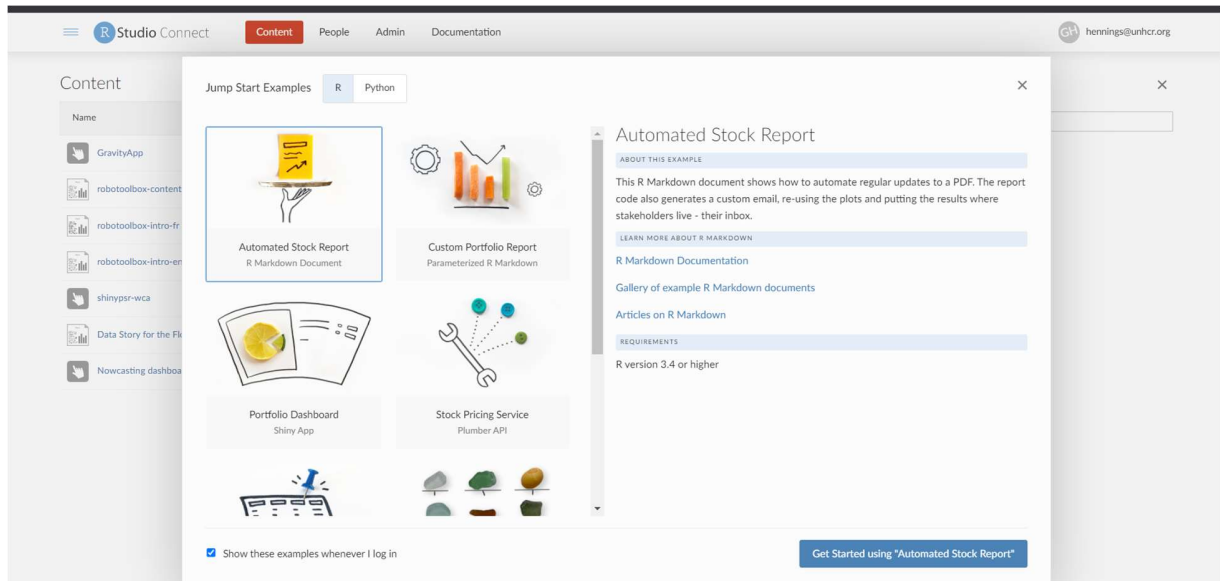


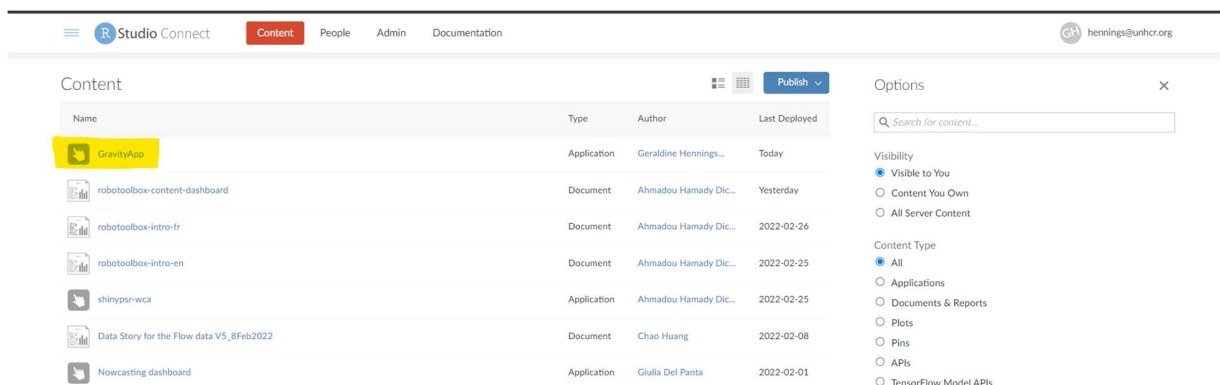
# How to use the SIMOGRV App

## Step 1

Access RStudio Connect under <https://rstudio.unhcr.org/>. If you need a licence to access the platform, please apply [here](#).



Open the SIMUGRAV app by clicking on the link GravityApp:



The app takes a little while to load.

