

For this question, refer to the data provided in the Excel file "Data.LB". This dataset encompasses key indicators of the Lithuanian banking sector's activities for the third quarter of the years 2023, 2022, and 2021. Each sheet presents data in thousands of Euros (EUR).¹

To simplify the task, I will provide guidance and examples. Ensure all figures have appropriate titles, you can modify or omit the x and y-axis labels. Use the ggplot2 package for plotting and dplyr, tidyverse for data manipulation. For all plots in this question, utilize the theme minimal() theme.

3.1 Task: Constructing Long Format Dataset

Load the data from the three sheets into R and combine them into a single long-format dataset using the bind_rows() function. The resulting dataset should have four columns², see the example below:

¹Data source: Bank of Lithuania webpage.

²"ID" (balance sheet item name), "bank.name" (bank name), "value" (balance sheet item values), and "date" (corresponding date as "202X-10-01").

	ID	bank.name	value	date
1	Cash	EMB	NA	2021-10-01
2	Cash	EMB	0	2022-10-01
3	Cash	EMB	0	2023-10-01
4	Cash	FBB	104090	2021-10-01
5	Cash	FBB	77739	2022-10-01
6	Cash	FBB	69957	2023-10-01
7	Cash	FIN	0	2022-10-01
8	Cash	FIN	0	2023-10-01
9	Cash	FJO	NA	2021-10-01
10	Cash	FJO	0	2022-10-01
11	Cash	FJO	0	2023-10-01
12	Cash	GFB	111	2021-10-01
13	Cash	GFB	72	2022-10-01
14	Cash	GFB	0	2023-10-01
15	Cash	MED	25417	2021-10-01
16	Cash	MED	24968	2022-10-01
17	Cash	MED	16611	2023-10-01

Figure 1 – Example Dataset

3.2 Task: Total Banking Sector Assets

Calculate the total assets of the banking sector (including foreign branches) for each year and report the results in the PDF.

3.3 Task: Stacked Column Chart of Bank Profit

Plot a stacked column chart displaying bank profit/loss (in million EUR) for each year using `geom_col()`. Replicate the figure in R and include it in the PDF. See an example below.

3.4 Task: Comment the results in tasks 3.2, 3.3 and 3.4

3.5 Task: Subset Data for Specific Banks

Subset the data to include only the *Swedbank*, *AB*, *AB SEB bankas*, *Revolut Bank*, *UAB*, *AB Siauliu bankas*, *UAB Medicinos bankas*, *AB "Mano bankas"*. Calculate the total assets of these banks and determine their share of the total banking sector assets (including foreign branches). Report and comment the results in the PDF.

