	5.87 e+ 0
1039	India	2016	4.94 e+ 0
1040	India	2017	2.49 e+ 0
1041	India	2018	4.86 e+ 0
1042	India	2019	7.66 e+ 0
1043	India	2020	5.56 e+ 0
1044	India	2021	4.89 e+ 0
1045	Indonesia	1993	9.67 e+ 0
1046	Indonesia	1994	8.53 e+ 0
1047	Indonesia	1995	9.42 e+ 0
1048	Indonesia	1996	7.97 e+ 0
1049	Indonesia	1997	6.23 e+ 0
1050	Indonesia	1998	5.85 e+ 1
1051	Indonesia	1999	2.05 e+ 1
1052	Indonesia	2000	3.69 e+ 0
1053	Indonesia	2001	1.15 e+ 1
1054	Indonesia	2002	1.19 e+ 1
1055	Indonesia	2003	6.76 e+ 0
1056	Indonesia	2004	6.06 e+ 0
1057	Indonesia	2005	1.05 e+ 1
1058	Indonesia	2006	1.31 e+ 1
1059	Indonesia	2007	6.41 e+ 0
1060	Indonesia	2008	1.02 e+ 1
1061	Indonesia	2009	4.39 e+ 0
1062	Indonesia	2010	5.13 e+ 0
1063	Indonesia	2011	5.36 e+ 0
1064	Indonesia	2012	4.28 e+ 0
1065	Indonesia	2013	6.41 e+ 0
1066	Indonesia	2014	6.39 e+ 0

1067	Indonesia	2015	6.36 e+ 0
1068	Indonesia	2016	3.53 e+ 0
1069	Indonesia	2017	3.81 e+ 0
1070	Indonesia	2018	3.20 e+ 0
1071	Indonesia	2019	3.03 e+ 0
1072	Indonesia	2020	1.92 e+ 0
1073	Indonesia	2021	1.56 e+ 0
1074	Israel	1993	1.10 e+ 1
1075	Israel	1994	1.23 e+ 1
1076	Israel	1995	9.94 e+ 0
1077	Israel	1996	1.14 e+ 1
1078	Israel	1997	8.96 e+ 0
1079	Israel	1998	5.50 e+ 0
1080	Israel	1999	5.18 e+ 0
1081	Israel	2000	1.05 e+ 0
1082	Israel	2001	1.15 e+ 0
1083	Israel	2002	5.76 e+ 0
1084	Israel	2003	7.26 e- 1
1085	Israel	2004	-4.12 e- 1
1086	Israel	2005	1.31 e+ 0
1087	Israel	2006	2.06 e+ 0
1088	Israel	2007	4.60 e- 1
1089	Israel	2008	4.56 e+ 0
1090	Israel	2009	3.34 e+ 0
1091	Israel	2010	2.72 e+ 0
1092	Israel	2011	3.48 e+ 0
1093	Israel	2012	1.69 e+ 0
1094	Israel	2013	1.58 e+ 0
1095	Israel	2014	4.86 e- 1
1096	Israel	2015	-6.34 e- 1
1097	Israel	2016	-5.46 e- 1
1098	Israel	2017	2.45 e- 1
1099	Israel	2018	8.17 e- 1
1100	Israel	2019	8.44 e- 1
1101	Israel	2020	-5.88 e- 1
1102	Israel	2021	1.49 e+ 0
1103	Russia	1993	8.74 e+ 2
1104	Russia	1994	3.08 e+ 2
1105	Russia	1995	1.97 e+ 2
1106	Russia	1996	4.78 e+ 1
1107	Russia	1997	1.48 e+ 1
1108	Russia	1998	2.77 e+ 1
1109	Russia	1999	8.57 e+ 1

