



# sustainwell

Rethinking the roles of  
**family, market & state**

## WP3

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- WP3 goals
- Point of departure: existing models
- Tasks and outputs
  - Socio-demographic core
  - Longitudinal activity careers
  - Labor-related income components
  - Tax-benefit modeling
  - Accounting
  - Case studies & sensitivity analysis
- Outlook



# WP3 Goals

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- Development of a dynamic microsimulation model for the comparative study of the interactions between population aging, sociodemographic change, and welfare states regimes (8 countries).
- Modeling of public and private transfer flows bringing National Transfer Accounting (NTA) and National Time Transfer Accounting (NTTA) to the individual level



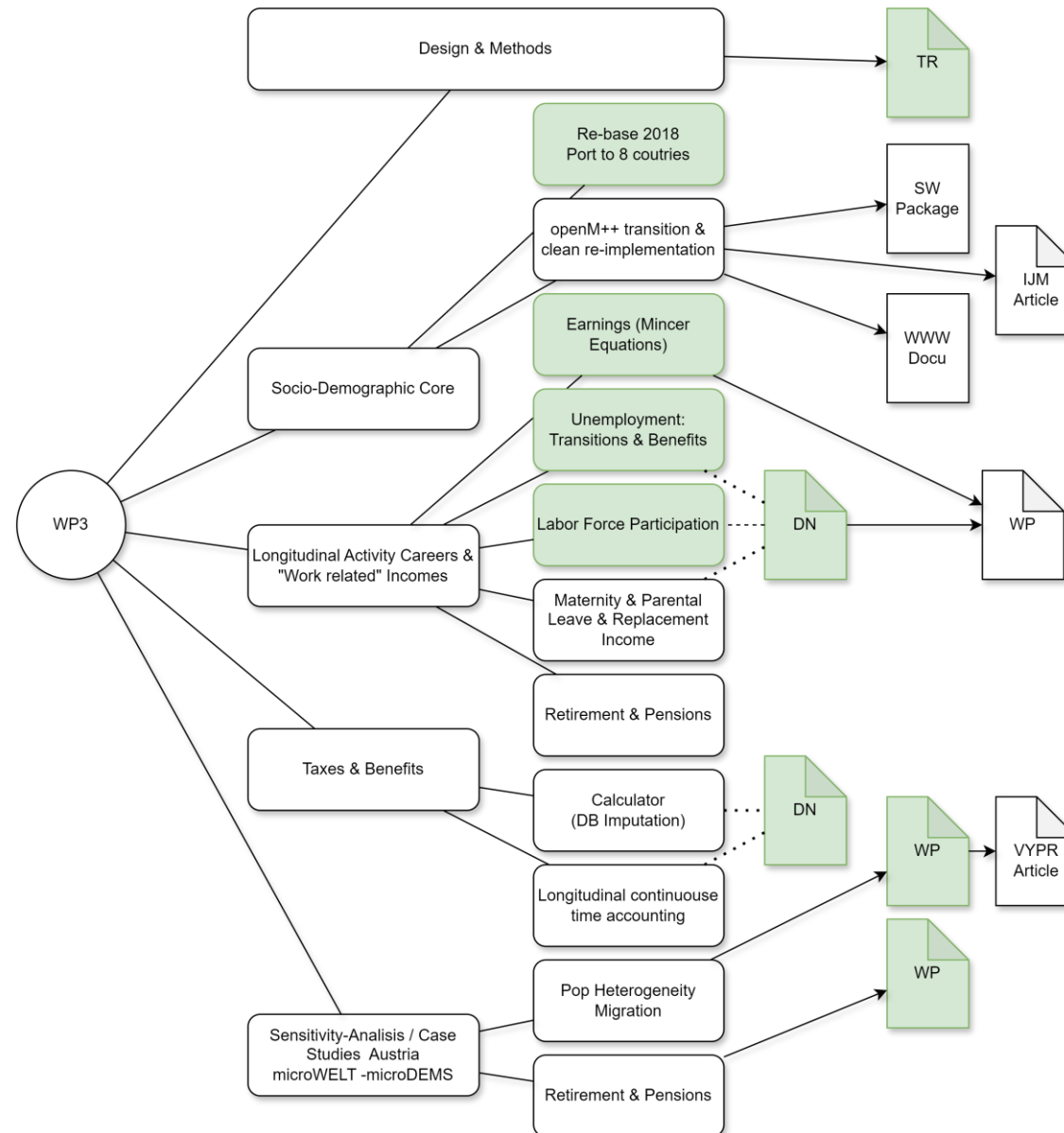
## microWELT

- Internationally portable model based on comparative data (e.g., SILC, LFS)
- Reproduces Eurostat population projections (age-specific fertility, mortality, net migration)
- Adds education, family composition, fertility, health, and mortality by education
- Activity status (cross-sectional imputation of labor force participation, employment) by age, sex, education, children's age, health
- NTA variables (e.g., labor income, transfers, taxes..) by age group, sex, family type, and education (group averages)
- **Point of departure**

## microDEMS

- Detailed Austrian model based on administrative data
- Reproduces Statistics Austria population projections including region of birth, duration of residence
- Adds detailed education careers, family composition, fertility, health, and mortality by education
- Detailed longitudinal activity careers (transition models) incl. state duration, education, children's age, health
- Institutional detail, such as eligibility conditions of various pension types; insurance durations
- **Used for model comparison - sensitivity analysis, case studies – with focus (1) migration and (2) pensions & retirement**

