WIFO
TEL. (+43 1) 798 26 01-0
FAX (+43 1) 798 93 86
ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG
AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

WELTRASIM Project
JPI MORE YEARS BETTER LIVES

UB – Coordinator (Spain)
WIFO (Austria)
VATT+ FCP (Finland)

microWELT

Welfare Transfer Simulation

Microsimulation of Disaggregated National Transfer Accounts for the Comparative Study of Welfare State Regimes

Martin Spielauer, Meritxell Solé, Thomas Horvath, Marian Fink, Concepció Patxot, Guadalupe Souto

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Organization

- Context & Goals
- The microWELT Model
  - Model type
  - Philosophy
  - Development Strategy
  - Modules
- National Transfer Accounts (NTAs)
- First Results
- Next Steps

Context

- Part of "Weltransim" (Welfare Transfer) project – Joint Programming Initiative "More Years, Better Lives" – Horizon 2020
  - Who pays for longer lives?
  - Comparative analysis of welfare transfers in 4 welfare state regimes in the context of
    - Population ageing
    - Longer lives and life expectancy differentials by education
- Project duration: 2017-2020
- University Barcelona (UB) – Coordinator
  Austrian Institute of Economic Research (WIFO)
  Finish Institute for Economic Research (VATT),
  Finnish Centre for Pensions (FCP)

Context & Goals

- Comparative Welfare State Research
  - **Liberal:** poverty prevention when family and market solutions fail; means-tested minimum income schemes. - **UK**
  - **Conservative:** focus on status preservation mainly through social insurance schemes (family coverage) - **AT**
  - **Universalistic:** focus on social and economic rights; state plays a large re-distributive role incl. for middle-class - **FI**
  - **Mediterranean:** fragmented, some highly protected insider; low level of social transfers; reliance on family networks. - **ES**
- Goal: a model capturing key characteristics of welfare state regimes:
  - **Transfers**: Family – Market – State
  - Key socio-demographic **behaviors**: educational transmission, partnerships and concentration of reproduction by education

Context & Goals

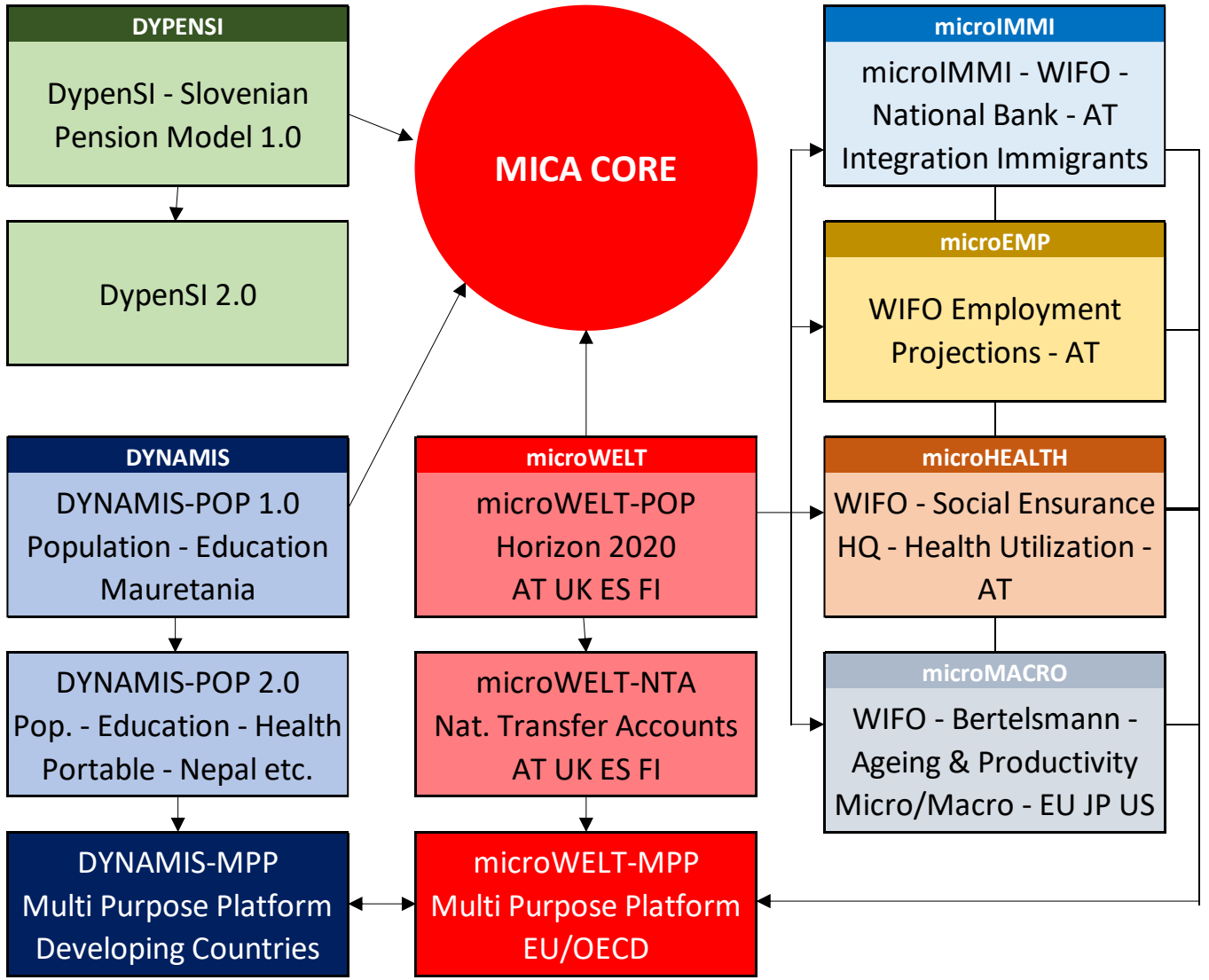
- **National Transfer Accounts (NTAs)**
  - National accounting broken down by age
  - Income, consumption, transfers by type
  - Data (by age and sex) available for 50+ countries
- **Project Goals:**
  - Identify Patterns from a Welfare State Perspective
  - Integrating NTAs into a longitudinal framework
  - Disaggregation of NTAs by education and family type accounting for key socio-demographic changes
  - Complementing / challenging existing literature using NTAs for projections of the effects of ageing

