This document explains how to replicate the results in the paper **"Public Investment in a Production Network: Aggregate and Sectoral Implications"**, by Alessandro Peri, Omar Rachedi, and Iacopo Varotto, to be published at *The Review of Economics and Statistics*.

CONTENT OF THE FOLDER:

The folder contains two main folders, "Data" and "Models".

The folder "Data" contains the STATA dataset "*Data.dta*" which is used by the script "*MainScript_Data.do*" to run the empirical analysis of the paper.

The folder "Models" contains a series of folders which are devoted to different specifications of the economies used in the paper. Specifically:

- "ElasticityDownstream": contains the scripts that compute the multi-sector economy in which the elasticity of output to public capital is sorted such that the highest values are associated with the most downstream industries. The multipliers based on this model version are reported in Table 3.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

- "ElasticityUpstream": contains the scripts that compute the multi-sector economy in which the elasticity of output to public capital is sorted such that the highest values are associated with the most upstream industries. The multipliers based on this model version are reported in Table 3.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "MultiSector": contains the script that compute the baseline multi-sector economy. The multipliers based on this model version are reported in Table 1 and 2, and Figure 1 and 3.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*Parameters_Calibration.mat*" reports the entire set of calibrated parameters of this model version;
  - "*run_Sect_Impl.m*" computes the sectoral multipliers;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoDemandHet"contains the scripts that compute the multi-sector economy in which there is no heterogeneity across sectors in the contribution of each industry to total final demand. The multipliers based on this model version are reported in Table 2.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoElasticity": contains the scripts that compute the multi-sector economy in which the elasticity of output to public capital is set to zero. The multipliers based on this model version are reported in Table 3.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoElasticityHet": contains the scripts that compute the multi-sector economy in which the elasticity of output to public capital is set homogeneously across industries. The multipliers

based on this model version are reported in Table 3.

The files inside the folder are:
- "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
- "*Final_Steady_State.mat*" reports the entire steady state of this model version;
- "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoFactorHet": contains the scripts that compute the multi-sector economy in which there is no heterogeneity across sectors in the factor intensities. The multipliers based on this model version are reported in Table 2.

The files inside the folder are:
- "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
- "*Final_Steady_State.mat*" reports the entire steady state of this model version;
- "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoIOHet": contains the scripts that compute the multi-sector economy in which there is no heterogeneity in the Input-Output matrix. The multipliers based on this model version are reported in Table 2.

The files inside the folder are:
- "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
- "*Final_Steady_State.mat*" reports the entire steady state of this model version;
- "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoIOMatrix": contains the scripts that compute the multi-sector economy in which there is no Input-Output matrix. The multipliers based on this model version are reported in Table 2.

The files inside the folder are:
- "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
- "*Final_Steady_State.mat*" reports the entire steady state of this model version;

- "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoPriceHet": contains the scripts that compute the multi-sector economy in which there is no heterogeneity across sectors in the degree of price rigidity. The multipliers based on this model version are reported in Table 2.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "NoPubDemandHet": contains the scripts that compute the multi-sector economy in which there is no heterogeneity across sectors in the contribution of each industry to public demand. The multipliers based on this model version are reported in Table 2.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*Final_Steady_State.mat*" reports the entire steady state of this model version;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "OneSector": contains the script that compute the one-sector economy without intermediate inputs. The multipliers based on this model version are reported in Table 1 and 2, as well as in Figure 1.

  The files inside the folder are:
  - "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
  - "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "OneSector-NoElasticity": contains the scripts that compute the one-sector economy without intermediate inputs in which the elasticity of output to public capital is set to zero. The multipliers based on this model version are reported in Table 3.

The files inside the folder are:

- "*ComputeMultipliers.m*" is the main script of the folder that solves the model version and computes the multipliers;
- "*script_nsectors.mod*" is the Dynare file with all equilibrium conditions.

– "Welfare": the sub-folder "MultiSector" contains the scripts that compute the welfare costs associated with inefficient levels of public investment in the baseline multi-sector economy, and the sub-folder "OneSector" contains the scripts that compute the welfare costs associated with inefficient levels of public investment in the one-sector economy without intermediate inputs. The results based on the model versions are reported in Figure 2.

The files inside the folder are:

- "*ComputeWelfare.m*" is the main script that computes the welfare costs;
- "*Parameters_Calibration.mat*" reports the entire set of calibrated parameters of the baseline multi-sector economy;
- "*solution_optimal.mat*" reports the steady-state of the different multi-sector economies considered in the exercise.

The folders "Table1", "Table2", "Table3", "Table4", "Figure1", "Figure2", "Figure3", "Figure4" are empty and will report separately and respectively each table and figure of the paper once the replication codes are executed.

The output of Table 1, Table 2, and Table 3 is reported in Matlab files ".mat". The output of Table 4 is reported in a ".log" file. The output of Figure 1, Figure 2, Figure 3, and Figure 4 is reported in a ".png" file.

Finally, note that the folder contains a file "*shade.m*", which is only used in the processing of Figure 4 (in shading the area associated with the confidence interval around the empirical estimates).

SOFTWARE REQUIREMENT:

The replication package has been compiled on a MacBook Pro, Apple M1 Pro, with macOS Venture 13.3.1 and 32 GB of memory.

The empirical analysis has been implemented with Stata 17.

The model analysis has been implemented with Matlab R2021B. IMPORTANT: the replication requires the installation of the Dynare package. Consider to install the version 4.6.4, which was used in this replication.

Matlab R2021b can be purchased for a fee from the company MathWorks using the following link: https://www.mathworks.com/products/new_products/release2021b.html.

Dynare is an open software whose latest version can be downloaded from the following webpage: https://www.dynare.org/download/. The right file to download depends on whether the user has a Windows or a Mac computing environment. Download the file named "*dynare-4.6.4.pkg"* at the webpage https://www.dynare.org/release/macos/dynare-4.6.4.pkg and use it to install Dynare by following the instructions provided therein.

HOW TO EXECUTE THE CODES:

1) Run the Stata script "*MainScript_Data.do*" to generate the empirical estimates used in Figure 4 and Table 4.

   IMPORTANT: Before running it, modify the directory in line 4 to adapt to the directory in which you have placed the folder in your computer. For instance, if the directory of the replication folder in your computer is the following, "/Users/NameSurname/ Desktop/Replication/", then amend line 4 as follows:
   global rootname = "/Users/NameSurname/Desktop/";

2) Run the Matlab script "*MainScript_Model.m*" to generate the results from the different model economies that are used in Table 1, Table 2, Table 3, Figure 1, Figure 2, Figure 3, and Figure 4.