Replication Package of
Job Polarisation, Labor Market Fluidity and the Flattening of the Phillips Curve

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Abstract

This readme accompanies the replication package of Siena and Zago (forthcoming) "Job Polarisation, Labor Market Fluidity and the Flattening of the Phillips Curve", The Economic Journal.

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Data availability and provenance statements

The authors of the manuscript have legitimate access to and permission to use the data used in this manuscript.

Structure of the replication package

The replication package is organised as follows:

- [SienaZago2023ReplicationPackage]
    - [ado]
    - [data]:
        - [input_data]
        - [non_proprietary_data]
        - [output_data]
    - [figures]
    - [programs]
        - [programs_matlab]
            - [x13tbx]
        - [programs_stata]
    - [tables]

Summary of availability

All data for replication are publicly available.

Details on each data source

The data used to support the findings of this paper have been deposited in the [SienaZago2023ReplicationPackage/data/input_data] repository. The data were collected by the authors, and are available under a Creative Commons Non-commercial license.

Within [SienaZago2023ReplicationPackage/data/input_data] you find the following datasets:

1. Gross value added and income A*10 industry breakdowns
   Source: EUROSTAT; series code: namq_10_a10
   URL: https://ec.europa.eu/eurostat/databrowser/view/namq_10_gdp/default/table?lang=en
   Data file: valueadded.xlsx
   Data construction file: 1.6_cleaning_value_added.do
   Variable names: va_manuf, va_con
   Description: We consider only the series of value added in manufacturing and construction expressed as share of total value added of the economy. The final series used through the paper is the sum of the value added share from these two sectors

2. High-frequency monetary policy shocks
   Source: Altavilla et al. 2019
   URL: https://www.ecb.europa.eu/pub/pdf/annex/Dataset_EA-MPD.xlsx
   Data file: Dataset_EA-MPD.xlsx
   Data construction file: 1.5_cleaning_mp_shocks_altavilla.do
   Variable names: mp_shock and lags
   Description: To move from the original monthly frequency to the desired quarterly frequency, we take 3-months sums of monthly MP shocks. Finally, we keep only those shocks inversely correlated with stock market movements

3. Import Price Index: European Union - All commodities
   Source: FRED; series code: eectot_pc1
   URL: https://fred.stlouisfed.org/series/EECTOT
   Data file: import_p_index.xls
   Data construction file: 1.8_cleaning_import_index.do
   Variable names: xp
   Description: we use these series to proxy the import price index for Portugal since this is not available on DATASTREAM

4. Import Price Index
   Source: DATASTREAM; series code: ..IMPPRCF
   URL: available in the request table in NT_inflation_GDPdeflator.xlsm
   Data file: datastream_feb2023.xlsx
   Data construction file: 1.7_cleaning_datastream.do
   Variable names: Import_Prices

Description: Import_Prices is the country-specific import price index. For Portugal see
[3.]

5. Labour cost index by NACE Rev. 2 activity
   Source: EUROSTAT; series code: lc_lci_r2_q
   URL: https://ec.europa.eu/eurostat/databrowser/view/LC_LCI_R2_Q/default/table?lang=en
   Data file: labor_cost_index_nace_2023.dta
   Data construction file: 1.10_cleaning_wages.do
   Variable names: inf_w_bn
   Description: Wage inflation is built from the y-o-y percentage change of the index for
   total wages and salaries by sector. We focus on wage index for the business economy
   to generate the variable inf_w_bn. For data availability across countries, we use the
   non-seasonally adjusted index with base year 2016

6. Labour cost index by NACE Rev. 2 activity - item weight
   Source: EUROSTAT; series code: lc_lci_r2_itw
   URL: https://ec.europa.eu/eurostat/databrowser/view/lc_lci_r2_itw/default/table?lang=en
   Data file: labor_cost_weights_nace_2023.dta
   Data construction file: 1.10_cleaning_wages.do
   Variable names: w_inf_nt
   Description: Using sectoral data from labor_cost_index_nace_2023.dta and the sectoral
   weights from labor_cost_weights_nace_2023.dta, we build the wage price index and y-
   on-y wage inflation for the non-tradable sector

