# Reproducibility package for "Understanding Labor Market Demand in Real Time in Argentina and Uruguay"

## Overview

This package creates the output of the document "Understanding Labor Market Demand in Real Time in Argentina and Uruguay" using Stata. The package consists of a series of do files and databases that allow the user to reproduce all the figures, tables and estimates that are part of the manuscript. All the material is stored in a shared folder on OneDrive. To replicate these outputs, just run the code "main_dofile.do" after modifying the user path. The replication of some figures requires to run a series of R scripts. We explain in detail how to do it in the Instructions for Replicators section.

## Data Availability

The data folder is divided into a "raw" data folder and a "cleaned" data folder. The former contains the following files:

- ARG_postings.csv: job postings collected by Lightcast in Argentina between 2020 and 2023.
- CHL_postings.csv: job postings collected by Lightcast in Chile between 2020 and 2023.
- URY_postings.csv: job postings collected by Lightcast in Uruguay between 2020 and 2023.
- US_postings.dta: job postings collected by Lightcast in the United States in December 2023.
- US_postings_isco.dta: classification of job postings collected by Lightcast in the United States in December 2023 according to their ISCO code.
- ARG_skills.csv: individual skills identified by Lightcast for each posting in Argentina.
- CHL_skills.csv: individual skills identified by Lightcast for each posting in Chile.
- URY_skills.csv: individual skills identified by Lightcast for each posting in Uruguay.
- US_skills.csv: individual skills identified by Lightcast for each posting in the United States.

These are the main files used to carry out the analysis in the paper. The "raw" data folder also contains the following secondary files:

- cuadros_tasas_indicadores_eph_09_24.xls: quarterly series of labor indicators for Argentina, including employment and unemployment rates.
- serie_empleo_ury.xlsx: monthly series of Uruguay's employment rate.
- serie_desempleo_ury.xlsx: monthly series of or Uruguay's unemployment rate.

- usu_individual_T322.txt: third quarter of 2022 microdata from the *Encuesta Permanente de Hogares* (Argentina household survey).
- usu_individual_T422.txt: fourth quarter of 2022 microdata from the *Encuesta Permanente de Hogares* (Argentina household survey).
- usu_individual_T423.txt: fourth quarter of 2023 microdata from the *Encuesta Permanente de Hogares* (Argentina household survey).
- ECH_2022.csv: 2022 microdata from the *Encuesta Continua de Hogares* (Uruguay household survey).
- uhci_dataappendix_sep2020.xlsx: Data Appendix to the Utilization-adjusted Human Capital Index (UHCI) (Pennings, 2020).
- eil_2307_estadisticas.xlsx: raw data from the *Encuesta de Indicadores Laborales* which monthly time series of job vacancy rates in Argentina.
- eil_2411_estadisticas_0.xlsx: updated version of the previous file.
- OxCGRT_compact_national_v1.csv: raw data created by the COVID-19 Government Response Tracker (University of Oxford) which includes the daily series of the Stringency Index.

The "cleaned" data folder contains the following files:

- ARG_postingsout.dta: modified version of the raw data of job postings in Argentina.
- baseUryNueva_completa.dta: modified version of the raw data of job postings in Uruguay.
- CHL_postingsout.dta: modified version of the raw data of job postings in Chile.
- US_postingsout: modified version of the raw data of job postings in the United States.
- skills_ARG4_cat&noncat.dta: modified version of the raw data of skills in Argentina (classification of skills).
- skills_CHL4_cat&noncat.dta: modified version of the raw data of skills in Uruguay (classification of skills).
- skills_URY4_cat&noncat.dta: modified version of the raw data of skills in Uruguay (classification of skills).
- skills_usa_categorizadas.dta: modified version of the raw data of skills in the United States (classification of skills).
- postings&skillsARGout.dta: merged job postings and skills data from Argentina.
- postings&skillsCHLout.dta: merged job postings and skills data from Chile.
- postings&skillsURYout.dta: merged job postings and skills data from Uruguay.
- postings&skillsUSout.dta: merged job postings and skills data from the United States.