## Step 2

Once the app is loaded you should see this window:

The screenshot shows the SIMUGRAV app interface. At the top, there is a navigation bar with tabs: SIMUGRAV, Simulation Flow Data, Data Download, Variables, and Background. The SIMUGRAV tab is active. Below the navigation bar, there is a header area with 'Content / GravityApp' on the left and user information 'hennings@unhcr.org' on the right. The main content area is divided into two columns. The left column is titled 'Country of Origin' and contains a dropdown menu for 'Choose country' with 'Antigua and Barbuda' selected. Below this is a slider for 'Total number of fatalities' ranging from 0 to 5,000. Further down is a slider for 'GDP per capita \$26803. Percentage change:' ranging from -25 to 25. Below that are two dropdown menus for 'Civil liberty on 1-7 scale' and 'Political rights on 1-7 scale', both set to '2 Free'. At the bottom of this column is a dropdown menu for 'Select year' with '2022' selected. The right column is titled 'Country of Asylum' and contains a dropdown menu for 'Choose country' with 'Argentina' selected. Below this is a slider for 'Total number of fatalities' ranging from 0 to 5,000. Further down is a slider for 'GDP per capita \$17351. Percentage change:' ranging from -25 to 25. Below that are two dropdown menus for 'Civil liberty on 1-7 scale' and 'Political rights on 1-7 scale', both set to '2 Free'. At the bottom of this column is a checkbox for 'Temporary Protection' which is checked, and a blue 'RUN' button. The UNHCR logo is visible in the bottom right corner.

You can navigate the app by choosing the tabs in the black taskbar at the top. The first tab shows the simulation interface. The second tab is the download interface for the stock data:

The screenshot shows the SIMUGRAV app interface with the 'Data Download' tab selected. The navigation bar at the top shows the tabs: SIMUGRAV, Simulation Flow Data, Data Download, Variables, and Background. The 'Data Download' tab is active. Below the navigation bar, there is a header area with 'Content / GravityApp' on the left and user information 'hennings@unhcr.org' on the right. The main content area is titled 'Download stock data country of asylum'. It contains a dropdown menu for 'Choose ranking variable' with 'Refugee Stocks' selected. Below this is a button labeled 'Download as CSV'. Further down is a section titled 'Download all stock data' with a button labeled 'Download as CSV'. The UNHCR logo is visible in the bottom right corner.

The third tab gives you an overview of the variables that are used to run the simulation.

Content / GravityApp

SIMUGRAV Simulation Flow Data Data Download Variables Background

### Explanation of Variables

The following variables are used in the simulation:

| Variable      | Label   | Source        |
|---------------|---|---------------|
| CL_d          | Civil Liberty of destination CL, range between 1.0 and 2.5 were designated Free; between 3.0 and 5.5 Partly Free, and between 5.5 and 7.0 Not Free.   | Freedom House |
| CL_o          | Civil Liberty of origin CL, range between 1.0 and 2.5 were designated Free; between 3.0 and 5.5 Partly Free, and between 5.5 and 7.0 Not Free.        | Freedom House |
| col45         | 1 for pairs in colonial relationship post 1945  | CEPII         |
| colony        | 1 for pairs ever in colonial relationship   | CEPII         |
| comcol        | 1 for common colonizer post 1945  | CEPII         |
| comlang_ethno | 1 if a language is spoken by at least 9% of the population in both countries  | CEPII         |
| comlang_off   | 1 for common official of primary language   | CEPII         |
| contig        | 1 for contiguity  | CEPII         |
| CPI_d         | Inflation, end of period percentage change in consumer prices of destination  | FMI           |
| CPI_o         | Inflation, end of period percentage change in consumer prices of origin   | FMI           |
| Dead_d        | Dummy variable: 1 number of fatalities at destination > 100   | UCDP          |
| Dead_o        | Dummy variable: 1 number of fatalities at origin > 100  | UCDP          |
| Dead_log_d    | Logarithm of number of fatalities at destination  | UCDP          |
| Dead_log_o    | Logarithm of number of fatalities at origin   | UCDP          |
| dist          | Simple distance (most populated cities, km)   | CEPII         |
| GDP_PP_d      | Gross domestic product per capita, constant prices of destination   | IMF           |
| GDP_PP_o      | Gross domestic product per capita, constant prices of origin  | IMF           |
| GDP_PPP_d     | Gross domestic product based on purchasing-power-parity (PPP) share of world tot of destination   | IMF           |
| GDP_PPP_o     | Gross domestic product based on purchasing-power-parity (PPP) share of world tot of origin  | IMF           |
| indexAsylum   | 1 if country of destination gives temporal asylum   | UNHCR         |
| newarrival    | New Asylum Seekers  | UNHCR         |
| Nyear_conf_d  | Dummy variable: years of conflict at destination > 0  | UCDP          |
| Nyear_conf_o  | Dummy variable: years of conflict at origin > 0   | UCDP          |
| Nyear_log_d   | Logarithm of number of years of conflict at destination   | UCDP          |
| Nyear_log_o   | Logarithm of number of years of conflict at destination   | UCDP          |
| Pop_d         | Population of destination   | IMF           |
| Pop_o         | Population of origin  | IMF           |
| PR_d          | Politics Rights of destination PR, range between 1.0 and 2.5 were designated Free; between 3.0 and 5.5 Partly Free, and between 5.5 and 7.0 Not Free. | Freedom House |
| PR_o          | Politics Rights of origin PR, range between 1.0 and 2.5 were designated Free; between 3.0 and 5.5 Partly Free, and between 5.5 and 7.0 Not Free.      | Freedom House |
| smctry        | 1 if countries were or are the same country   | CEPII         |

