Retrieving data from Staistics Canada using the cansim library

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Introduction

This paper shows how to retrieve CANSIM data from Statistics Canada using the cansim package. Three R packages are used in this demonstration: tidyverse, cansim, and writexl. The cansim package is very useful in retrieving data tables and time-series from Canada's socioeconomic repository, CANSIM. The tidyverse package is a collection of R packages designed for data science¹. Lastly, writexl is a package that is used to export the dataframes in 'xlsx' format. In this demonstration, I will be using the Consumer Price Index, monthly, not seasonally adjusted².

Importing Packages

The relevant packages are loaded using the library() function. It is important to set up a file cache using the options() function. Although this step is optional, it is highly recommended as it would speed up data retrieval. This is because the cansim package will cache the data in a temporary directory for the duration of the R session.

```
# import packages
library(cansim)
library(tidyverse)
library(writexl)

options(cansim.cache_path = "StatCan4R") # Set-up File Cache
```

List of Vectors

Next, is to search for the relevant data. Statistics Canada data are accessed by using vector identifiers. This is because retrieving by table number as the package will load the entire package, putting an excessive demand on RAM and slowing down the retrieval process. Searching the desired vectors is done by using the Statistics Canada Data Search Tool.

To find the correct vector identifier(s), enter the table number in the "Keyword(s)" field. Then click the matching StatCan table in the search results. Then click on Add/Remove data to select which specific dimensions and customize the data. It is important to be specific and check the right boxes when customizing the table as this yields the desired vector identifier(s). I customized the data table by CPI All-items, and in the four provinces across Western Canada. Copy the relevant identifiers and paste them to a vector object.

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¹For more information, see https://www.tidyverse.org/

²Statistics Canada. Table 18-10-0004-01 Consumer Price Index, monthly, not seasonally adjusted



Figure 1: Search by table number

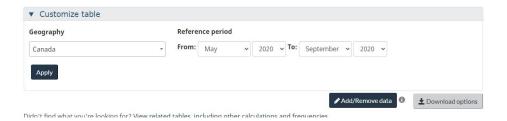


Figure 2: Click Add/Remove data

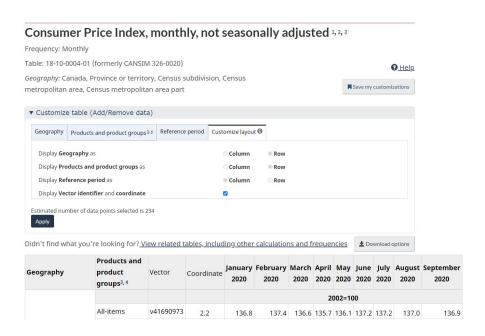


Figure 3: Check 'Display Vector indentifier and coordinate'

In the section of code below, the necessary vector identifiers are assigned into a vector object in R. Second, the desired start and end periods are defined. Next I use the <code>get_cansim_vector()</code> to retrieve the necessary tables. Lastly, the variable names in the dataframe are changed and the irrelevant columns are dropped.

Spreading the Data

Although I have shown how to retrieve StatCan data using the cansim package, The get_cansim_vector() does not return a tidy data. Data points by vector indentifiers are piled on top of one another. To address this, the code below shows how to spread the data using the spread() function. This clean data is then exported as a '.xlsx' file.

Next, I use the get_cansim_vector_info() function to get the information about vectors. I use a for loop to repalce the vector names in the dataframe with their appropriate english names.

Full Implementation using a Function

The code below is a full implementation, but with a function. Functions are very useful to perform specific tasks. First, I used an if-else statement to check if the vector is not a NULL type object. After using the <code>get_cansim_vector()</code> for retrieval and selection of useful information, I used a for loop to rename the vectors into more informative names. Then the data is spread using the <code>spread()</code> function. It is important to note that when creating a vector of names to replace the original identifiers, they have to match the order of their vector identifiers.

```
date.start <- "2000-01-01" # start period
date.end <- "2020-09-01" # end period
# function for importing the necessary vectors
query <- function(x, date1, date2){</pre>
  if (is.null(x) != TRUE){# if list of vectors is not NULL (empty)
    if ((is.null(date1) != TRUE) && (is.null(date2) != TRUE)){# if dates are not NULL (empty)
      df <- get_cansim_vector(x, "2000-01-01", "2019-12-01") %>% # start and end dates
        rename(value = VALUE) %>% # rename variables
        rename(date = REF_DATE) %>%
        rename(vector = VECTOR) %>%
        select(-c(1, 4:8)) # drop the irrelevant variables.
      title.vectors <- get_cansim_vector_info(x) %>%
        select(-c(1,3:4,6:10)) # get the titles
      for (i in 1:length(x)){
        # replace vector numbers with actual names;
        # match vector with the appropriate english title
        df[df==title.vectors$VECTOR[i]] <- title.vectors$title_en[i]</pre>
      }
      df <- spread(df, key=vector, value=value) # spread the dataframe</pre>
      return(df) # return dataframe
   }
   else{ # warning statement that says inputs are not valid; 'stop' halts execution of code.
      stop("Please enter appropriate start and end dates.")
   }
  }
 else{
    stop("Your inputs are not valid. Please use a list of CANSIM vectors or a vector.")
  }
df <- query(vectors.cpi, date.start, date.start)</pre>
write_xlsx(df, path="StatCan4R\CPI-all-items.xlsx") # export data
```

Conclusion

I have shown how to retrieve, manipulate and clean the data from StatsCan using three libraries: cansim, tidyverse, and writexl. The Data Enthusiast's Blog and the cansim package reference guide have been been very helpful to me in creating this demonstration. Links to relevant webpages are attached in the References section.

References

Baranovsky, Petr. 2019. "Working with Statistics Canada Data in R, Part 2: Retrieving Cansim Data." https://dataenthusiast.ca/.

Ooms, Jeroen. 2020. Writexl: Export Data Frames to Excel 'Xlsx' Format. https://CRAN.R-project.org/package=writexl.

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Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.