7. HICP - monthly data (index)
   Source: EUROSTAT; series code: prc_hicp_midx
   URL: https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_MIDX/default/table?lang=en
   Data file: cpi_eurostat_complete_nov22.dta
   Data construction file: 1.4_cleaning_cpi_inflation.do
   Variable names: dprc, dprc_x_nrg_food, dprc_qoq, P_x_nrg
   Description: Starting from the monthly frequency price index (base year 2015) we build
   y-on-year percentage change in in the HCPI price level and the HCPI price level exclud-
   ing food and energy. From these monthly frequency data, we take quarterly averages
   to move. dprc is the quarterly frequency y-o-y HCPI inflation rate. dprc_x_nrg_food is
   the quarterly frequency y-o-y HCPI (energy and food exluded) inflation rate. dprc_qoq
   is built from the q-on-a chane in the HCPI index. We take within-quarter mean to

transform this series at quarterly frequency. P_x_nrg is the price index for energy goods from the last month of each quarter

8. Employment by sex, age and economic activity (1998-2008, NACE Rev. 1.1)
   Source: EUROSTAT; series code: lfsq_egana
   URL: https://ec.europa.eu/eurostat/databrowser/product/view/lfsq_egana?lang=en
   Data file: LFSQ_EGANA.xlsx
   Data construction file: 1.9_cleaning_sectoral_emp_data.do
   Variable names: mancon_emp_share
   Description: We build the share of employment in manufacturing and construction sector as the sum of employment in manufacturing and construction over total employment.The sample considers employent in the age bracket 15-74

9. Employment by sex, age and economic activity (from 2008 onwards, NACE Rev. 2))
   Source: EUROSTAT; series code: lfsq_egana2
   URL: https://ec.europa.eu/eurostat/databrowser/view/lfsq_egana2d/default/table?lang=en
   Data file: LFSQ_EGANA2.xlsx
   Data construction file: 1.9_cleaning_sectoral_emp_data.do
   Variable names: mancon_emp_share
   Description: We build the share of employment in manufacturing and construction sector as the sum of employment in manufacturing and construction over total employment. The sample considers employment in the age bracket 15-74

10. NAIRU
    Source: OECD ECONOMIC OUTLOOK 2018
    URL: https://stats.oecd.org/Index.aspx?DataSetCode=EO103_LTB
    Data file: OECD_EconOutlook_Data_2018.xlsx
    Data construction file: 1.1_cleaning_nairu.do
    Variable names: nairu
    Description: We use the nairu from the OECD to build the unemployment gap

11. ECB Inflation Expectations Consensus Forecast
    Source: `https://www.ecb.europa.eu/stats/ecb_surveys/survey_of_professional_forecasters/html/all_data.en.html`
    Data file: exp_inflation.xls
    Data construction file: 1.2_cleaning_expected_inflation.do

Variable names: ep_1y

Description: ep_1y is the level of expected inflation in t+4, i.e. one year from today

12. Employment Protection Liberalization Data
    Source: Data from Duval et al. 2018
    URL: https://www.imf.org/en/Publications/WP/Issues/2018/08/16/Employment-Protection-
    Deregulation-and-Labor-Shares-in-Advanced-Economies-46074
    Data file: EPL_Duval_et_al.xlsx Data construction file: 1.11_cleaning_EPL_Duval_et_al.do
    Variable names: epl_lib Description: epl_lib takes value one if an employment protec-
    tion liberalization occurred in that period

13. i) Employment by sex, age, professional status and occupation ii) GDP and main
    components (chained linked volumes 2010) iii) Unemployment by sex and age (total)
    Source: EUROSTAT; series code: lfsq_egais, namq_10_gdp, une_rt_q
    URL: https://ec.europa.eu/eurostat/databrowser/view/lfsq_egais/default/table?lang=en
    URL: https://ec.europa.eu/eurostat/databrowser/view/namq_10_gdp/default/table?lang=en
    URL: https://ec.europa.eu/eurostat/databrowser/view/une_rt_q/default/table?lang=en
    Data file: employment_by_occupation.xlsx
    Data construction file: Data_polarization.m / 1_data_cleaning.do
    Variable names: a_share, r_share, m_share, RealGDP, u, phase_i, u
    Description: a_share, r_share, m_share are respectively the abstract, routine, manual
    employment share of workers employed (age bracket 15-74); u is the unemployment
    rate for workers in the same age bracket; RealGDP id real GDP; phase_i is a categor-
    ical variable that split periods in windows; before the Great Recession (GR), during
    the GR, between GR and Sovereign Debt Crisis (SDC), after the SDC. Each phase is
    defined according to country specific business cycle dates

14. GDP Deflator for non-tradable sectors.
    Source: DATASTREAM;
    series codes: available in the request table in NT_inflation_GDPdeflator.xlsm.
    Data file: employment_by_occupation.xlsx
    Data construction file: NT_inflation_GDPdeflator.m / 1.3_cleaning_non_tradable_inflation.do
    Variable names: dp_nt, p_nt, dp_nt_qoq
    Description: y-on-y non-tradable inflation, home relative price of non-tradable, q-on-q
    non tradable inflation. Constructed as in Siena 2021: (nominal gross value added of
    NT activities ESA2010)/ (REAL gross value added of NT activities ESA2010)