Source of variables: d: Data of UCDP conflict at destination; o: origin; conf: conflict; log: logarithm; pp: per capita; ppp: purchasing power parity; tot: total; dist: distance.

UNHCR

And the fourth and final tab gives a brief overview on how to use the app.

### Step 3

In the following we will walk you through how to run the simulation in the first tab 'Simulation Flow Data'. First choose the country of origin and the country of asylum you're interested in through the drop-down menus. The countries are arranged by regions.

Content / GravityApp

SIMUGRAV Simulation Flow Data Data Download Variables Background

### Country of Origin

Choose country

Antigua and Barbuda

Costa Rica

Dominica

Dominican Republic

Ecuador

El Salvador

Grenada

Guatemala

Guyana

### Country of Asylum

Choose country

Argentina

Total number of fatalities

0 5,000

GDP per capita \$17351. Percentage change:

-25 0 25

Alternatively, you can start typing in the country name in the field above the drop-down menu and pick among the suggestions that pop up.

Once you have made your country choices, the other buttons will be updated to reflect the status quo situation of the country. These are the values that will be used to predict the flow data. Any change in these values made by you through the interface will subsequently change these values and the predicted flow and stock data.

After you have chosen the country pair, you can now make modifications to some variables through the interface. As the prediction is covering three years, you have first to decide which years you want to change. Let's say, we want to make modifications for 2022 and 2023. To do so we choose the years in the drop-down menu 'Select Year' in the lower left corner of the interface and click on 2022 and 2023.

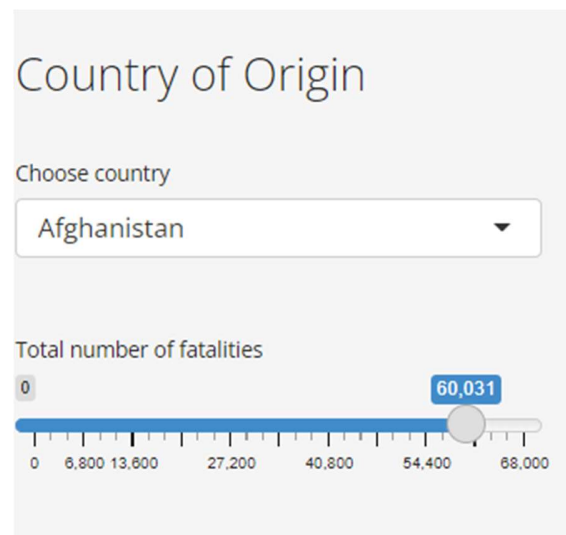
The screenshot shows a simulation interface with two main sections. The top section is titled 'GDP per capita \$26803. Percentage change:' and features a horizontal slider ranging from -25 to 25, with a blue bar and a central knob set at 0. The bottom section is titled 'Civil liberty on 1-7 scale' and contains a dropdown menu. The dropdown is open, showing options: '2 Free' (selected), '2022' (checked), '2023' (checked), '2024', and '2022, 2023' (highlighted at the bottom).

