

README for the Reproducibility Package for Structural shift in job creation: Evidence from Bangladesh

Overview

This package provides a detailed explanation of the data and steps that are needed to replicate the results in the paper titled 'Structural shift in job creation: Evidence from Bangladesh'. The user can easily replicate the results using the evIEWS workfile and the excel file attached. There are four output tables in the paper and some charts in the appendix. The outputs in table 1 and 2 can be replicated using the evIEWS workfile. For table 3 and 4, the excel file is sufficient. No codes are needed to run to replicate the results. This file provides detail description of how to reproduce the results.

Data Availability Statement

1. World Development Indicators

Source: World Bank

Year: 2024

URL: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KN>

Access Date (Month-Year): -

Note: The Real GDP (constant LCU) is taken from the WDI dataset for the all the countries except Bangladesh.

This data is available in the excel file 'data.xls' under sheet 'GDP'. In the evIEWS file, they are represented as 'gdp_(country name)'. For example, the real GDP data (constant LCU) for Thailand collected from WDI, is named as 'gdp_thailand' in the evIEWS file.

Access Type: Open

License: -

License URL: -

Citation: World Bank. 2024. "World Development Indicators" [dataset].

<https://data.worldbank.org/indicator/NY.GDP.MKTP.KN>.

2. GDP data by BBS

Source: Bangladesh Bureau of Statistics (BBS)

Year: 2025

URL: <https://bbs.gov.bd/pages/static-pages/6922df6e933eb65569e21f3f>

Access Date (Month-Year): -

Note: The source for real GDP (constant LCU) data for Bangladesh is BBS. This data is available in the excel file 'data.xls' under sheet 'GDP'. In the evIEWS file, it is named as 'gdp_bgd'

Access Type: Open

License: -

License URL: -

Citation: Bangladesh Bureau of Statistics (BBS). 2025. "GDP data by BBS" [dataset].

<https://bbs.gov.bd/pages/static-pages/6922df6e933eb65569e21f3f>.

3. World Bank MFMOD-GJ - total employment

Source: World Bank

Year: 2025

URL: NA

Access Date (Month-Year): June 2025

Note: These data (for all countries) are available in the excel file 'data.xls' under the sheet named 'Employment data'. The log value of this numbers are available in this sheet. In the evIEWS file, under the page 'tot_employment_diff', these employment numbers are shown in the following format: emp_(country name). For example, the emp_china file contains the employment data for China (the same data available in the excel file). Similarly, the 'tot_emp_gap' page of the evIEWS file contains the same variables in their logarithm form. For example, emp_china under the 'tot_emp_gap' has the log value of employment in China (also shown in the excel file).

Access Type: Unsure

License: -

License URL: -

Citation: World Bank. 2025. "World Bank MFMOD-GJ - total employment" [dataset]. NA. Accessed June 2025.

4. Total labor force

Source: Bangladesh Bureau of Statistics (BBS)

Year: 2024

URL: <https://bbs.gov.bd/pages/static-pages/6922ddd1933eb65569e166e7>

Access Date (Month-Year): January 2025

Note: These labor force data for Bangladesh, used in deriving the outputs in table 3 and 4, are taken from different editions of the Bangladesh Labor Force Survey (i.e., LFS 2002–03, 2010, 2015–16, and 2024) published by the BBS. Sectoral employment data (i.e., agriculture, industry and services) are also available from the same source. These data are available in the excel file 'Table 3 and 4 replication data and estimation.xls' (see the sheet 'calculation using LFS data'). In the eviews file, they are available under the page 'BGD_elasticity' under the name agriculture_emp, industry_emp, services_emp, employment_total.

Access Type: Open

License: -

License URL: -

Citation: Bangladesh Bureau of Statistics (BBS). 2024. "Total labor force" [dataset].

<https://bbs.gov.bd/pages/static-pages/6922ddd1933eb65569e166e7>. Accessed January 2025.

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Instructions for Replicators

The instructions below provide a detailed guide on how to replicate the results reported in the four main output tables of the paper, as well as the appendix results, using the EViews workfile (for table 1 and appendix) and the excel file named 'table 3 and 4 replication data and estimation.xlsx'.