1110	Russia	2000	2.08 e+ 1
1111	Russia	2001	2.15 e+ 1
1112	Russia	2002	1.58 e+ 1
1113	Russia	2003	1.37 e+ 1
1114	Russia	2004	1.09 e+ 1
1115	Russia	2005	1.27 e+ 1
1116	Russia	2006	9.67 e+ 0
1117	Russia	2007	9.01 e+ 0
1118	Russia	2008	1.41 e+ 1
1119	Russia	2009	1.16 e+ 1
1120	Russia	2010	6.85 e+ 0
1121	Russia	2011	8.44 e+ 0
1122	Russia	2012	5.07 e+ 0
1123	Russia	2013	6.75 e+ 0
1124	Russia	2014	7.82 e+ 0
1125	Russia	2015	1.55 e+ 1
1126	Russia	2016	7.04 e+ 0
1127	Russia	2017	3.68 e+ 0
1128	Russia	2018	2.88 e+ 0
1129	Russia	2019	4.47 e+ 0
1130	Russia	2020	3.38 e+ 0
1131	Russia	2021	6.69 e+ 0
1132	Saudi Arabia	1993	NA
1133	Saudi Arabia	1994	NA
1134	Saudi Arabia	1995	NA
1135	Saudi Arabia	1996	1.22 e+ 0
1136	Saudi Arabia	1997	5.72 e- 2
1137	Saudi Arabia	1998	-3.71 e- 1
1138	Saudi Arabia	1999	-1.33 e+ 0
1139	Saudi Arabia	2000	-1.12 e+ 0
1140	Saudi Arabia	2001	-1.12 e+ 0
1141	Saudi Arabia	2002	2.47 e- 1
1142	Saudi Arabia	2003	6.12 e- 1
1143	Saudi Arabia	2004	5.16 e- 1
1144	Saudi Arabia	2005	4.79 e- 1
1145	Saudi Arabia	2006	2.21 e+ 0
1146	Saudi Arabia	2007	4.17 e+ 0
1147	Saudi Arabia	2008	9.87 e+ 0
1148	Saudi Arabia	2009	5.06 e+ 0
1149	Saudi Arabia	2010	5.34 e+ 0
1150	Saudi Arabia	2011	5.83 e+ 0
1151	Saudi Arabia	2012	2.87 e+ 0
1152	Saudi Arabia	2013	3.53 e+ 0

1153	Saudi Arabia	2014	2.24 e+ 0
1154	Saudi Arabia	2015	1.21 e+ 0
1155	Saudi Arabia	2016	2.07 e+ 0
1156	Saudi Arabia	2017	-8.38 e- 1
1157	Saudi Arabia	2018	2.46 e+ 0
1158	Saudi Arabia	2019	-2.09 e+ 0
1159	Saudi Arabia	2020	3.45 e+ 0
1160	Saudi Arabia	2021	3.06 e+ 0
1161	Slovenia	1993	3.18 e+ 1
1162	Slovenia	1994	2.10 e+ 1
1163	Slovenia	1995	1.35 e+ 1
1164	Slovenia	1996	9.86 e+ 0
1165	Slovenia	1997	8.36 e+ 0
1166	Slovenia	1998	7.89 e+ 0
1167	Slovenia	1999	6.16 e+ 0
1168	Slovenia	2000	8.91 e+ 0
1169	Slovenia	2001	8.38 e+ 0
1170	Slovenia	2002	7.48 e+ 0
1171	Slovenia	2003	5.54 e+ 0
1172	Slovenia	2004	3.59 e+ 0
1173	Slovenia	2005	2.45 e+ 0
1174	Slovenia	2006	2.46 e+ 0
1175	Slovenia	2007	3.66 e+ 0
1176	Slovenia	2008	5.65 e+ 0
1177	Slovenia	2009	8.39 e- 1
1178	Slovenia	2010	1.80 e+ 0
1179	Slovenia	2011	1.80 e+ 0
1180	Slovenia	2012	2.60 e+ 0
1181	Slovenia	2013	1.77 e+ 0
1182	Slovenia	2014	1.99 e- 1
1183	Slovenia	2015	-5.26 e- 1
1184	Slovenia	2016	-5.50 e- 2
1185	Slovenia	2017	1.43 e+ 0
1186	Slovenia	2018	1.74 e+ 0
1187	Slovenia	2019	1.63 e+ 0
1188	Slovenia	2020	-5.49 e- 2
1189	Slovenia	2021	1.92 e+ 0
1190	South Africa	1993	9.72 e+ 0
1191	South Africa	1994	8.94 e+ 0
1192	South Africa	1995	8.68 e+ 0
1193	South Africa	1996	7.35 e+ 0
1194	South Africa	1997	8.60 e+ 0
1195	South Africa	1998	6.88 e+ 0