  The "_tax" version of the last four databases includes dummies that indicate whether a categorized skill appears in a job posting. The "cleaned" data folder also contains the following secondary files:

- covid_string_index.dta: monthly averages series of the Oxford COVID Stringency Index for Argentina and Uruguay. The source of the original daily data series is listed in the Data Sources section.
- eil_vacancies.dta: monthly series of job vacancies from the *Encuesta de Indicadores Laborales* of Argentina. Job vacancies were estimated as the product of the job vacancy rate for each month and the total population of employees for which the survey is representative. The source of the original database is listed in the Data Sources section.
- seriesMC_ARG.dta: monthly series of job postings and labor indicators for Argentina, including employment and unemployment rates. The file includes a normalized version of the three series using May 2020 as the base month as well as its natural logarithms, first differences and moving averages. The source of the original employment and unemployment series is listed in the Data Sources section (cuadros_tasas_indicadores_eph_09_24.xls). The monthly series of job postings was generated by grouping the observations from the ARG_postingsout.dta file by month.
- seriesMC_URY.dta: monthly series of job postings and labor indicators for Uruguay, including employment and unemployment rates. The file includes a normalized version of the three series using August 2020 as the base month as well as its natural logarithms, first differences and moving averages. Besides, monthly job postings are divided into those located in Montevideo and those located in the rest of Uruguay. The source of the original employment and unemployment series is listed in the Data Sources section (serie_empleo_ury.xlsx and serie_desempleo_ury.xlsx). The monthly series of job postings was generated by grouping the observations from the baseUryNueva_completa.dta file by month.
- fixed_layout_Arg.rds: Argentina occupation map layout generated the first time the occupation_map_ARG.R script was run. A different layout with the same information can be generated by enabling lines 74-80 of the code.
- fixed_layout_Uy.rds: Uruguay occupation map layout generated the first time the occupation_map_URY.R script was run. A different layout with the same information can be generated by enabling lines 75-81 of the code.
- skillmapARG_out.xlsx: matrix with skill requirements by occupation and inputs for the generation of occupation maps for Argentina.
- skillmapURY_out.xlsx: matrix with skill requirements by occupation and inputs for the generation of occupation maps for Uruguay.

The generation of the last two files requires some further explanation. Each XLS file consists of four sheets. The first one is generated by the Stata code and contains a matrix with occupations as rows and skill requirements as columns. The second sheet contains a binary matrix built into the XLS file itself. This matrix is constructed assigning a 1 to those skills that have a higher-than-average requirement for a specific occupation. The third sheet has three columns: "dem" classifies occupations into three demand groups according to their total number of postings (1 corresponds to "low demand", 2 to "medium demand" and 3 to "high demand"), "greenbrown" classifies occupations into green occupations, neutral occupations, and brown occupations

(groups 1, 2 and 3, respectively) and "isco_08_4" stores the occupation code. Finally, the fourth sheet contains the inputs required for the classification carried out on the previous sheet. Specifically, occupations are sorted by the total number of postings and divided into terciles to form demand groups. In addition, this sheet contains the "greenness" and "brownness" measures for each occupation according to the sources cited in the paper. An occupation is classified as green if its "greenness" measure is greater than zero, brown if its "brownness" measure is greater than zero and its "greenness" measure is equal to zero, and neutral otherwise.

Databases containing information collected by Lightcast cannot be made publicly available. All other databases are publicly available.

## Data Sources

| File name | Source | URL |
|---|---|---|
| cuadros_tasas_indicadores_eph_09_24.xls | INDEC - Argentina | https://www.indec.gob.ar/indec/web/Nivel4-Tema-4-31-58 |
| serie_empleo_ury.xlsx | INE - Uruguay | https://www7.ine.gub.uy/Dashboard-%20ML-ECH/MercadoLaboral/ |
| serie_desempleo_ury.xlsx | INE - Uruguay | https://www7.ine.gub.uy/Dashboard-%20ML-ECH/MercadoLaboral/ |
| usu_individual_T322.txt | INDEC - Argentina | https://www.indec.gob.ar/indec/web/Institucional-Indec-BasesDeDatos |
| usu_individual_T422.txt | INDEC - Argentina | https://www.indec.gob.ar/indec/web/Institucional-Indec-BasesDeDatos |
| usu_individual_T423.txt | INDEC - Argentina | https://www.indec.gob.ar/indec/web/Institucional-Indec-BasesDeDatos |
| ECH_2022.csv | INE - Uruguay | https://www4.ine.gub.uy/Anda5/index.php/catalog/730/get-microdata |
| covid_string_index.dta | Oxford Covid-19 Government Response Tracker | https://github.com/OxCGRT/covid-policy-dataset/blob/main/data/OxCGRT_compact_national_v1.csv |
| eil_vacancies.dta | *Secretaría de Trabajo, Empleo y Seguridad Social -* Argentina | https://www.argentina.gob.ar/sites/default/files/eil_2411_estadisticas_0.xlsx |