All modifications you make will now be implemented for the years 2022 and 2023.

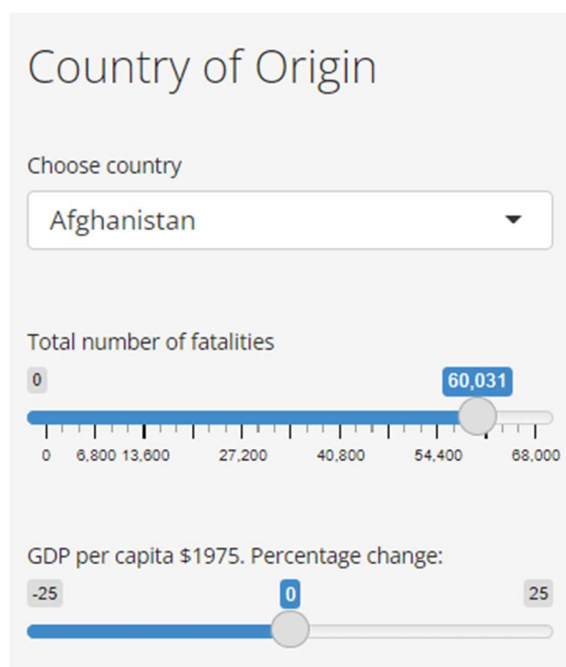
Once you've made these choices, you can begin to modify the variables through the sliders, drop-down menus, and tick boxes. We begin with the number of conflict fatalities in a year. The slider scale will display the status quo value. As the status quo for future years isn't known, this value reflects the last known value of fatalities for the chosen country. In this example we have chosen Afghanistan and the slider shows the last known value of total conflict fatalities in Afghanistan, 30,434 fatalities:

The screenshot shows a simulation interface titled 'Country of Origin'. It features a 'Choose country' dropdown menu with 'Afghanistan' selected. Below this is a section titled 'Total number of fatalities' with a horizontal slider. The slider has a blue bar and a central knob. The scale is marked with values: 0, 6,800, 13,600, 27,200, 40,800, 54,400, and 68,000. The current value is 30,434, which is displayed in a blue box above the knob.

We can now modify this value according to our expectations or interests. Remember that these modifications will only apply for the chosen years, in our example 2022 and 2023. Let's assume we expect an increase in yearly conflict fatalities to around 60,000 for these two years. All we need to do is move the slider to this value.



Subsequently, we want to look at changes in GDP per capita. The slider allows us to modify percentage changes in GDP per capita. It will show the original GDP per capita in the text above, which is based on forecasts from the IMF. In our example Afghanistan, expected GDP per capita is \$1975 in 2022<sup>1</sup>.



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<sup>1</sup> If multiple years are chosen, the default values only display the values of the first chosen year.

To proceed with our example, we reduce the Afghan GDP per capita by 10%. Again, we simply need to move the slider accordingly.

### Country of Origin

Choose country

Afghanistan ▼

Total number of fatalities

0 60,031

0 6,800 13,600 27,200 40,800 54,400 68,000

GDP per capita \$1975. Percentage change:

-10 25

Finally, we need to look at the indices for 'Civil Liberty' and 'Political Rights'. These indices are measured on a 7-point Lickert scale, where 1 indicates absolute liberty and 7 indicates no liberty at all. The default values for Afghanistan are again taken from the last known year, in our example they are '6 Unfree' for civil liberty and '5 Partly free' for political rights.