15. Employed persons having a second job by sex, age and occupation in the first job.
    Source: EUROSTAT; series code: lfsq_e2gis
    URL: https://ec.europa.eu/eurostat/databrowser/view/lfsq_e2gis/default/table?lang=en
    Data file: multiple_contract.dta
    Data construction file: 1.16_cleaning_multiple_contracts.do
    Variable names: multiple_r, multiple_a, multiple_m
    Description: multiple_r, multiple_a, multiple_m are the share of workers within each job category having multiple contracts at the same time

16. Number of time a firm in the sample has changed price in the year. Source: Wage Dynamic Network Data (ECB)
    URL: To obtain the raw data, a request can be made at this link
    `https://www.ecb.europa.eu/home/pdf/research/wdn/WDN-data_access_request_`
    `form.pdf?1daf263da10aa4b0b1ae8b491cea410d`
    Data file: WDN_ecb_data.dta
    Variable names: P_frequency_1013, wb, r_share, m_share, a_share
    Description: P_frequency_1013 is the number of time a firm in the sample has changed price in the year; wb is the weight of that firm in the sample; r_share is the share of routine workers within a firm; m_share and a_share are respectively the share of manual and abstract workers

17. Previous occupations of the unemployed, by sex (1 000)
    Source: EUROSTAT; series code: lfsq_ugpis
    URL: https://ec.europa.eu/eurostat/databrowser/view/lfsq_ugpis/default/table?lang=en
    Data file: unemp_by_occ.xlsx
    Data construction file: 1.15_cleaning_conditional_separation_hiring.do
    Variable names: X_a, X_r, X_m, h_a, h_r, h_m
    Description: X_* and h_* are the conditional (job-specific) separation and hiring rate. *=a,r,m, i.e. abstract, routine, manual

18. Unemployment by sex, age and duration of unemployment (1 000)
    Source: EUROSTAT; series code: lfsq_ugad
    URL: https://ec.europa.eu/eurostat/databrowser/view/lfsq_ugad/default/table?lang=en
    Data file: data_for_aggregate_separation.xlsx
    Data construction file: 1.14_cleaning_aggregate_separation_hiring.do

Variable names: DELTA, H

Description: DELTA is the aggregate separation rate; H is the aggregate hiring rate.

19. Employment and activity by sex and age.
    Source: EUROSTAT; series code: lfsi_emp_q
    URL: https://ec.europa.eu/eurostat/databrowser/view/lfsi_emp_q/default/table?lang=en
    Data file: emp_lf.dta
    Data construction file: 1.14_cleaning_aggregate_separation_hiring.do
    Variable names: DELTA, H
    Description: DELTA is the aggregate separation rate; H is the aggregate hiring rate

20. Cross-classification of gross fixed capital formation by industry and by asset
    Source: EUROSTAT; series code: nama_10_nfa_fl
    URL: https://ec.europa.eu/eurostat/databrowser/view/nama_10_nfa_fl/default/table?lang=en
    Data file: capital_formation.xlsx
    Data construction file: 1.13_cleaning_tech_change.do
    Variable names: inv_into_tech_change
    Description: inv_into_tech_change is the sum of investments in ICT and patenting activity. This variable is expressed as the share of total investments.

21. Financial balance sheets - quarterly data - liabilities
    Source: EUROSTAT; series code: nasq_10_f_bs
    URL: https://ec.europa.eu/eurostat/databrowser/view/nasq_10_f_bs/default/table?lang=en
    Data file: fincorp_liab.dta
    Data construction file: 1.12_cleaning_variables_for_robustness_check.do
    Variable names: fincorp_liab_F2
    Description: fincorp_liab_F2 is short-term liabilities (currencies and deposits) for financial firms

22. Financial balance sheets - quarterly data - asset
    Source: EUROSTAT; series code: nasq_10_f_bs
    URL: https://ec.europa.eu/eurostat/databrowser/view/nasq_10_f_bs/default/table?lang=en
    Data file: fincorp_asset.dta
    Data construction file: 1.12_cleaning_variables_for_robustness_check.do
    Variable names: fincorp_asset_F2
    Description: fincorp_asset_F2 is short-term assets (currencies and deposits) for finan-

cial firms

23. Government debt -to- GDP ratio
    Source: EUROSTAT; series code: gov_10q_ggdebt
    URL: https://ec.europa.eu/eurostat/databrowser/view/gov_10q_ggdebt/default/table?lang=en
    Data file: gov_debt.dta
    Data construction file: 1.12_cleaning_variables_for_robustness_check.do
    Variable names: gov_debt_ratio
    Description: gov_debt_ratio is government debt -to- GDP ratio