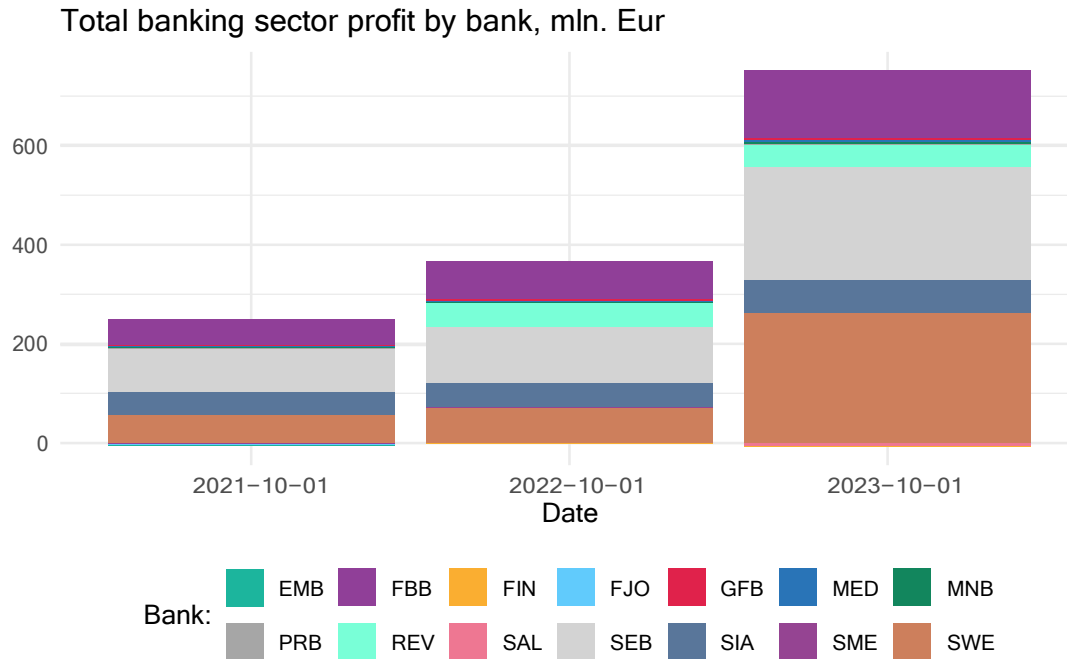


Figure 2 – Stacked Column Chart of Bank Profit

3.6 Task: Plot Assets by Bank and Year

Plot the total assets (named "Total assets" in the balance sheet) for the selected banks by bank and year using `geom_col()` and `position_dodge()`. Refer to the example figure provided below. Replicate the figure in R and include it in the PDF.

3.7 Task: Plot Profit (Loss) by Year

Plot the "Profit (loss) of the current year" by year on a horizontal column chart. Utilize `facet_wrap()` to facet the plot by bank name. Plot it in R and include it in the PDF. Refer to the example figure for guidance.