Civil liberty on 1-7 scale

6 Unfree ▼

Political rights on 1-7 scale

5 Partly free ▼

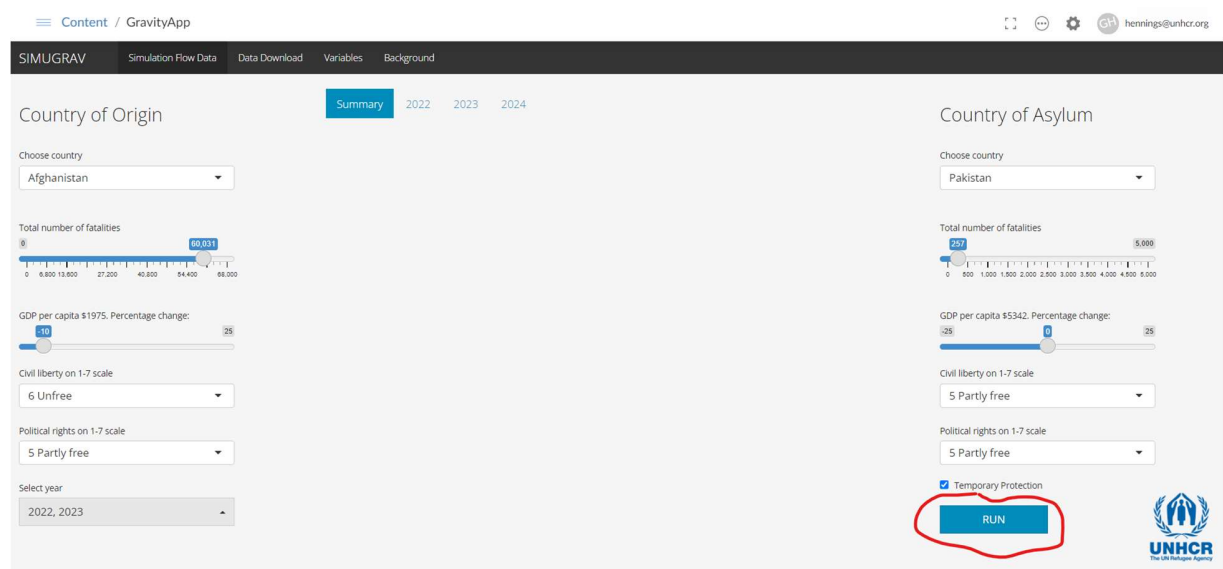
As these indices change only slowly over time, we leave them as is.

As a country of asylum, we have chosen Pakistan. But we decide to leave all values for Pakistan at their default values. However, feel free to make any modification you like on both country of origin and country of asylum. In case you are unsure about the variables and what exactly they measure, you can always consult the list under the tab 'Variables' for further information.

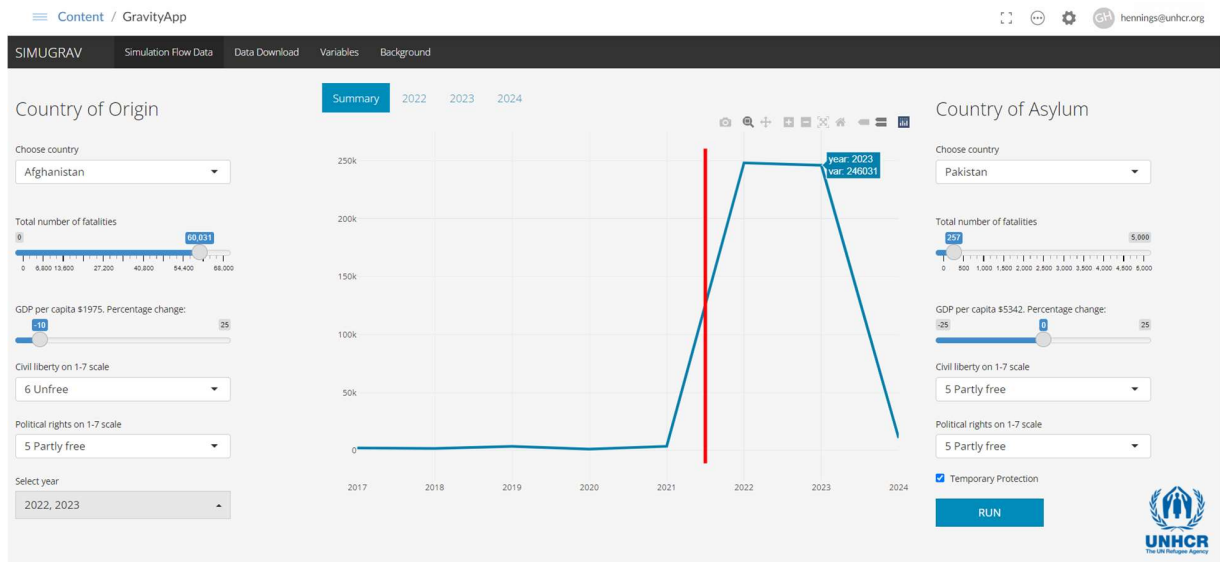
Finally, we need to decide whether there will be temporary protection for Afghan refugees in Pakistan in 2022 and 2023. We can activate or deactivate temporary protection by clicking or unclicking the little box 'Temporary Protection' on the lower right side.