# Activities

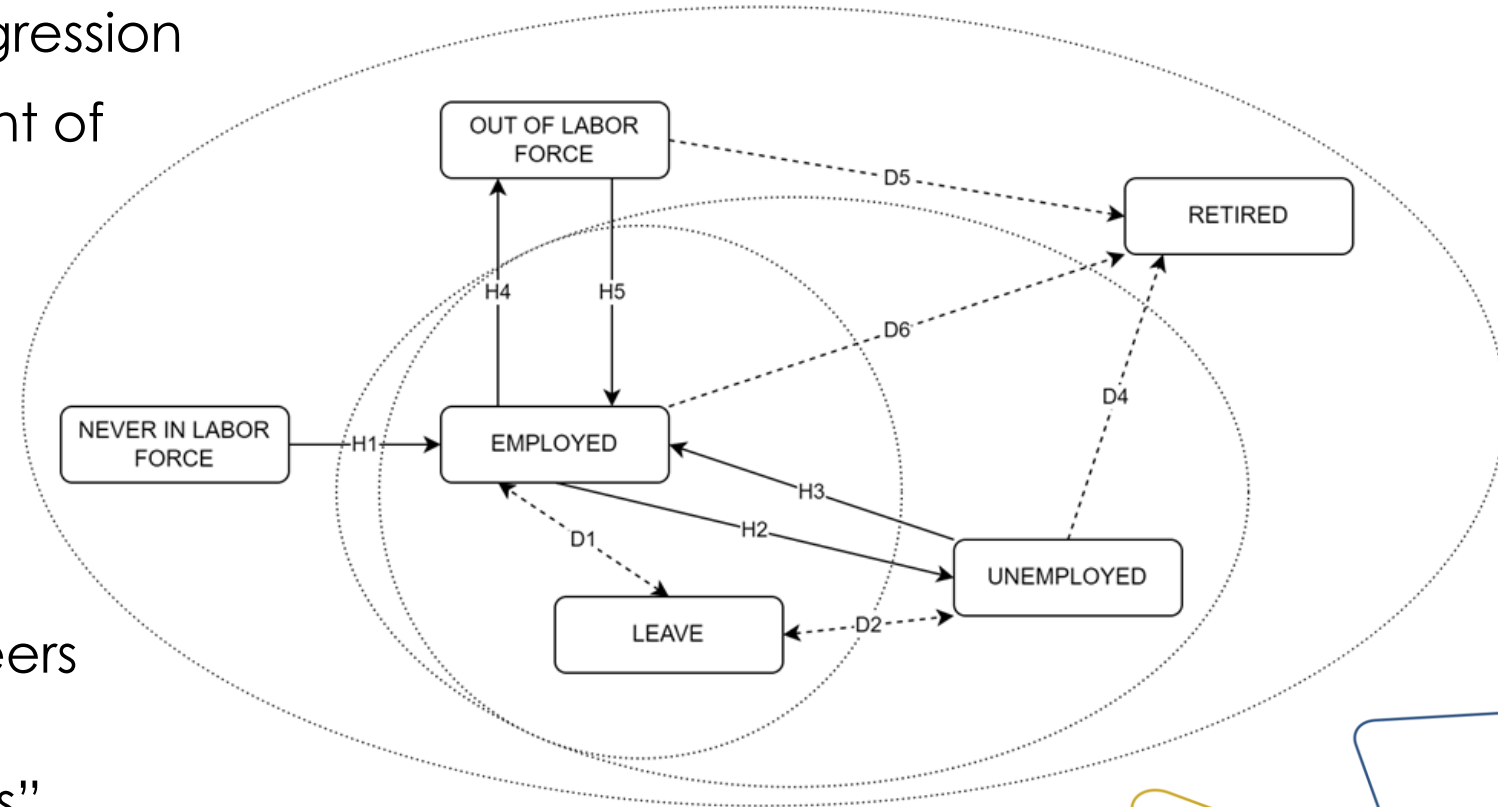


- Consolidation of the (socio-demographic) model core
  - Re-basing of existing models: 2018 starting populations; parameter updates
  - Extension to 8 countries
- openM++ transition: Update to new open-source programming technology
  - Code adaptations for x-compatibility with the programming language openM++ (currently Modgen; openM++ is open-source successor of Modgen)
  - Revisions, adaptations, and improvements to existing modules

## Next steps

- Release microWELT-2.0 “Core”– also sample model part of openM++ package download
- Journal article (IJM)
- Update of web documentation, incl. downloads (model, analysis scripts, user guide etc.)

- Activity transitions: combination of
  - Transition models: hazard regression
  - Imputation models: alignment of transitions
  - Decision models
  - Alignment targets: Unemployment rates; LF Scenarios



- Longitudinal model of work careers in continuous time
- Discussion Note “Activity Careers”

■ Next steps: Paper discussing approach incl. validation study: unemployment

- Key income components are explicitly simulated in microWELT:
  - Earnings (Mincer-) Equations based on EU-SILC
  - Unemployment benefits: replacement rates by duration, age group, family characteristics -- parameters derived from OECD database
  - Maternity & Parental leave replacement incomes: replacement rates & rules extracted from Euromod Country reports and HHoT (Euromod Hypothetical Household Tool)
  - Public pensions
  - (Asset income)
- These income components are inputs into the tax-benefit calculator