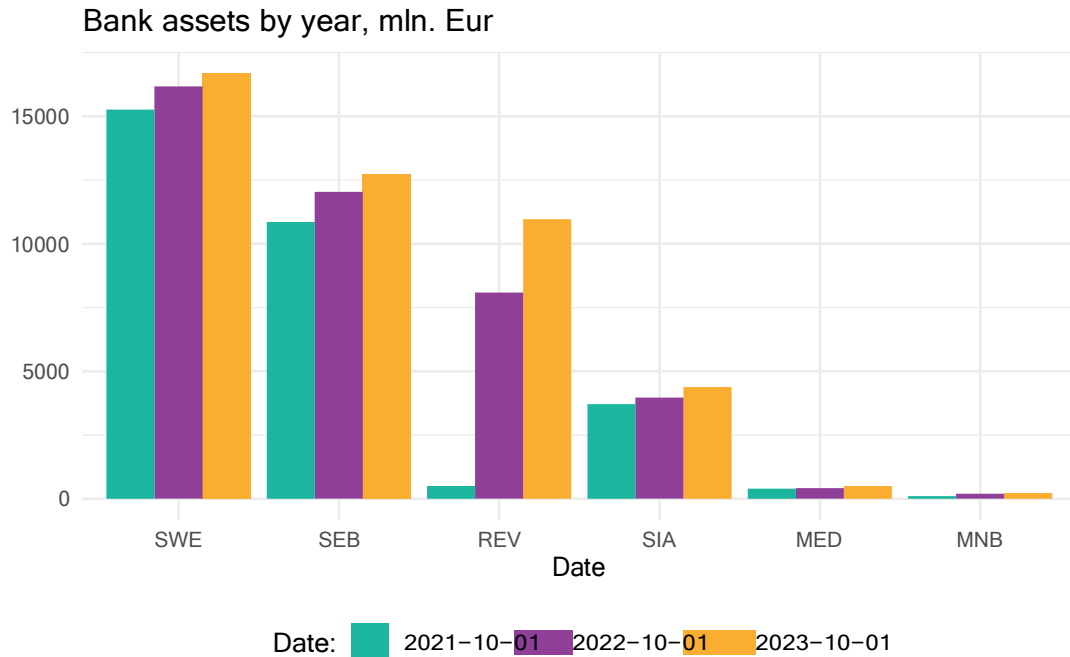


Figure 3 – Assets by Bank and Year

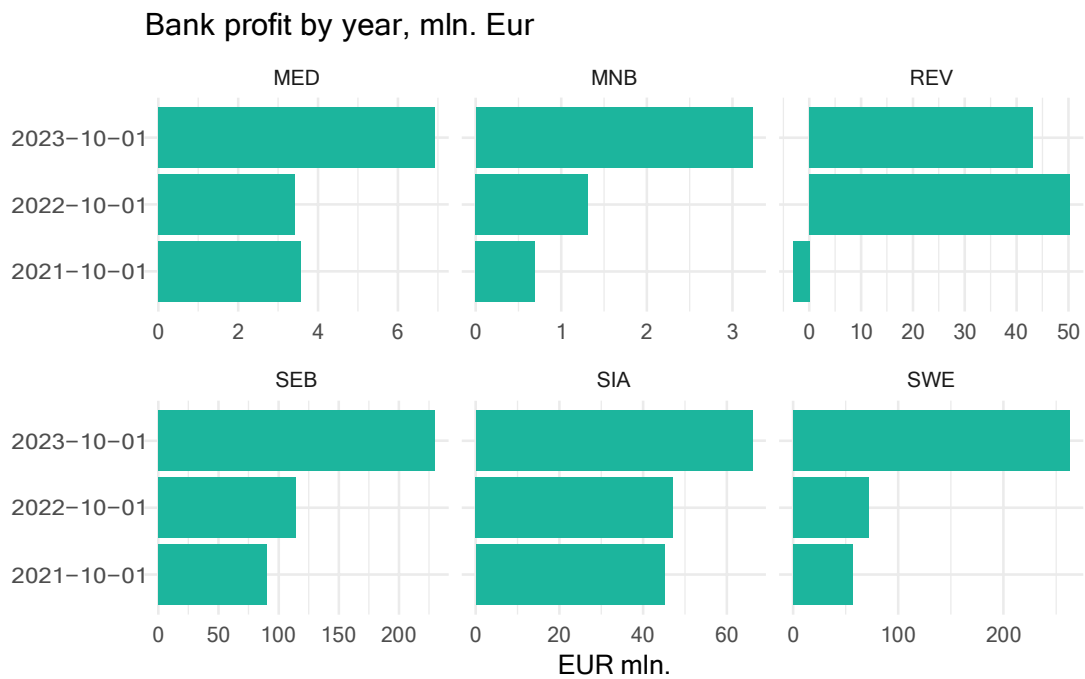


Figure 4 – Profit (Loss) by Year and Bank

3.8 Task: Ratios

For the selected banks, calculate the following ratios (shares of balance sheet items of total assets):

Cash balances with central banks to Total assets ratio.

Loans and advances (including leasing) to Total assets ratio.

Replicate the chart below, illustrating the share of cash and loans of the total bank assets in percentages on the plot. Create a stacked column chart using `geom_col()` and `facet_wrap()` by bank. Add the ratios to the plot using `geom_text()`.