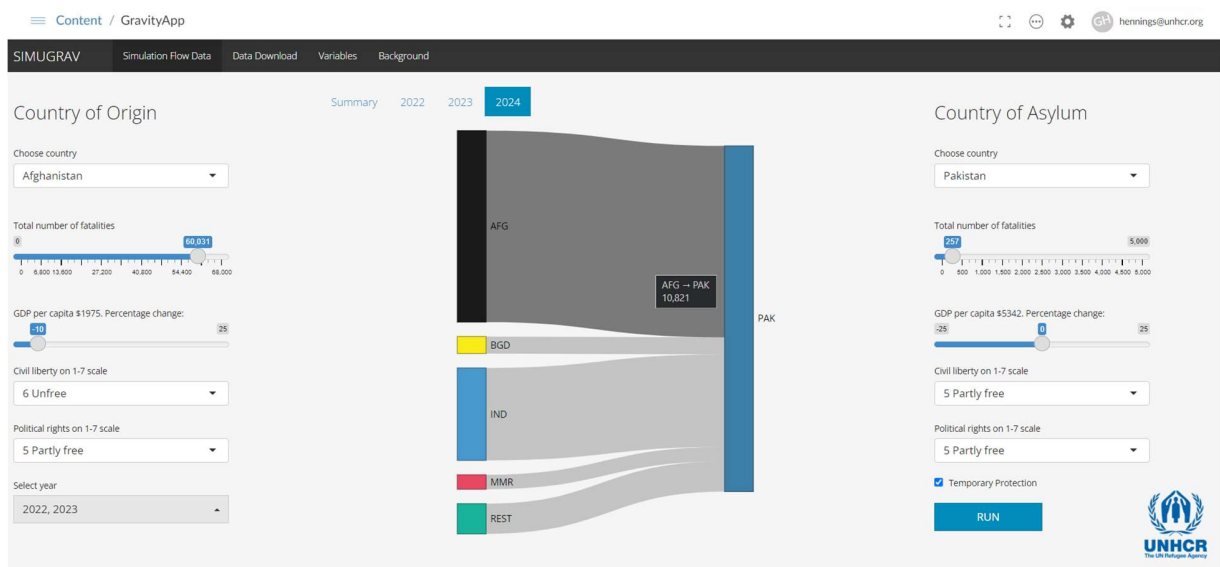
We are now ready to run the simulation and get predicted flow and stock values. To start the simulation, click on the blue 'RUN' button at the bottom to the right. The simulation can take a few seconds to run, so do not close or reload the app.



The first figure shows the historical and predicted flows for the chosen country pair. In our example Afghanistan -> Pakistan. The red line indicates where the predicted values begin on the timeline. You can see the exact values by hovering the cursor over the curve. It is also possible to zoom into the figure if needed.



Under the tabs 2022, 2023, and 2024, the results are displayed as Sankey plots that show the flows from the chosen country of origin to the chosen country of asylum, the four largest flows to the chosen country of asylum and the rest. Exact values can again be displayed by hovering the cursor over the figure.



This completes the simulation tab.



## Step 4

To access the predicted stock figures, go to the second tab 'Data Download'. The stock figures will **only** be calculated if you have hit the 'RUN' button in the first simulation tab. The reason for this is that any modification you might make will change the stock figures. If you are only interested in the stock figures from the status quo, simply hit 'RUN' without further modifications. The calculation can take some seconds, so do not close the app or reload it.

The stock figures from the three largest stocks are displayed for the chosen country of asylum, for the last known year, as well as the subsequent three predicted years.