Description of programs/codes

- 'programs/MASTER.do' will run all the programs (coded in Stata and Matlab) necessary to replicate the paper. This is the order of programs executed by 'programs/MASTER.do':

    - 'programs_matlab/MASTER_matlab.m' which will run the following sub-programs in matlab:

        - 'programs/programs_matlab/Data_polarization.m' creates the job-polarization data for the STATA analysis
        - 'programs_matlab/NT_inflation_GDPdeflator.m' creates the non-tradable inflation for the STATA analysis
        - 'programs_matlab/BG_derivatives_Fixed_U_May23.m' computes the Derivative of the Slope of the Price Phillips Curve in the Full Model with fixed unemployment and plots Figure 9
        - 'programs_matlab/BG_derivatives_Moving_U_May23.m' computes the Slope and the Derivative of the Slope of the Price Phillips Curve in the Full Model with variable unemployment and plots Figure D1(a and b) in Appendix D

    - 'programs/programs_stata/0_paths' defines directories for Stata output and downloads all necessary packages: ivreg2, estout, cibar, regsave, ranktest, textsave, ftools, reghdfe, ivreghdfe.
    - 'programs/programs_stata/1_data_cleaning' cleans all data. This program uses other do-files to clean specific datasets as described in the section dedicated to data description. These sub-programs are:

        - 'programs/programs_stata/1.1_cleaning_nairu'
        - 'programs/programs_stata/1.2_cleaning_expected_inflation'

- '`programs/programs_stata/1.3_cleaning_non_tradable_inflation`'
- '`programs/programs_stata/1.4_cleaning_cpi_inflation`'
- '`programs/programs_stata/1.5_cleaning_mp_shocks_altavilla`'
- '`programs/programs_stata/1.6_cleaning_value_added`'
- '`programs/programs_stata/1.7_cleaning_datastream`'
- '`programs/programs_stata/1.8_cleaning_import_index`'
- '`programs/programs_stata/1.9_cleaning_sectoral_emp_data`'
- '`programs/programs_stata/1.10_cleaning_wages`'
- '`programs/programs_stata/1.11_cleaning_EPL_Duval_et_al`'
- '`programs/programs_stata/1.12_cleaning_variables_for_robustness_check`'
- '`programs/programs_stata/1.13_cleaning_tech_change`'
- '`programs/programs_stata/1.14_cleaning_aggregate_separation_hiring`'
- '`programs/programs_stata/1.15_cleaning_conditional_separation_hiring`'
- '`programs/programs_stata/1.16_cleaning_multiple_contracts`'

- '`programs/programs_stata/2_employment_unemployment_sectoral_analysis`' computes employment and unemployment analysis (tables and figures)
- '`programs/programs_stata/3_graphs_1`' generates most of the figure for the papaer and Appendix
- '`programs/programs_stata/4_StockWatson_PC`' generates other figures, Table 1 and Table C1 in Appendix
- '`programs/programs_stata/5_graphs_2`' generates all other remaining graphs
- '`programs/programs_stata/6_Table_3`' generates Table 3 by running these two sub-programs

    - '`programs/programs_stata/6.1_New_Keynesian_PC`'
    - '`programs/programs_stata/6.2_Regional_PC`'

- '`programs/programs_stata/7_Table_C3`' generates Table C3 in Appendix
- '`programs/programs_stata/8_Table_C4`' generates Table C4 in Appendix by running these two sub-programs

    - '`programs/programs_stata/8.1_New_Keynesian_PC_qoq_inflation`'
    - '`programs/programs_stata/8.2_Regional_PC_qoq_inflation`'

- '`programs/programs_stata/9_Table_C5`' generates Table C5 in Appendix
- '`programs/programs_stata/10_Table_A1`' generates Table A1 in Appendix
- '`programs/programs_stata/11_Table_C6`' generates Table C6 in Appendix
- '`programs/programs_stata/12_Table_4`' generates Table 4 by running these two sub-programs

- 'programs/programs_stata/12.1_New_Keynesian_WPC'
- 'programs/programs_stata/12.2_Regional_WPC'
- 'programs/programs_stata/13_Table_B2' generates Table B2 in Appendix
- 'programs/programs_stata/14_Table_C7' generates Table C7 in Appendix
- 'programs/programs_stata/15_Table_C2' generates Table C2 in Appendix
- 'programs/programs_stata/16_regression_page35' generates the results reported in the text in page 35
- 'programs/programs_stata/17_empty_all_output_folders' bring the replication package to its original form, by deleting any table, figure and file generated during the compiling process. **Run this only if you want to erase everything and start with a clean sheet**.