Literature

- Rich literature projecting effect of ageing based on aggregated NTAs and pop. projections; growth models: indicators and generational accounts.
  - Lee, Ronald & Andrew Mason (2017) Some Economic Impacts of Changing Population Age Distributions - Capital, Labor and Transfers - Agenta Keynote, WP
  - Lee, Ronald & Andrew Mason (2014) Is low fertility really a problem? Population aging, dependency, and consumption - Science
  - Lee, Ronald, David McCarthy, James Sefton, Jože´Sambt. (2017) Full Generational Accounts: What Do We Give to the Next Generation? - Population & Development Review
  - Mejía-Guevara I, Rentería E., Patxot C, Souto G. (2016). "The effect of education on the demographic dividend", Population and Development Review, 42, 4, 651-671.
  - Sánchez-Romero, M., G. Abio, C. Patxot and G. Souto (2017). "The Welfare State and the Demographic Dividends", Demographic Research, 36 – 48, 1453-1490.
- Goal: Reproducing published projections .. stepwise disaggregated NTAs and detailed population projections by sex, education, family. Accounting by groups, e.g. education, childless.

microWELT - Architecture

- MicroWELT is a MICA model
  - Modgen / openM++
  - Interacting Population
  - Continuous Time
  - Alignable
- Cross-fertilization & synergies within MICA family
  - Common core
  - Shared modules
- Intended to become a multi-purpose modeling platform



microWELT – Design & Development Steps

- **Design:**
  - **Highly modular and refineable modeling platform**
  - **Fully (self-) documented step-wise implementation**
  - **Highly automated parameter generation**
  - **Mainly based on (Euromod) SILC data. National refinements**
- **MicroWELT-POP: Detailed socio-demographic projections including family histories, school enrolment, intergenerational transmission of education.**
  - **Can reproduce available macro projections**
- **MicroWELT-NTA: disaggregated longitudinal NTA accounts, growth models, NTA indicators. Analysis tool for re-producing and refining existing models from a comparative welfare state perspective**
- **MicroWELT-MPP: Multi-purpose platform, library of modules, etc.**