1196	South Africa	1999	5.18 e+ 0
1197	South Africa	2000	5.34 e+ 0
1198	South Africa	2001	5.70 e+ 0
1199	South Africa	2002	9.49 e+ 0
1200	South Africa	2003	5.68 e+ 0
1201	South Africa	2004	-6.92 e- 1
1202	South Africa	2005	2.06 e+ 0
1203	South Africa	2006	3.24 e+ 0
1204	South Africa	2007	6.18 e+ 0
1205	South Africa	2008	1.01 e+ 1
1206	South Africa	2009	7.22 e+ 0
1207	South Africa	2010	4.09 e+ 0
1208	South Africa	2011	5.00 e+ 0
1209	South Africa	2012	5.72 e+ 0
1210	South Africa	2013	5.78 e+ 0
1211	South Africa	2014	6.13 e+ 0
1212	South Africa	2015	4.54 e+ 0
1213	South Africa	2016	6.57 e+ 0
1214	South Africa	2017	5.18 e+ 0
1215	South Africa	2018	4.52 e+ 0
1216	South Africa	2019	4.12 e+ 0
1217	South Africa	2020	3.21 e+ 0
1218	South Africa	2021	4.61 e+ 0
1219	Colombia	1993	2.24 e+ 1
1220	Colombia	1994	2.28 e+ 1
1221	Colombia	1995	2.09 e+ 1
1222	Colombia	1996	2.08 e+ 1
1223	Colombia	1997	1.85 e+ 1
1224	Colombia	1998	1.87 e+ 1
1225	Colombia	1999	1.09 e+ 1
1226	Colombia	2000	9.23 e+ 0
1227	Colombia	2001	7.97 e+ 0
1228	Colombia	2002	6.35 e+ 0
1229	Colombia	2003	7.13 e+ 0
1230	Colombia	2004	5.90 e+ 0
1231	Colombia	2005	5.05 e+ 0
1232	Colombia	2006	4.29 e+ 0
1233	Colombia	2007	5.54 e+ 0
1234	Colombia	2008	7.00 e+ 0
1235	Colombia	2009	4.20 e+ 0
1236	Colombia	2010	2.27 e+ 0
1237	Colombia	2011	3.42 e+ 0
1238	Colombia	2012	3.17 e+ 0

1239	Colombia	2013	2.02 e+ 0
1240	Colombia	2014	2.90 e+ 0
1241	Colombia	2015	4.99 e+ 0
1242	Colombia	2016	7.51 e+ 0
1243	Colombia	2017	4.31 e+ 0
1244	Colombia	2018	3.24 e+ 0
1245	Colombia	2019	3.52 e+ 0
1246	Colombia	2020	2.53 e+ 0
1247	Colombia	2021	3.50 e+ 0
1248	Costa Rica	1993	9.78 e+ 0
1249	Costa Rica	1994	1.35 e+ 1
1250	Costa Rica	1995	2.32 e+ 1
1251	Costa Rica	1996	1.75 e+ 1
1252	Costa Rica	1997	1.32 e+ 1
1253	Costa Rica	1998	1.17 e+ 1
1254	Costa Rica	1999	1.00 e+ 1
1255	Costa Rica	2000	1.10 e+ 1
1256	Costa Rica	2001	1.13 e+ 1
1257	Costa Rica	2002	9.17 e+ 0
1258	Costa Rica	2003	9.45 e+ 0
1259	Costa Rica	2004	1.23 e+ 1
1260	Costa Rica	2005	1.38 e+ 1
1261	Costa Rica	2006	1.15 e+ 1
1262	Costa Rica	2007	9.36 e+ 0
1263	Costa Rica	2008	1.34 e+ 1
1264	Costa Rica	2009	7.84 e+ 0
1265	Costa Rica	2010	5.66 e+ 0
1266	Costa Rica	2011	4.88 e+ 0
1267	Costa Rica	2012	4.50 e+ 0
1268	Costa Rica	2013	5.23 e+ 0
1269	Costa Rica	2014	4.52 e+ 0
1270	Costa Rica	2015	8.02 e- 1
1271	Costa Rica	2016	-1.75 e- 2
1272	Costa Rica	2017	1.63 e+ 0
1273	Costa Rica	2018	2.22 e+ 0
1274	Costa Rica	2019	2.10 e+ 0
1275	Costa Rica	2020	7.25 e- 1
1276	Costa Rica	2021	1.73 e+ 0