Table 1: Model Estimation Results

For each country, Table 1 reports results from three types of models:

the difference model,

the gap model using the Hodrick–Prescott (HP) filter, and

the gap model using the Baxter–King (BK) filter

(see the paper for a detailed discussion of these models).

All estimations are conducted in EViews.

Difference Model

The results for the difference model are available in the tot_employment_diff worksheet of the EViews workfile. Within this worksheet, equation files with the suffix _diff1 contain the estimation results reported in Table 1 for each country.

For example, the file bgd_diff1 reports the estimation results for Bangladesh using the difference model. The selected lag structure reported in Table 1 corresponds to the “Selected model: ARDL(x, y)” row in the equation output. The coefficients ψ_0 , ψ_1 , and ψ_2 reported in the table are taken directly from the Coefficient column of the estimation output.

The estimated equation can be viewed by opening the relevant equation file and clicking the “Estimate” tab. The same procedure applies to all countries.

Gap Models (HP and BK Filters)

The results for the gap models are available in the tot_emp_gap worksheet of the EViews workfile. Equation files with the suffix _hp correspond to the gap model using the HP filter, while files with the suffix _bk correspond to the gap model using the BK filter.

As with the difference model, the estimated equations can be viewed by opening the relevant equation file and clicking the “Estimate” tab. The same naming convention and procedure are followed for all countries.

Cointegrating Coefficient (θ)

To obtain the value of θ , open the relevant equation file and navigate to:

View → ARDL Diagnostics → Cointegrating Relations.

The value of θ is reported under the “Cointegrating Coefficient” table.

Table 2: Sectoral Employment Elasticities (Bangladesh)

The results reported in Table 2 are available in the BGD_elasticity worksheet of the EViews workfile. The equation files

agriculture_elasticity,

industry_elasticity, and
services_elasticity

contain the elasticity estimates for the agriculture, industry, and services sectors, respectively, as reported in Table 2.

Tables 3 and 4: Employment Elasticity Calculations Using LFS Data

The elasticity calculations reported in Tables 3 and 4 are performed separately in an Excel file titled “table 3 replication data and estimation.” The calculations are carried out in the worksheet “calculations using LFS data,” while the final Tables 3 and 4 are compiled in the worksheet “Table – LFS data.”

All calculations rely on visible cell formulas, which can be viewed by selecting the relevant cells and are self explanatory.

Calculations on how the table 3 and 4 are numbers are derived are shown in the excel file named ‘Table 3 and 4 replication data and estimation.xls’.

Employment data for the three sectors (agriculture, industry and services) and the total employment for 2003 and 2010 are taken from the Labor Force Survey 2010 report by the BBS. This data is available on page 5 of the report under the table 17. The report can be downloaded from here: <http://webapps.ilo.org/surveyLib/index.php/catalog/7873/related-materials>. From the table, following calculations are done:

- The data for *agriculture* is represented in the row showing ‘Agriculture, forestry & fisheries’. The data for *industry* comes by adding the values under Mining and quarrying, Manufacturing, Electricity, Gas and water, and Construction. The data for *services* is derived by subtracting the values for agriculture and industries from the total employment shown in the same table.

Similarly, the data for the three sectors for 2017 and 2024 taken from the Bangladesh Labor Force Survey (LFS, 2024) Report. See page xxxiii of the report (table no. 8). The report is published by the Bangladesh Bureau of Statistics (BBS) and its available here: http://203.112.218.101/storage/files/1/Publications/LFS/LFS-2024_Full%20Book-09.09.2025_compressed.pdf

For the sub-sector elasticity shown under table 4 of the paper, the 2024 data is taken from the LFS 2024 report (the same report mentioned above). Please have a look at table 6.3.2 on page 53 of the report. Please note that the table in the LFS 2024 show the share of the total employment (not the total employment for that particular sector). To get the employment for that sector, the total employment in all sectors is multiplied by the share in that sector. For example, total employment in 2024 is 69.01 million (based on the same report). To get the employment in manufacturing, 69.01 is multiplied by the share of manufacturing shown in table 6.3.2 (0.1175). So the number 8.11 million comes by multiplying 69.01 by 0.1175. Similar calculation applies for other subsectors.