microWELT-POP – Modules

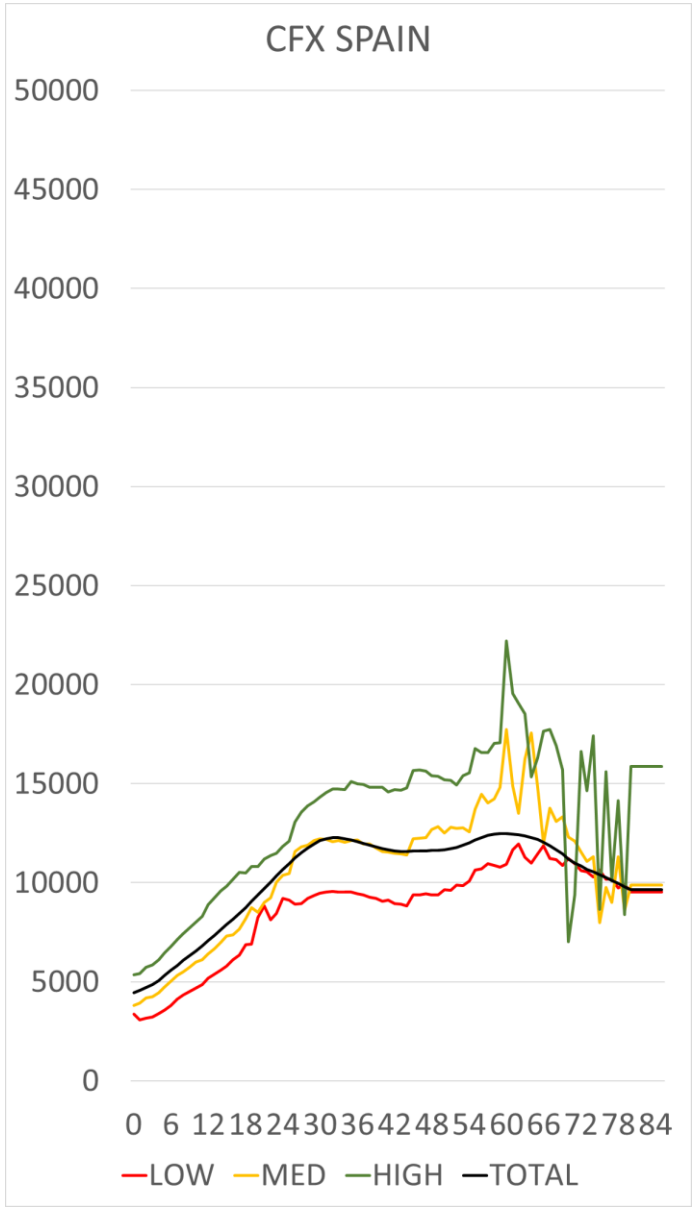
- **Demography**
  - Fertility by education, focus on concentration of reproduction
  - Mortality by education: life expectancy differences
  - Partnerships: realistic careers reproducing observed patterns by education, age of youngest child, and education. Matching
  - International migration: by age and sex / family emigration. Family immigration: number by sex, age patterns
- **Education**
  - Macro scenarios of progressions low -> medium -> high
  - Intergenerational transmission (alignment options to macro scenarios)
  - School career patterns
  - Optional alignment targets of enrolment rates