3 columns, 1276 rows

Question 5

Use a separate, single pipeline to answer each of the following questions.

Requirement: Your code must use the `filter()` function for each part, not `arrange()`.

a. What is the highest inflation rate observed between 1993 and 2021? The output of the pipeline should be a data frame with one row and three columns. In addition to code and output, your response should include a single sentence stating the country and year.

```
inf_long%>%
  filter(annual_inflation==max(annual_inflation, na.rm = TRUE))
```

```
# A tibble: 1 x 3
  country  year annual_inflation
  <chr>   <dbl>            <dbl>
1 Brazil   1994            2076.
```

ANSWER

b. What is the lowest inflation rate observed between 1993 and 2021? The output of the pipeline should be a data frame with one row and three columns. In addition to code and output, your response should include a single sentence stating the country and year.

```
inf_long%>%
  filter(annual_inflation==min(annual_inflation, na.rm = TRUE))
```

```
# A tibble: 1 x 3
  country  year annual_inflation
  <chr>   <dbl>            <dbl>
1 Ireland  2009            -4.48
```

ANSWER

c. Putting (a) and (b) together: What are the highest and the lowest inflation rates observed between 1993 and 2021? The output of the pipeline should be a data frame with two rows and three columns.

```
inf_long %>%
  filter(annual_inflation %in% c(max(annual_inflation, na.rm = TRUE),
                                 min(annual_inflation, na.rm = TRUE)))
```

```
# A tibble: 2 x 3
  country  year annual_inflation
  <chr>   <dbl>            <dbl>
1 Ireland  2009            -4.48
2 Brazil   1994          2076.
```

ANSWER

Question 6

a. Create a vector called `countries_of_interest` which contains the names of up tp five countries you want to visualize the inflation rates for over the years. For example, if these countries are Türkiye and United States, you can express this as follows:

```
countries_of_interest <- c("Sweden", "Norway", "Denmark", "Finland", "Iceland")
```

Then, in 1-2 sentences, state why you chose these countries.

Picked because they are all nordic countires and interesting to compare

b. In a single pipeline, filter your reshaped dataset to include only the `countries_of_interest` from part (a), and save the resulting data frame with a new name so you (1) can refer to this data frame later in your analysis and (2) do not overwrite the data frame you're starting with. Use a short but informative name. Then, in a new pipeline, find the `distinct()` countries in the data frame you created.

```
nordic_inf <- inf_long %>%
  filter(country %in% countries_of_interest)

nordic_inf %>%
  distinct(country)
```

```
# A tibble: 5 x 1
  country
  <chr>
1 Denmark
2 Finland
3 Iceland
4 Norway
5 Sweden
```

