



Emily R. Barker, Jakub Bijak

Uncertainty in Migration Scenarios

Deliverable 9.2 - Data Description



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Technical Report:

D9.2: Uncertainty in migration scenarios

Data Description

Emily R. Barker* Jakub Bijak[†]

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Abstract

This cover note is a description of the data used in [Barker and Bijak \(2021\)](#), intended to accompany the open data deposit related to the work presented in that report. It should be read in conjunction with the report, available via www.quantmig.eu, and with the individual readme files in the data folders that can be found within the Zenodo repository (DOI: [10.5281/zenodo.7709443](https://doi.org/10.5281/zenodo.7709443)).

Keywords: Complexity, DSGE models, Macroeconomics, Migration modelling, Prediction, Shocks, Uncertainty, Forecasting, Panel VAR, Bayesian Estimation, Automation

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*University of Southampton, UK. Email: E.R.Barker@soton.ac.uk

[†]University of Southampton, UK. Email: J.Bijak@soton.ac.uk

1 Data Description

The cover note presents a summary of the data used in estimation of the analysis in [Barker and Bijak \(2021\)](#). The data come from the national accounts (via OECD Economic Outlook), Eurostat, and national statistical offices. Table 1 is reproduced after [Barker and Bijak \(2021, Table 1, p. 11\)](#) to provide an overview of the data used and their provenance, as well as of the transformations and processing of data subsequently used in the analysis. The CSV files contained in the open data repository on Zenodo (DOI: [10.5281/zenodo.7709443](https://doi.org/10.5281/zenodo.7709443)) present only the final versions of the data used in estimation.

Table 1: Data used in [Barker and Bijak \(2021\)](#): Variables, sources, and descriptions

Variable	Description	Source	Transformation
<i>Migration</i>			
NM	Net Migration	Eurostat, IMEM, Nat. Stat.	Per 1000 WA Residents
Emig	Emigration	Eurostat, IMEM, Nat. Stat.	Per 1000 WA Residents
Immig	Immigration	Eurostat, IMEM, Nat. Stat.	Per 1000 WA Residents
<i>National Accounts - Expenditure</i>			
GDP	Gross Domestic Product	OECD - CARSA, DNBSA	Real, Per WA, Logged
Cons	Private Consumption	OECD - CARSA, DNBSA	Real, Per WA, Logged
X	Private Investment	OECD - CARSA, DNBSA	Real, Per WA, Logged
<i>National Accounts - (General) Government</i>			
GovCons	Gov Final Consumption	OECD - CARSA, DNBSA	Real, Per WA, Logged
GovInv	Gov Fixed Capital Formation	OECD - CARSA	Real, Per WA, Logged
SocSecP	Social security benefits paid GG	OECD - CARSA	Real, Per WA, Logged
SocSecR	Social security benefits received GG	OECD - CARSA	Real, Per WA, Logged
TaxProdImp	Taxes on production and imports	OECD - CARSA	Real, Per WA, Logged
TaxOther	Other current receipts	OECD - CARSA	Real, Per WA, Logged
TaxDir	Total direct taxes	OECD - CARSA	Real, Per WA, Logged
PropIncP	Property income paid	OECD - CARSA	Real, Per WA, Logged
PropIncR	Property income received	OECD - CARSA	Real, Per WA, Logged
OutOther	Other current outlays	OECD - CARSA	Real, Per WA, Logged
GovPur	Government Purchases	GovCons+GovInv	
TaxRev	Tax Revenues	TaxProdImp + TaxDir + SocSecR + PropIncR + TaxOther	
Transf	Transfers	SocSecP + PropIncP + OutOther	
PubSpen	Public Spending	GovPur + Transf	
<i>Labour Market</i>			
Unemp	Unemployment 15-64 %	Eurostat, OECD	
Emp	Employment 15-64 %	Eurostat, OECD	
WageSal	Wages and Salaries	Eurostat	Real, Per WA, Logged
WagePre	Wage Premium to EU 15	Eurostat	WageSal to WageSal-EU15

Abbreviations used: WA = working-age population. Nat. Stat. = National statistical offices. CARSA = National currency, current prices, annual levels, seasonally adjusted. DNBSA = Deflator, national base year, seasonally adjusted. Variables are deflated by using the GDP deflator unless a corresponding one is available. *Wage premium to EU-15* is a ratio of wage and salary data taken from the national accounts via Eurostat, transformed into real terms, per working-age population, relative to that of the EU-15 countries. Apart from percentages, all data are logged (log-transformed) during the estimation.

In the following, we summarise the data sets within the collection, which is split into four sections: (i) the master data set for each country (folder “Data”); (ii) the [dynare](#) ([Adjemian et al., 2011](#)) code and data used in estimation of the parameters for the model

examining the future of East to West migration under job automation ([Barker, 2021](#)) (folder “DSGE Model - East to West Mig”); (iii) the `dynare` code and data used in estimation of the parameters of the model assuming exogenous migration ([Barker and Vella, 2021](#)) (folder “DSGE Model - Exogenous Migration”); and (iv) results from the panel VAR modelling and short- to long-term forecasting (folder “Forecasts & PVAR”).

1.1 Input Data by Country

The “Data” folder includes CSV files with data for each country included in the analysis, labelled with their ISO 3166-2 codes. The files include data for 2002Q1:2019Q4 for all variables used. In addition, data used for conditional forecasting are included where available. A `readme.txt` file presents more detailed information on the folder’s content.

1.2 DSGE Model - East to West Migration

The full specification of the model presented in [Barker and Bijak \(2021, Section 3.1\)](#) is described in detail in [Barker \(2021\)](#). The folder “DSGE Model - East to West Mig” contains the data used in the estimation process using the [Hamilton \(2018\)](#) filter, and the files used in `dynare` for the model. The `readme.txt` file includes further description of the content of this folder, intended to aid the use of the model and replication of results.

1.3 DSGE Model - Exogenous Migration

The specification of the second model presented in [Barker and Bijak \(2021, Section 3.2\)](#) is described in detail in [Barker and Vella \(2021\)](#). Within the folder “DSGE Model - Exogenous Migration”, included are all the data used in the estimation process applying the [Hamilton \(2018\)](#) filter, and the files used in `dynare` for the model itself. Again, `readme.txt` contains further information on the folder content and individual files.

1.4 Forecasts and Panel VAR

For the forecasting exercise presented in [Barker and Bijak \(2021, Section 4\)](#) for each of the forecast horizons, there is a file which includes the medians, as well as the upper and lower bounds of 67-per cent predictive intervals. The variables are identified by: (i) country, (ii) migration flow type; and (iii) whether is is the median, upper or lower bound.

For example, `aut_immig_lb` is the lower bound forecast of the 67-per cent predictive interval (corresponding to the 0.165th quantile) for **imm**migration to Austria.

For the impulse response functions (IRFs) generated by the panel VAR models, the data are sorted by model type and then by country group, so to correspond directly with the figures presented in the report. The responses for Group 4 are inverted to aid comparison. The impulse responses were estimated in Matlab, as such, there is an m-file to recreate the IRFs. As before, the `readme.txt` file contains further information.

Note on Software Used

The modelling has been performed within Matlab 2018b, used for Panel VAR forecasting in the **BEAR Toolbox** (Dieppe et al., 2016), and Matlab 2020a, used for modelling in **dynare** v4.5.1 (Canova and Ferroni, 2020); on macOS Big Sur v11.1.

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