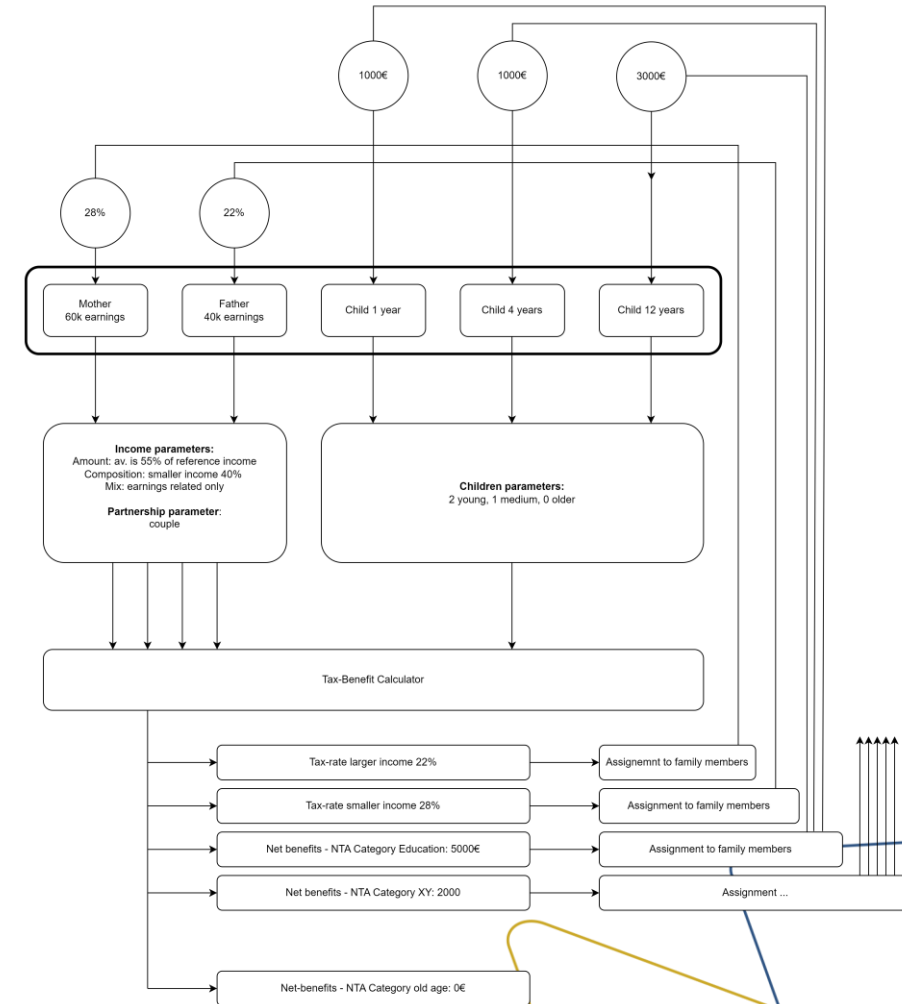
## Approach: Database-imputation

- Income tax rates and (most) benefits by NTA category are derived from a synthetic database created with the Euromod hypothetical household tool
- DB created alongside key categorical dimensions: each simulated family can address a corresponding record

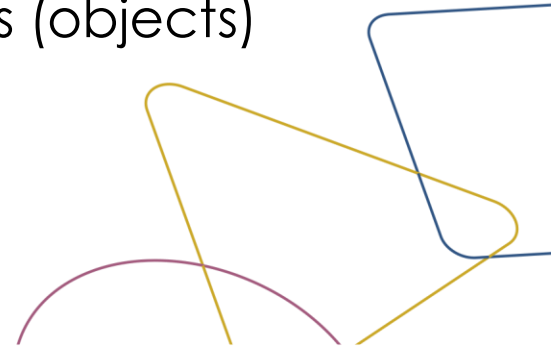
## Input

- Income level
- Income composition
- Family composition

- Discussion Note “Tax-Benefit”



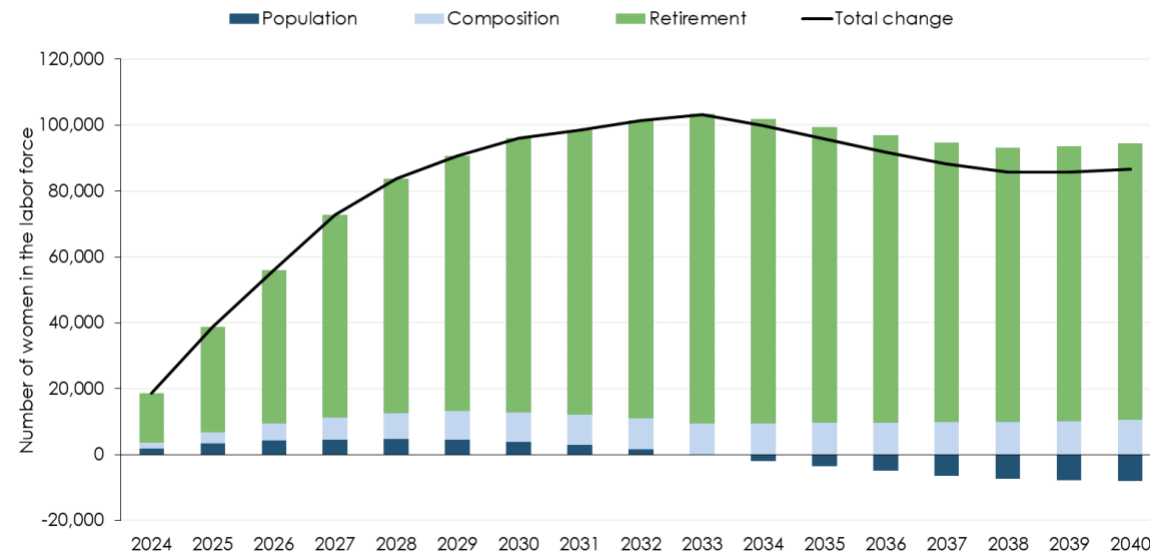
- MicroWELT operates in continuous time, events such as partnership formation or unemployment can happen at any point in time and can alter the flows of modeled incomes, taxes, benefits, and time transfers
- Flows are accumulated over the year
  - Flow variables modeled directly, e.g. earnings
  - Flow variables looked up from database: e.g. benefits
- At the end of the year (and at death) accumulated flows are stored in individual calendar year records
- If needed, at the end of the year, yearly totals can be adjusted
- Implementation tests: memory requirements; generic “Account” actors (objects)