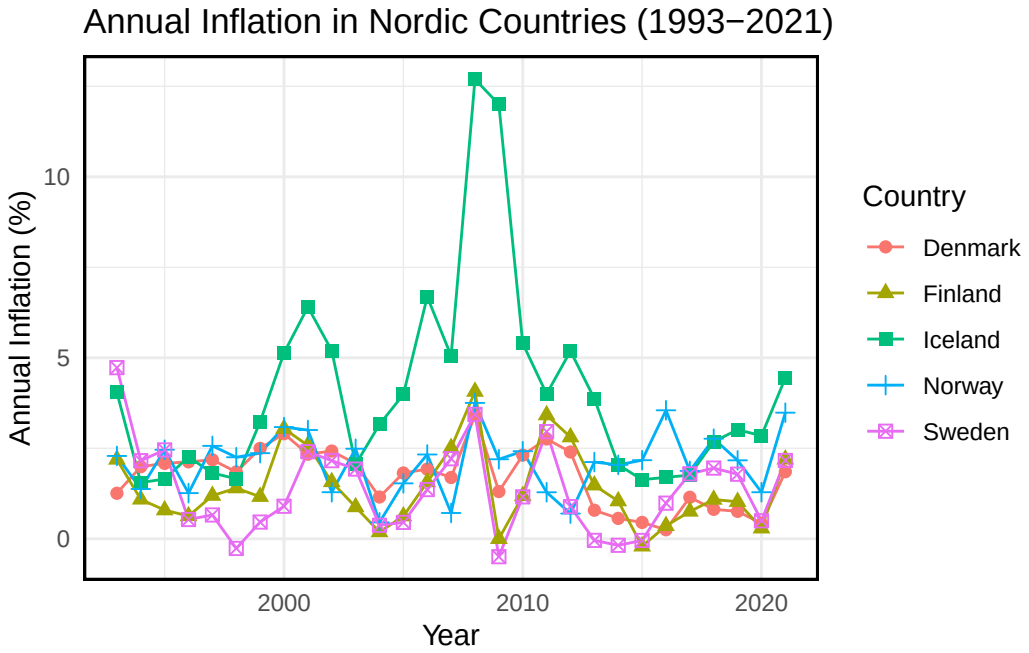
Question 7

Using your data frame from the previous question, create a plot of annual inflation vs. year for these countries. Then, in a few sentences, describe the patterns you observe in the plot, particularly focusing on anything you find surprising or not surprising, based on your knowledge (or lack thereof) of these countries economies.

Requirements for the plot:

- Data should be represented with points as well as lines connecting the points for each country.
- Each country should be represented by a different color line and different color and shape points.
- Axes and legend should be properly labeled.
- The plot should have an appropriate title (and optionally a subtitle).
- Plot should be customized in at least one way – you could use a different than default color scale, or different than default theme, or some other customization.

```
ggplot(nordic_inf, aes(x = year, y = annual_inflation,
                       color = country, shape = country)) +
  geom_line() +
  geom_point(size = 2) +
  labs(
    title = "Annual Inflation in Nordic Countries (1993-2021)",
    x = "Year",
    y = "Annual Inflation (%)",
    color = "Country",
    shape = "Country"
  ) +
  theme_minimal() +
  theme(panel.border = element_rect(color = "black", fill = NA, size = 1))
```



If you haven't yet done so, now is a good time to render, commit, and push. Make sure that you commit and push all changed documents and your Git pane is completely empty before proceeding.

Part 2

Inflation in the US

The OECD defines inflation as follows:

> Inflation is a rise in the general level of prices of goods and services that households acquire for the purpose of consumption in an economy over a period of time.
>
> The main measure of inflation is the annual inflation rate which is the movement of the Consumer Price Index (CPI) from one month/period to the same month/period of the previous year expressed as percentage over time.
>
> Source: OECD CPI FAQ

CPI is broken down into 12 divisions such as food, housing, health, etc. Your goal in this part is to create another time series plot of annual inflation, this time for US only.

The data you will need to create this visualization is spread across two files:

- `us-inflation.csv`: Annual inflation rate for the US for 12 CPI divisions. Each division is identified by an ID number.

- `cpi-divisions.csv`: A "lookup table" of CPI division ID numbers and their descriptions.

