Part 4 IM Review 2023 Cost of capital topic paper asset beta calculations – R code covering note

Purpose

The purpose of this covering note is to provide guidance on running the R codes to produce the asset beta and leverage results in our final Cost of capital topic paper.

Setting up a file directory

The code requires that the user set up a file directory so that R pulls from the correct folders and data. The file directory should be the folder that contains the sub-folders (in the zip file published) as shown below.

Name

- Airport analysis
- Airport analysis - Auckland Airport
- Bloomberg data extraction
- Data
- Energy analysis
- Energy analysis - Vector
- Flint analysis - Airports
- Flint analysis - Auckland Airport
- Flint analysis - Energy
- Flint analysis - Vector
- Gas analysis
- Routes analysis

Data published with the code

We have also published some excel files with the R codes which are used in the calculations. These are saved under a 'Data' folder (shown above). These do not need to be modified and are pulled into the calculations in the relevant R codes.

The code in the 'Bloomberg data extraction' folder pulls Bloomberg data (which requires a Bloomberg subscription) and creates the datasets that we used in the calculations. We note that Bloomberg periodically updates its data. The data that we used for our draft and final decisions were extracted prior to the draft decision.

How to run the codes

In the folders that perform calculations (Airport analysis folders, Energy analysis folders, Gas analysis folder, Flint analysis folders) there will be a 'master' R file which needs to be run from beginning to end to produce results. The other files in the folders are pulled in through the master file to run the calculations for different scenarios.

The 'Data' folder does not include any R codes to run.

The 'Bloomberg data extraction' and 'Routes analysis' folders contain R codes that need to be run.

Order for running the codes

We recommend running the codes in the following order:

1. Bloomberg data extraction (DataExtract.R) – this needs to be run to produce the dataset used in calculations.

2. Airport analysis master code, Airport analysis – Auckland Airport master code, Energy analysis master code, Energy analysis – Vector master code, Gas analysis master code. These produce the results for our final asset beta and leverage estimates as explained in the final decision topic paper.

3. Flint analysis master codes for Airports, Auckland Airport, Energy, Vector, gas analysis t-test master code, and routes analysis codes (for asset beta and equity beta). These produce results that support our decisions on the asset beta and leverage estimates.