- Context: Comparative modeling requires high(er) level of abstraction compared to national applications based on admin data and detailed modeling of institutional settings
- Model comparison: Labor-force effect of harmonization of retirement age in Austria

Figure 8: **Change in the number of women aged 60-64 in the labour force, 2023 to 2040**

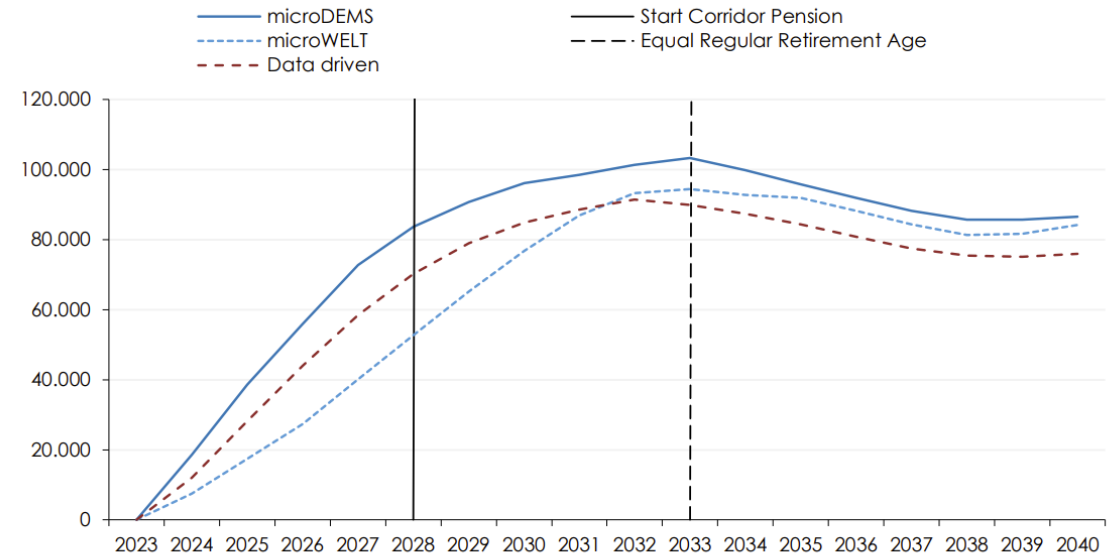
Total change and decomposition into population, composition, and retirement effects



S: microDEMS.

Figure 13: **Number of women (60-64) in the labour force by projection method**

Absolute difference to 2023



S: microDEMS.

- Context: Comparative modeling restricted to net migration.
- Austria: Place of birth, immigration by country(cluster) of origin, and duration dependency of emigration risks (by place of birth) added to official Austrian population projections
- Updated microDEMS for consistency – WP on population heterogeneity. Focus on education (incl. 3<sup>rd</sup> generation immigrants), size and composition of labor force