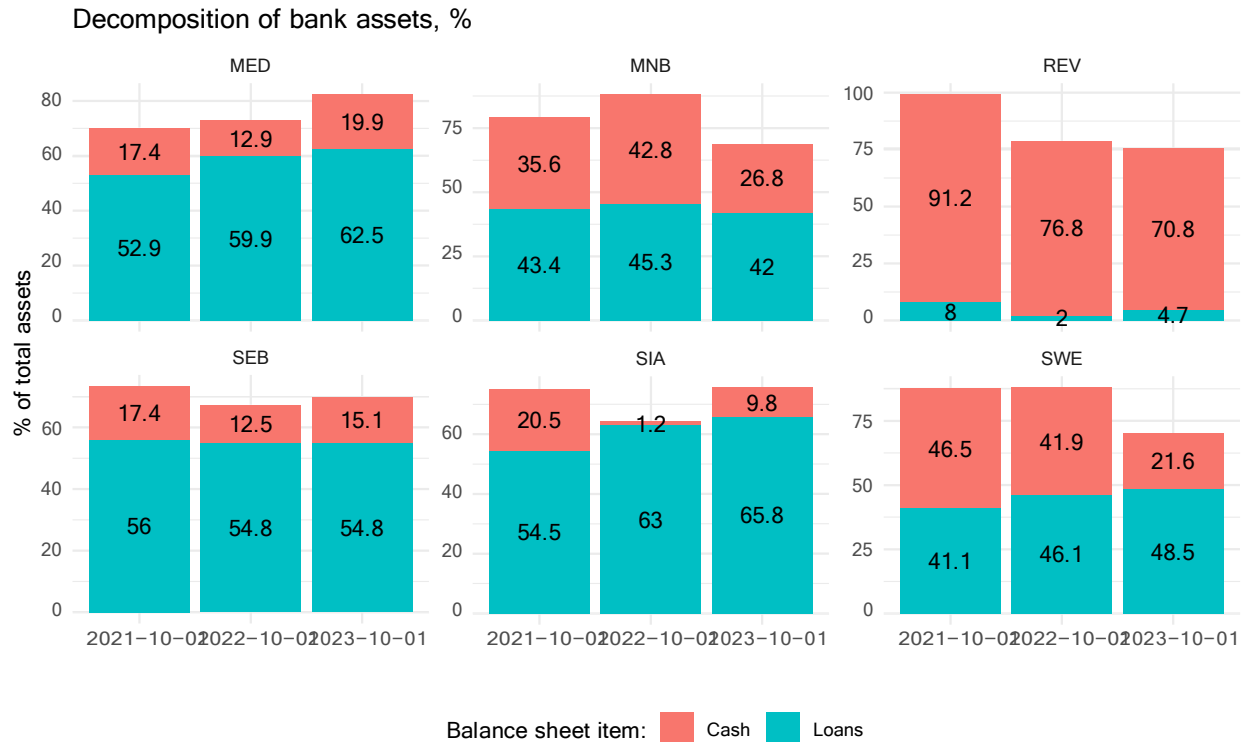


Figure 5 – Ratios

3.9 Task: Comment the results in tasks 3.6, 3.7, 3.8

3.10 Task: Scatter plot

Using the full dataset, create a new column 'Bank group', assigning "Selected bank" for the banks indicated in task 3.5 and "Other bank" for remaining banks. Filter three balance sheet items: "Total assets", "Total equity", "Profit (loss) of the current year". Create a wide dataset using `pivot_wider()` and calculate 'Profit to equity ratio' and 'Profit to asset ratio'. Produce a scatter plot with 'Profit to equity ratio' on the x-axis and 'Profit to asset ratio' on the y-axis, differentiating between the Bank group.

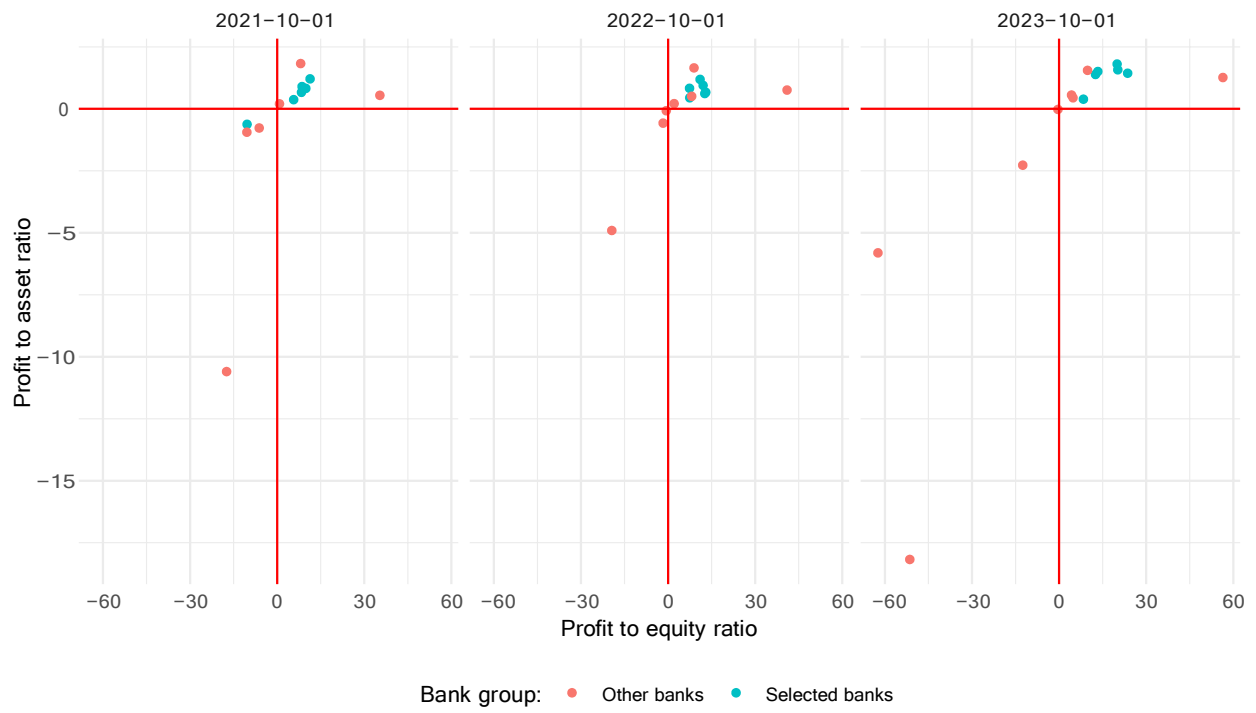


Figure 6 – Scatterplot