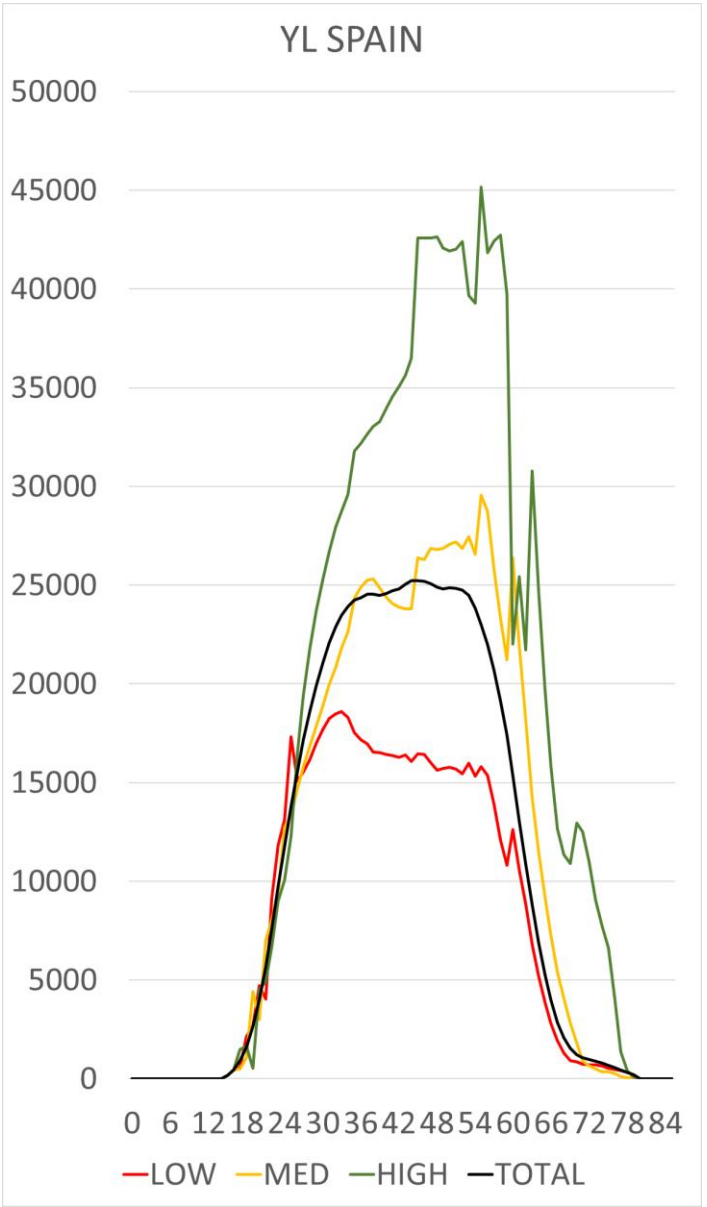
microWELT-POP – Characteristics

- **Family Linkages**
  - Biological Parent(s) - linked at birth
  - Household Guardian(s) – links maintained until leaving home
  - Partner – link maintained over life
- **Education:** primary, secondary, post-secondary
- **NTA family/education groups**
  - Children 0-16 by parents education
  - Students 17-25 by parents education
  - Non-Students 17-25 by sex, education, partner, presence/age children
  - Adults 26-59 by sex, education, partnership, presence/age children
  - Adults 60+ by sex, education, childlessness

microWELT-NTA – Variables

- Private Consumption Education (CFE)
- Private Consumption Health (CFH)
- Private Consumption excl. Educ & Health (CFX)
- Public Consumption Education (CGE)
- Public Consumption Health (CGH)
- Public Consumption excl. Educ & Health (CGX)
- Public Transfers Pensions, Inflows (TGSOAI)
- Public Transfers Other Cash Inflows (TGXCI)
- Public Transfers Other In-Kind Inflows (TGXII)
- Public Transfers Education Inflows (TGEI)
- Public Transfers Health Inflows (TGHI)
- Public Transfers Outflows (TGO)
- Net Interhousehold Transfers (TFB)
- Net Intrahousehold Transfers (TFW)
- Private Saving (SF)
- Public Saving (SG)
- Labor Income (LY)
- Private Asset Income (YAF)
- Public Asset Income (YAG)