Figure 6: Population by age and migration background  
In | 1.000

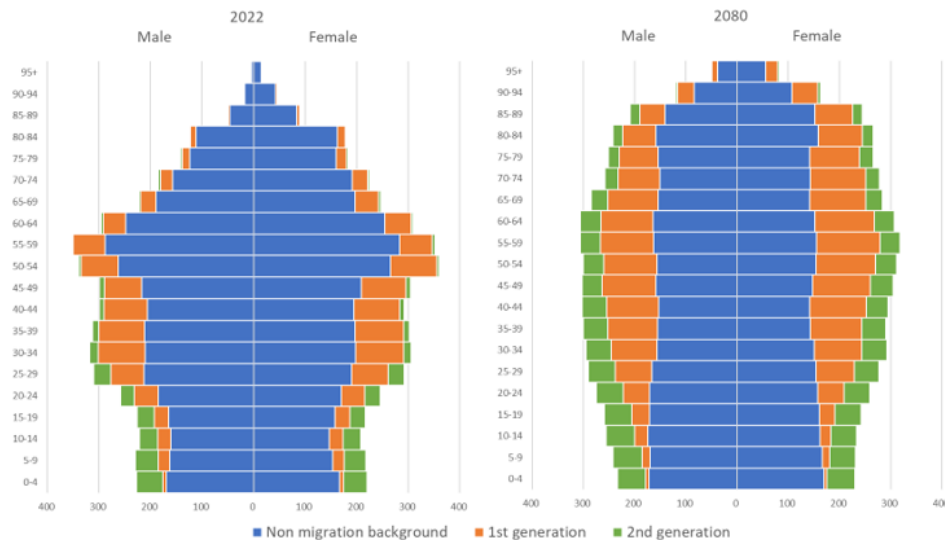
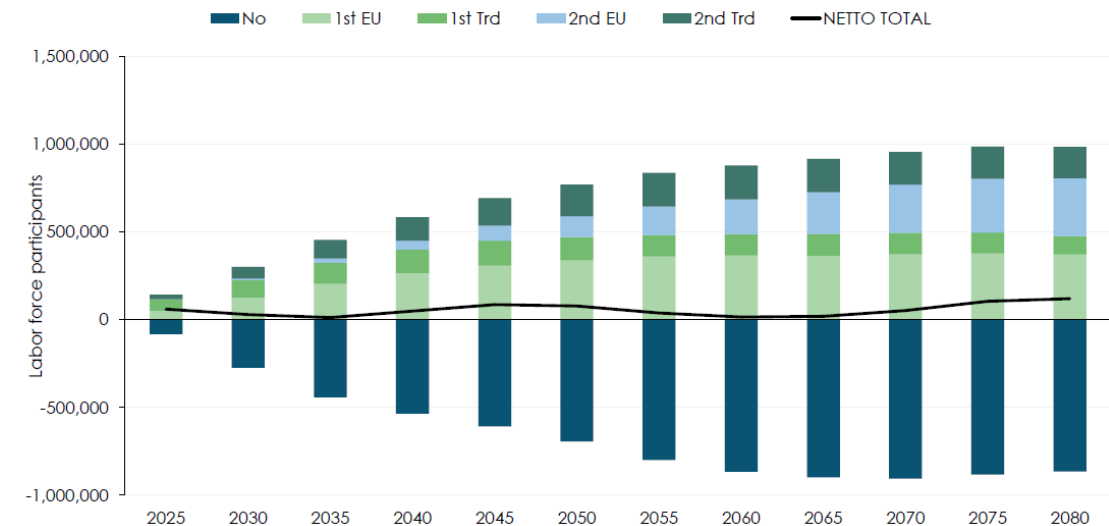


Figure 9: Labour force by migration background  
Absolute difference to 2022



S: Own calculations based on Statistics Austria Micro census labour force survey (2022) and projections by microDEMS.

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- Progress in developing microWELT into a longitudinally consistent microsimulation including earnings, taxes, social insurance, and benefits according to NTA framework and categories.
- We reached an interim step of model development that – once wrapped up and validated – is already useful for various types of applications / improving existing applications
- Challenges
  - Adding missing components: assets and asset income, consumption and saving
  - Consistency: Euromod-based Tax-Benefit calculations with NTA accounting
  - Modeling private transfers incl. time transfers (NTTA)

- Materials at:

<https://www.microwelt.eu>

<https://www.microwelt.eu/development/development-sustain/development-sustain-index.html>