Content / GravityApp

SIMUGRAV Simulation Flow Data Data Download Variables Background

Choose ranking variable  
Refugee Stocks

| country_origin | country_asylum | year | refugee_stocks | asylum_stocks | venezuelans_stocks |
|----------------|----------------|------|----------------|---------------|--------------------|
| AFG            | PAK            | 2021 | 1438828        | 13255         | 0                  |
| SOM            | PAK            | 2021 | 175            | 28            | 0                  |
| YEM            | PAK            | 2021 | 137            | 30            | 0                  |
| REST           | PAK            | 2021 | 206            | 123           | 0                  |
| AFG            | PAK            | 2022 | 1439770        | 257469        | 0                  |
| SOM            | PAK            | 2022 | 175            | 46            | 0                  |
| YEM            | PAK            | 2022 | 137            | 33            | 0                  |
| REST           | PAK            | 2022 | 220            | 6926          | 0                  |
| AFG            | PAK            | 2023 | 1443143        | 496199        | 0                  |
| SOM            | PAK            | 2023 | 175            | 71            | 0                  |
| YEM            | PAK            | 2023 | 137            | 35            | 0                  |
| REST           | PAK            | 2023 | 250            | 13587         | 0                  |
| AFG            | PAK            | 2024 | 1446540        | 499668        | 0                  |
| SOM            | PAK            | 2024 | 176            | 97            | 0                  |
| YEM            | PAK            | 2024 | 137            | 37            | 0                  |
| REST           | PAK            | 2024 | 294            | 20106         | 0                  |

Download stock data country of asylum  
Download as CSV

Download all stock data  
Download as CSV

You can modify the display by choosing either the three largest refugee stocks, or the three largest asylum seeker stocks through the drop- down menu at the top.

SIMUGRAV Simulation Flow Data Data

Choose ranking variable

Refugee Stocks

Refugee Stocks

Asylum Seeker Stocks

SOM PAK 2021

YEM PAK 2021

REST PAK 2021

You can download either the stock figures for the chosen country of asylum, or the entire data set of stock figures, i.e., for all countries of asylum, as a csv file by clicking the respective download buttons below the table. Please wait until the table is displayed before clicking on the buttons, as otherwise the calculation of the stock figures won't be finished, and the app will throw an error.

Content / GravityApp

SIMUGRAV
Simulation Flow Data
Data Download
Variables
Background

Choose ranking variable
Refugee Stocks

| country_origin | country_asylum | year | refugee_stocks | asylum_stocks | venezuelans_stocks |
|----------------|----------------|------|----------------|---------------|--------------------|
| AFG            | PAK            | 2021 | 1438020        | 13255         | 0                  |
| SOM            | PAK            | 2021 | 175            | 28            | 0                  |
| YEM            | PAK            | 2021 | 137            | 30            | 0                  |
| REST           | PAK            | 2021 | 206            | 123           | 0                  |
| AFG            | PAK            | 2022 | 1439770        | 257469        | 0                  |
| SOM            | PAK            | 2022 | 175            | 46            | 0                  |
| YEM            | PAK            | 2022 | 137            | 33            | 0                  |
| REST           | PAK            | 2022 | 220            | 6926          | 0                  |
| AFG            | PAK            | 2023 | 1443143        | 496199        | 0                  |
| SOM            | PAK            | 2023 | 175            | 71            | 0                  |
| YEM            | PAK            | 2023 | 137            | 35            | 0                  |
| REST           | PAK            | 2023 | 250            | 13587         | 0                  |
| AFG            | PAK            | 2024 | 1446540        | 499668        | 0                  |
| SOM            | PAK            | 2024 | 176            | 97            | 0                  |
| YEM            | PAK            | 2024 | 137            | 37            | 0                  |
| REST           | PAK            | 2024 | 294            | 20106         | 0                  |

Download stock data country of asylum
Download as CSV

Download all stock data
Download as CSV

https://rstudio.unhcr.org/content/e4397bcc-cdc2-40a3-a420-363e245ed0c2/\_w\_818038b8/session/378d61feae647ce78d1f62327df8
stock\_data\_country....csv

This concludes the introduction. Please contact Andrea Pellandra ([pellandr@unhcr.org](mailto:pellandr@unhcr.org)) or Geraldine Henningsen ([hennings@unhcr.org](mailto:hennings@unhcr.org)) in case you have questions or encounter problems.