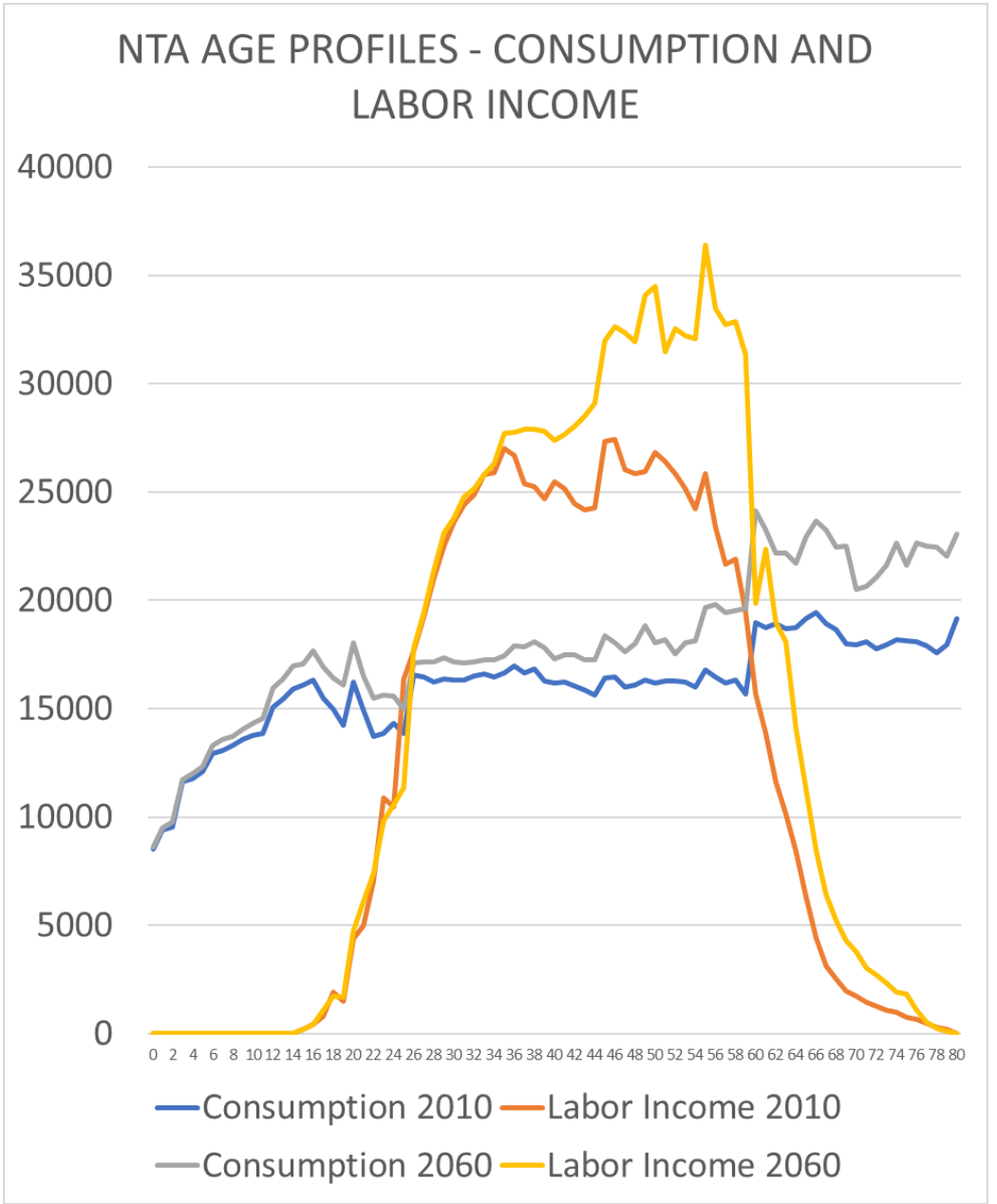


microWELT-NTA – Indicators

- Literature has proposed a series of indicators which, based on current NTA data and population projections aim at measuring the effect of population ageing on the economy
- MicroWELT allows
  - reproducing existing research for comparative welfare state analysis
  - studying the effect of disaggregating NTA by education and family
- Example: Lee & Mason 2017
  - Simple Cobb Douglas economy without innovation
  - Fixed capital stock and saving rates by age as today
  - Two versions: open economy, closed economy
  - Support Ratio: Labor/ Effective Consumers
  - Impact Index: Consumption / Effective Consumers