## Instructions for Replicators

- Update the main_dofile with your directory paths.
- Run the main_dofile in Stata.
- Update the following R scripts with your directory paths (including the output path stored in the object path_output): occupation_space_ARG.R, occupation_space_ARG_green, occupation_space_URY.R and occupation_space_URY_green.R.

- Run the R scripts separately.
- Check the outputs folder.

## List of Exhibits

The provided code reproduces all tables and figures in the paper.

| Exhibit name | Output filename | Sheet | Script | Note |
|---|---|---|---|---|
| Figure 1 | figures.xlsx | fig1 | mainresults.do (line 8) | Found in outputs/main/figures |
| Figure 2 | figures.xlsx | fig2 | mainresults.do (line 97) | Found in outputs/main/figures |
| Figure 3 | figures.xlsx | fig3 | mainresults.do (line 131) | Found in outputs/main/figures |
| Figure 4 | figures.xlsx | fig4 | mainresults.do (line 157) | Found in outputs/main/figures |
| Figure 5 | figures.xlsx | fig5 | mainresults.do (line 165) | Found in outputs/main/figures |
| Figure 6 | figures.xlsx | fig6 | mainresults.do (line 201) | Found in outputs/main/figures |
| Figure 8 | figures.xlsx | fig8 | mainresults.do (line 406) | Found in outputs/main/figures |
| Figure 9 | figures.xlsx | fig9 | mainresults.do (line 464) | Found in outputs/main/figures |
| Figure 10 | figures.xlsx | fig10 | mainresults.do (line 665) | Found in outputs/main/figures |
| Figure 11a | figure11a.png | - | occupation_space_ARG.R (line 87) | Found in outputs/main/figures |
| Figure 11b | figure11b.png | - | occupation_space_URY.R (line 88) | Found in outputs/main/figures |
| Figure 12a | figure12a.png | - | occupation_space_ARG_green.R (line 87) | Found in outputs/main/figures |
| Figure 12b | figure12b.png | - | occupation_space_URY_green.R (line 85) | Found in outputs/main/figures |
| Table 6 | tables.xlsx | tab6 | mainresults.do (line 14) | Found in outputs/main/tables |
| Table 7 | tables.xlsx | tab7 | mainresults.do (line 32) | Found in outputs/main/tables |
| Table 8 | tables.xlsx | tab8 | mainresults.do (line 260) | Found in outputs/main/tables |
| Table 9 | tables.xlsx | tab9 | mainresults.do (line 328) | Found in outputs/main/tables |
| Table 10 | tables.xlsx | tab10 | mainresults.do (line 384) | Found in outputs/main/tables |
| Table 12 | tables.xlsx | tab12 | mainresults.do (line 630) | Found in outputs/main/tables |
| Table 15 | table15.xls | Sheet1 | appendix.do (line 8) | Found in outputs/main/tables |
| Table 17 | tables.xlsx | tab17 | appendix.do (line 36) | Found in outputs/annex/tables |
| Table 18 | tables.xlsx | tab18 | appendix.do (line 71) | Found in outputs/annex/tables |
| Table 19 | tables.xlsx | tab19 | appendix.do (line 139) | Found in outputs/annex/tables |

## Requirements

The code was reproduced on a computer with the following specifications:

- OS: Windows 11 Pro

- Processor: 12th Gen Intel(R) Core(TM) i7-12700   2.10 GHz

- Memory available: 63.8 GB

- Software version: Stata version 17 and R version 4.4.0

### Memory and Runtime and Storage Requirements

The implementation of the reproducibility package does not require additional storage beyond the 267 GB used by the shared material in the OneDrive folder. The code takes approximately two hours to finish running.