Let's load both of these files.

```
us_inflation <- read_csv("data/us-inflation.csv")
cpi_divisions <- read_csv("data/cpi-divisions.csv")
```

Question 8

a. How many columns and how many rows does the `us_inflation` dataset have? What are the variables in it? Add a brief (1-2 sentences) narrative summarizing this information.

```
glimpse(us_inflation)
```

```
Rows: 132
Columns: 4
$ country          <chr> "United States", "United States", "United States", "U~
$ cpi_division_id  <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2,~
$ year             <dbl> 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019,~
$ annual_inflation <dbl> 4.8039240, 2.4539620, 0.9083796, 2.6398010, 1.1677110~
```

ANSWER

b. How many columns and how many rows does the `cpi_divisions` dataset have? What are the variables in it? Add a brief (1-2 sentences) narrative summarizing this information.

```
glimpse(cpi_divisions)
```

```
Rows: 12
Columns: 2
$ id          <dbl> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
$ description <chr> "Food and non-Alcoholic beverages", "Alcoholic beverages, ~
```

ANSWER

c. Create a new dataset by joining the `us_inflation` dataset with the `cpi_division_id` dataset.

```
us_inflation_full <- us_inflation %>%
  left_join(cpi_divisions, by=c("cpi_division_id"="id"))
```

- Determine which type of join is the most appropriate one and use that.
- Note that the two datasets don't have a common variable. Review the help for the join functions to determine how to use the `by` argument when the names of the variables that the datasets should be joined by are different.
- Use a short but informative name for the joined dataset, and do not overwrite either of the datasets that go into creating it.

Then, find the number of rows and columns of the resulting dataset and report the names of its columns. Add a brief (1-2 sentences) narrative summarizing this information.

ANSWER

Question 9

a. Create a vector called `divisions_of_interest` which contains the descriptions or IDs of CPI divisions you want to visualize. Your `divisions_of_interest` should consist of no more than five divisions. If you're using descriptions, make sure that the spelling of your divisions matches how they appear in the dataset. Then, in 1-2 sentences, state why you chose these divisions.

```
divisions_of_interest <- c(2,4,6)
```

b. In a single pipeline, filter your reshaped dataset to include only the `divisions_of_interest` from part (a), and save the resulting data frame with a new name so you (1) can refer to this data frame later in your analysis and (2) do not overwrite the data frame you're starting with. Use a short but informative name. Then, in a new pipeline, find the `distinct()` divisions in the data frame you created.

```
cpi_of_interest <- us_inflation_full %>%
  filter(cpi_division_id %in% divisions_of_interest)

cpi_of_interest %>%
  distinct(description)
```

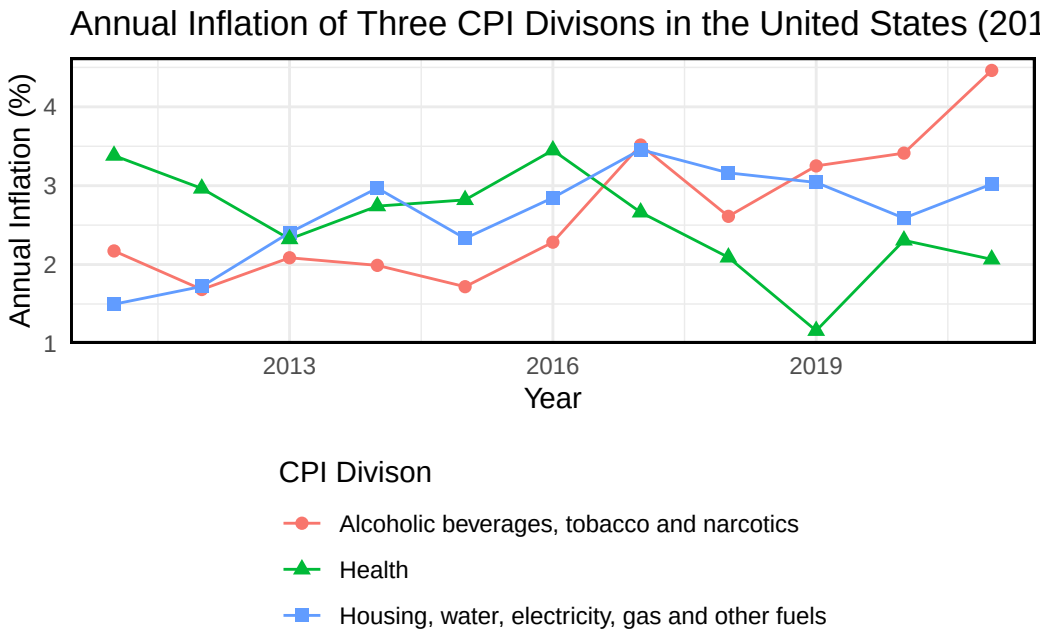
```
# A tibble: 3 x 1
  description
  <chr>
1 Alcoholic beverages, tobacco and narcotics
2 Housing, water, electricity, gas and other fuels
3 Health
```