Software and Replication

Operating system: Macintosh computers (iMac, Big Sur, Version 11.6).

Software: Matlab R2019a and Stata MP 17.0. Relevant packages:

- Optimization Toolboox for Matlab - make sure to install it from the Add-Ons tool on Matlab directly;
- All other programs needed are provided respectively in [x13tbx] and [ado]

To fully replicate the paper it is sufficient to run 'programs/MASTER.do'.

Running time: 8 min 36 sec

Output are stored in

- [SienaZago2023ReplicationPackage/figures]
- [SienaZago2023ReplicationPackage/tables]

List of Tables and Figures

Figure/Table #	Programs	Line	Output file	Note
Figure 9, D.1,a, D.1.b	programs/MASTER.do	15	figure_9, figure_D1a, figure_D1b	
Figure 1, 2.a, 2.b, 7.a ,7.b, 8	programs/MASTER.do	18	figure_1.pdf, figure_2a.pdf, figure_2b.pdf,	
Table 2, B.1, B.3	programs/MASTER.do	18	tab_2.tex, tab_B1.tex, tab_B3	
Figure 1, 2.a, 2.b, 7.a ,7.b, 8	programs/MASTER.do	18	figure_1.pdf, figure_2a.pdf, figure_2b.pdf, figure_7a.pdf, figure_7b.pdf, figure_8.pdf	
Figure A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, A.11, A.12, A.13, A.14, E.1.a, E.1.b, E.2.a, E.2.b, E.2.c, E.2.d, E.2.e, E.2.f, E.3.a, E.3.b, E.3.c	programs/MASTER.do	19	figure_A1.pdf, figure_A2.pdf, figure_A3.pdf, figure_A4.pdf, figure_A5.pdf, figure_A6.pdf, figure_A7.pdf, figure_A8.pdf, figure_A9.pdf, figure_A10.pdf, figure_A11.pdf, figure_A12.pdf, figure_A13.pdf, figure_A14.pdf, figure_E1a.pdf, figure_E1b.pdf, figure_E2a.pdf, figure_E2b.pdf, figure_E2c.pdf, figure_E2d.pdf, figure_E2e.pdf, figure_E2f.pdf, figure_E3a.pdf, figure_E3b.pdf, figure_E3c.pdf	
Table 1, C.1	programs/MASTER.do	20	tab_1.tex, tab_C1.tex	
Figure 3, 10.c, E.1.c	programs/MASTER.do	20	figure_3.pdf, figure_10c.pdf, figure_E1c.pdf	
Figure 4, 5.a, 5.b, 5.c, 5.d, 6.a, 6.b, 7.c, 7.d, B.1.a, B.1.b, B.1.c, B.2.a, B.2.b, B.2.c, B.2.d, B.3.a, B.3.b, B.3.c, B.4.a, B.4.b	programs/MASTER.do	21	figure_4.pdf, figure_5a.pdf, figure_5b.pdf, figure_5c.pdf, figure_5d.pdf, figure_6a.pdf, figure_6b.pdf, figure_7c.pdf, figure_7d.pdf, figure_B1a.pdf, figure_B1b.pdf, figure_B1c.pdf, figure_B2a.pdf, figure_B2b.pdf, figure_B2c.pdf, figure_B2d.pdf, figure_B3a.pdf, figure_B3b.pdf, figure_B3c.pdf, figure_B4a.pdf, figure_B4b.pdf	
Table 3	programs/MASTER.do	22	tab_3.tex	
Table C.3	programs/MASTER.do	23	tab_C3.tex	
Table C.4	programs/MASTER.do	24	tab_C4.tex	
Table C.5	programs/MASTER.do	25	tab_C5.tex	
Table A.1	programs/MASTER.do	26	tab_A1.tex	
Table C.6	programs/MASTER.do	27	tab_C6.tex	
Table 4	programs/MASTER.do	28	tab_4.tex	
Table B.2	programs/MASTER.do	29	tab_B2.tex	
Table C.7	programs/MASTER.do	30	tab_C7.tex	
Table C.2	programs/MASTER.do	31	tab_C2.tex	
Regression in text body at page 35	programs/MASTER.do	32	regression_page35.tex	