For the 2017 data, no separate calculations are needed. The data for the respective subsectors are available in LFS 2016-17 report published by the BBS (accessible here: http://203.112.218.101/storage/files/1/Publications/LFS/LFS_2016-17.pdf). Please see Table S7 of the report (page 164) for the total employment data for the relevant sub-sectors.

GDP data and sectoral GDP contributions used in table 3 and 4

These data are taken from the World Bank Dhaka office internal data storage. Our team saved annual data separately in an excel file. I have attached the excel file. Though this excel file can not be made public (it's internal), the data saved here are taken from different reports published by BBS at different times, and therefore they are public. This link provides the GDP data for different years: <https://bbs.gov.bd/pages/static-pages/6922df6e933eb65569e21f3f>. However, the data prior to 2017 is no longer available on the website.

Appendix 1: CUSUM of Squares Test Results

The charts presented in Appendix 1 are generated using EViews. For each country and model specification, open the corresponding equation file and follow these steps:

View → Stability Diagnostics → Recursive Estimates → CUSUM of Squares Test → OK

This procedure will generate the chart reported in Appendix 1.

For example, to replicate the CUSUM of squares test for India using the HP filter gap model, navigate to the tot_emp_gap worksheet, open the india_hp equation file, and follow the steps outlined above.

Figure 1: This figure is derived from the data coming Bangladesh Labor Force Survey (LFS) 2022 report by the Bangladesh Bureau of Statistics (BBS). See Page xxxii, table 9 of the report. The report is available here: <https://objectstorage.ap-dcc-gazipur-1.oraclecloud15.com/n/axvjbnqprylg/b/V2Ministry/o/office-bbs/2024/12/4ef9b287ba364d66b332c02b19745875.pdf>

Figure 2: This figure is coming from the same report above. See age 188, table 53.

Figure 3: In this figure, the data source for Bangladesh is same as figure 1. Data for SAR, lower middle, upper-middle, low income country groups are taken from the WDI:

- Employment in agriculture (% of total employment) (modeled ILO estimate). Indicator code: SL.AGR.EMPL.ZS
- Employment in industry (% of total employment) (modeled ILO estimate), indicator code: SL.IND.EMPL.ZS.
- Employment in services (% of total employment) (modeled ILO estimate), Indicator code: SL.SRV.EMPL.ZS

Figure 4: In this figure:

- Data for 2022 comes from the same report as figure 1 (LFS 2022). See table 9.3.2 (page 84).
- Data for 2016 comes from the LFS 2016-17 report by the BBS. The report is available here: http://203.112.218.101/storage/files/1/Publications/LFS/LFS_2016-17.pdf. See page 81 table 9.4 of the report.
- Data for 2013 comes from the LFS 2013 report. The report is available here: <http://203.112.218.101/storage/files/1/Publications/LFS/LabourForceSurvey2013.pdf>. See table 9.5 of page 83.

Reproducing the coefficients of Table 1 for China (step by step guide)

How the short-term coefficients (ψ) under the difference model are estimated

In the eviews, go to the sheet named *tot_employment_diff* and follow these steps:

- i) Select the two variables *emp_china_diff1* and *gdp_china_diff*
- ii) Right click → open as ‘equation’ → select ARDL as method from the dropdown list → select maximum lag length as 3 for both dependent and regressors
- iii) Go to the tab *options* → select schwarz criterion (SC) under model selection criterion → ok
- iv) You will get the same table that is saved under *china_diff1* as an equation file in the eviews
- v) The coefficient(s) for the variable *GDP_china_diff* are reported in the paper under table 1

Data:

- Two data files are used for China to run the regression: *emp_china_diff1* and *gdp_china_diff*
- *emp_china_diff1* data comes directly from the excel data file (under the sheet named CHN. The numbers are same as the column under the heading *diff*. See the formula to check how they are calculated from the original data in the same sheet.
- *gdp_china_diff* data file is created from the *gdp_g_china* data file. To create this in eviews, go to object → generate series → under ‘enter equation’, write *gdp_china_diff=d(gdp_g_china)* → ok
- Data in the *gdp_g_china* file comes directly from the excel file *GDPdata.xlsx* (see the GDP growth data for each country)

How the short term coefficients (θ) under the difference model is estimated

- Open the equation file *china_diff1* → view → ARDL diagnostic → cointegrating relations.
- The coefficient for the variable *gdp_china_diff* is shown in table 1.