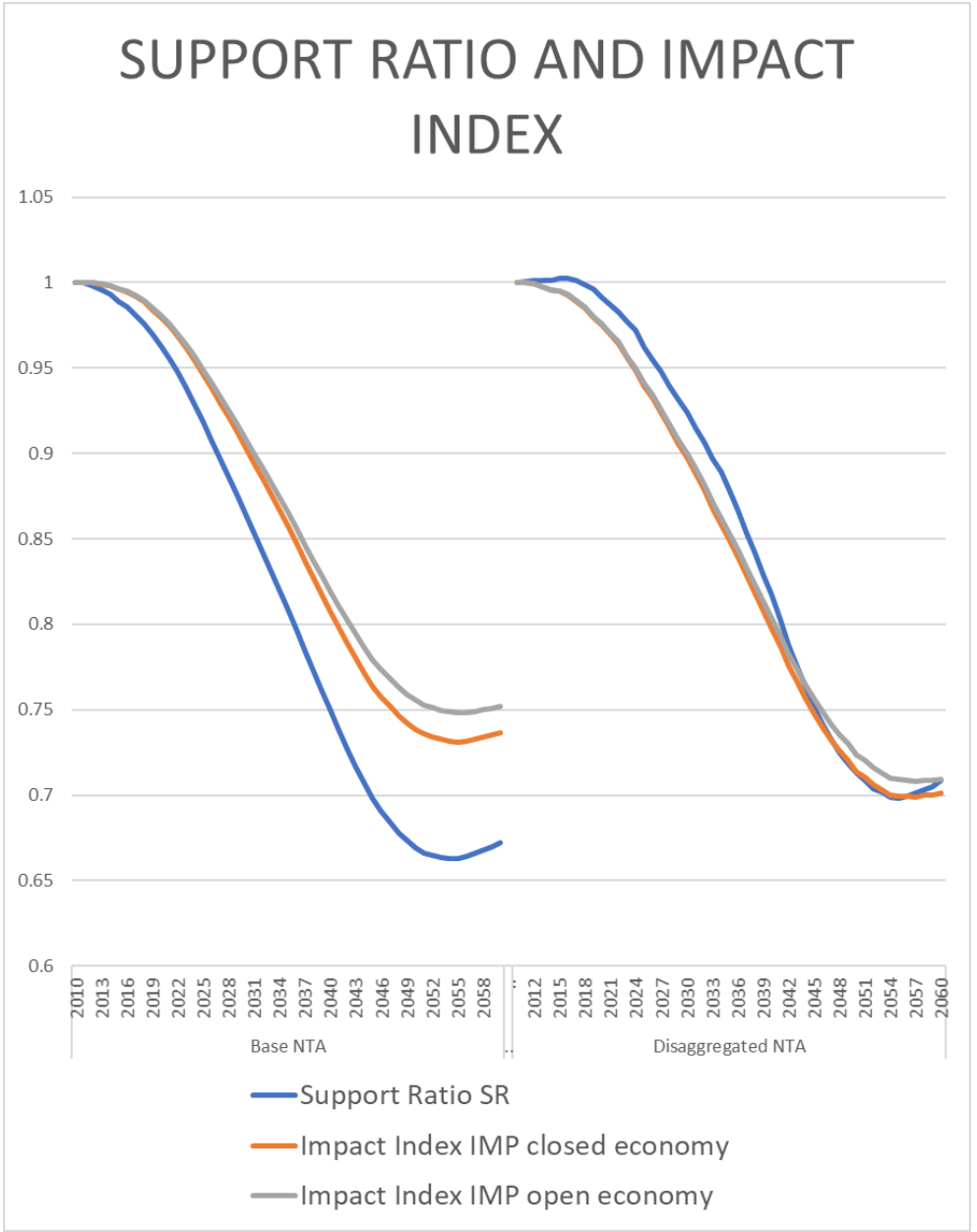
microWELT-NTA – Age Shapes

- Disaggregated NTAs lead to changing aggregated age profiles due to composition effects
- NTAs are a cross-sectional concept – do not add up in future; require:
  - assumptions of how societies adapt
  - economic models for price effects
- **Example** Lee Mason model Spain 2060:
  - Aggregated NTAs: wages +10%
  - Dis-aggrgated NTAs: wages +6%



microWELT-NTA – Indicators

- **Base Scenario (aggregated NTA)**
  - **Support Ratio (Labor input / Effective Consumers) drops by 1/3**
  - **Impact Index (Consumption / Effective Consumers) drops by ¼**
  - **Difference due to changing wages**
- **Disaggregated NTA Scenario**
  - **Support ratio drops less: more labor**
  - **Impact index drops more: less wage increase**



Next Steps – Model and Data

- microWELT
  - microWELT-NTA almost complete, incl. step-by-step and fully (self) documented implementation
  - Finalization of longitudinal accounting framework
  - Development into platform: e.g. employment, earnings, etc.
- NTA variables
  - Preliminary variables for Spain. Others to follow
  - Require modeling for smoothing and better identifying / quantifying differences between countries
- Parameters
  - Almost complete for Spain and Austria, other countries to follow
- Automated reproducible workflow and documentation of all data steps

Next Steps – Analysis

- Comparative analysis from welfare state regimes perspective
  - Model parameters: family patterns, concentration of reproduction, intergenerational transmission of education..
  - Current re-distributions between population groups: Euromod integration
  - NTA variables
- Simulation analysis
  - Based on existing literature: more indicators; longitudinal modeling
  - Study of transfer flows between population groups from a longitudinal perspective: by education, childless..
  - Specific research questions: effect of life expectancy differentials
- Technical tools for post-processing of simulation results in comparative framework