Question 10

Using your data frame from the previous question, create a plot of annual inflation vs. year for these divisions. Then, in a few sentences, describe the patterns you observe in the plot, particularly focusing on anything you find surprising or not surprising, based on your knowledge (or lack thereof) of inflation rates in the US over the last decade.

- Data should be represented with points as well as lines connecting the points for each division.
- Each division should be represented by a different color line and different color and shape points.
- Axes and legend should be properly labeled.
- The plot should have an appropriate title (and optionally a subtitle).
- Plot should be customized in at least one way – you could use a different than default color scale, or different than default theme, or some other customization.
- If your legend has labels that are too long, you can try moving the legend to the bottom and stack the labels vertically. *Hint:* The `legend.position` and `legend.direction` arguments of the `theme()` functions will be useful.

```
ggplot(cpi_of_interest, aes(x = year, y = annual_inflation,
                            color = description, shape = description)) +
  geom_line() +
  geom_point(size = 2) +
  labs(
    title = "Annual Inflation of Three CPI Divisons in the United States (2011-2021)",
    x = "Year",
    y = "Annual Inflation (%)",
    color = "CPI Divison",
    shape = "CPI Divison"
  ) +
  theme_minimal() +
  theme(panel.border = element_rect(color = "black", fill = NA, size = 1),
        legend.position = "bottom",
        legend.direction = "vertical")
```



If you haven't yet done so since Part 1, now is a good time to render, commit, and push. Make sure that you commit and push all changed documents and your Git pane is completely empty before proceeding.

Wrap-up

Submission

Once you are finished with the lab, you will submit your final PDF document to Canvas.

> **Warning**
>
> Before you wrap up the assignment, make sure all of your documents are updated on your GitHub repo. We will be checking these to make sure you have been practicing how to commit and push changes.
> You must turn in a PDF file to the Canvas page by the submission deadline to be considered "on time".

To submit your assignment:

- Go to http://www.Canvas.com and click *Log in* in the top right corner.
- Click *School Credentials* → *Duke NetID* and log in using your NetID credentials.
- Click on your *REN R 213* course.
- Click on the assignment, and you'll be prompted to submit it.

- Mark all the pages associated with question. All the pages of your lab should be associated with at least one question (i.e., should be "checked").

! Checklist

Make sure you have:

- attempted all questions
- rendered your Quarto document
- committed and pushed everything to your GitHub repository such that the Git pane in RStudio is empty
- uploaded your PDF to Canvas
- selected pages associated with each question on Canvas

Grading

The lab is graded out of a total of 36 points.

You can earn up to 4 points on each question:

- 4: Response shows excellent understanding and addresses all or almost all of the rubric items.
- 3: Response shows good understanding and addresses most of the rubric items.
- 2: Response shows understanding and addresses a majority of the rubric items.
- 1: Response shows effort and misses many of the rubric items.
- 0: Response does not show sufficient effort or understanding and/or is largely incomplete.