How the short term coefficients (ψ) under the Gap (HP) model are estimated

In eviews, go to the sheet named *tot_emp_gap* and follow these steps:

- i) Select the two variables *emp_china_hp* and *gdp_china_hp*

- ii) Right click → open as 'equation' → select ARDL as method from the dropdown list → select maximum lag length as 3 for both dependent and regressors
- iii) Go to the tab options → select schwarz criterion (SC) under model selection criterion → ok
- iv) You will get the same table that is saved under *china_hp* as an equation file in the evIEWS
- v) The coefficient(s) for the variable *gdp_china_hp* are reported in the paper under table 1

Data

- Two data are used: *emp_china_hp* and *gdp_china_hp*
- To get the *emp_china_hp* data, open the *emp_china* data → proc → hodrick-prescott filter → write *emp_china_hp* under 'cycle series' (keep lamda value 100) → ok
- Data in the file *emp_china* comes directly from the excel file *EMPLOYMENTdata.xlsx* under the sheet named CHN. The numbers are same as the column under the heading log (implying log of the variable).
- To get the *gdp_china_hp*, select and open the *gdp_china_log* data file → proc → hodrick-prescott filter → write *gdp_china_hp* under 'cycle series' (keep lamda value 100) → ok
- *Gdp_china_log* file is created in the following way: click object → generate series → under 'enter equation' write *gdp_china_log=log(gdp_china)* → ok
- The *gdp_china* data in the evIEWS file comes directly from the excel file *GDPdata.xlsx* (see China's numbers under 'GDP constant LCU')

Same method as the difference model is used to get the long term coefficients (θ) showed in table 1

How the short term coefficients (ψ) under the Gap (BK) model is estimated

In evIEWS, go to the sheet named *tot_emp_gap* and follow these steps:

- i) Select the two variables *emp_china_bx* and *gdp_china_bx*
- ii) Right click → open as 'equation' → select ARDL as method from the dropdown list → select maximum lag length as 3 for both dependent and regressors
- iii) Go to the tab options → select schwarz criterion (SC) under model selection criterion → ok
- iv) You will get the same table that is saved under *china_bx* as an equation file in the evIEWS
- v) The coefficient(s) for the variable *gdp_china_bx* are reported in the paper under table 1

Data

- Two data are used: *emp_china_bx* and *gdp_china_bx*
- To get the *emp_china_bx* data, open the *emp_china* data → proc → frequency filter → select 'fixed length symmetric (Baxter-King)' from the drop down list for filter type → select the lag as 2 → name the cycle series as *emp_china_bx* → ok
- See above (HP filter case) for the source of *emp_china* data.
- To get the *gdp_china_bx* data, open the *gdp_china_log* data → proc → frequency filter → select 'fixed length symmetric (Baxter-King)' from the drop down list for filter type → select the lag as 2 → name the cycle series as *gdp_china_bx* → ok
- See above (HP filter case) for the source of *gdp_china_log* data.

Same method as the difference model and gap (HP) model is used to get the long term coefficients (θ) showed in table 1

Software Requirements

Eviews 13 and MS 365 Excel were used in the paper. However, the immediate earlier versions should work as well.

Code Description

There were no codes used, only different commands in the evIEWS file are sufficient to get the results. Most of the commands used to get the results for table 1 are described in the instructions for replicators section.

To get the HP filtered version of the variables, double click on the series in the evIEWS file (i.e., if we want to get the HP filtered version of the employment in India, double click on 'emp_india' to open it and then click proc --> Hodric-Prescott Filter --> add a name under 'cycle series' --> select lambda as 100 --> click 'ok'. This creates the emp_india_hp file used in the equation file. Similar process is followed for other countries.

Similarly, for BK filters, open the series by double clicking and then proc --> frequency filter --> fixed length symmetric (Baxter-King) --> select lag 2 --> name the cycle series 'emp_(country)_bx -->ok. The BK filtered version of the series of all countries (named in the format emp_(country)_bx) are created this way.