



**WORLD STATISTICS
CONGRESS**

2025

THE HAGUE

IPS 1120

**International efforts to measure household
distributional information in line with
macroeconomic aggregates**

Mr Laurent Van Belle, Mr Rutger Kemels, Mr Romain Grailet
National Bank of Belgium

Wednesday 08 October, 2:00PM - 3:40PM



Distributional National Accounts in Belgium

**An Approach Combining Administrative
and Survey Data**

Laurent Van Belle, Rutger Kemels, Romain Grailet
The Hague, 08 October 2025



- 01 A need for more granular statistics
- 02 Challenges
- 03 Data model
- 04 Data process
- 05 A foretaste of the results

A need for more granular statistics

International context

- **2008 : The subprime crisis as a wake-up call that we had missed something**
 - ***Various initiatives***
 - G20 – Data Gap Initiative
 - Stiglitz-Sen-Fitoussi Commission
 - ...
 - ***Learnings***
 - The Household sector needs to be better understood and monitored
 - Measuring household vulnerability is quite complex and needs to apprehend several dimensions:
 - **Income**
 - **Consumption**
 - **Wealth**
 - **Demographics**

A need for more granular statistics

Towards new international statistical standards

Start
2009

DATA GAPS INITIATIVE (G20)
(DGI 1 TO DGI-3 - IMF)

2011
2017
2020

EXPERT GROUP (EG) ON DISPARITIES IN A NATIONAL ACCOUNTS FRAMEWORK (OECD - EUROSTAT)

EG ON THE JOINT DISTRIBUTION OF INCOME CONSUMPTION AND WEALTH AT MICRO LEVEL (OECD & EUROSTAT)

EG ON DISTRIBUTIONAL WEALTH ACCOUNTS (ECB)

2022

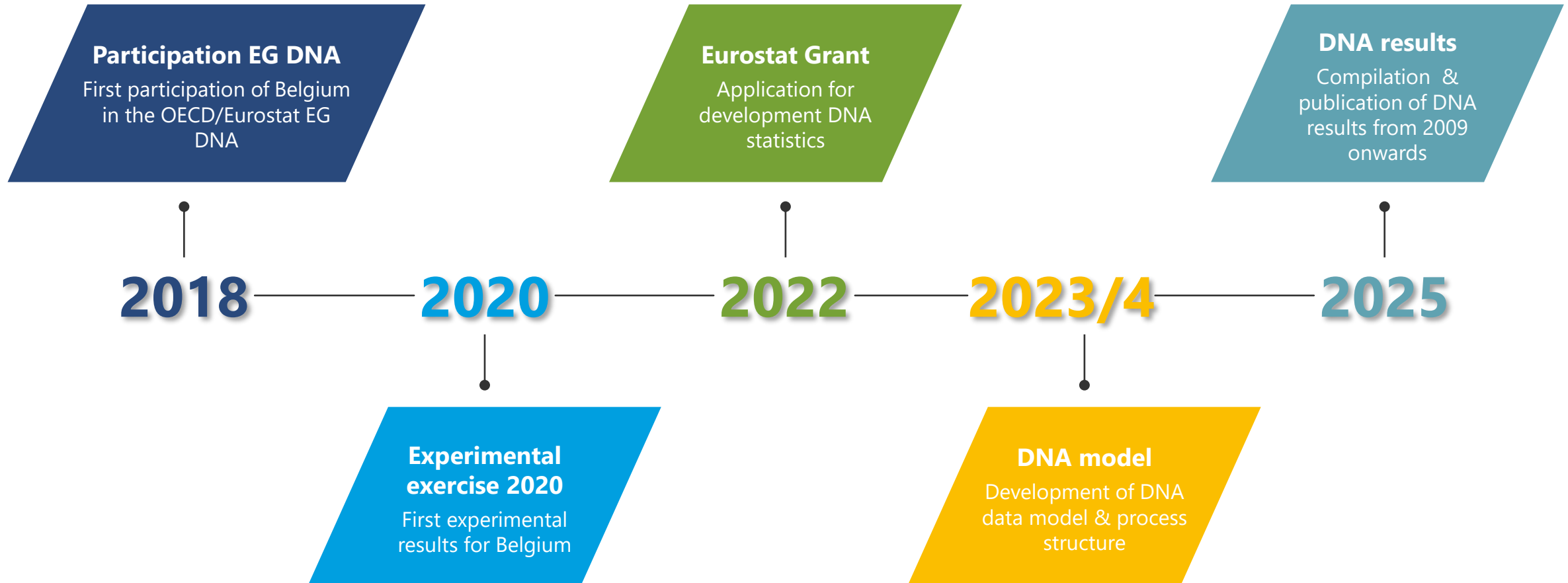
HOUSEHOLD DISTRIBUTIONAL ACCOUNTS (EUROSTAT)

DISTRIBUTIONAL FINANCIAL ACCOUNTS (ECB)

2025
2029

SYSTEM OF NATIONAL ACCOUNTS 2025
& EUROPEAN SYSTEM OF ACCOUNTS 2029

Distributional National Accounts project in BE



Challenges

Challenges

1) **How to distribute** macro statistics at household level ?

- Macro statistics are based on various sources of information and macro-economic models.
- **How to "individualize"** the contribution of each households to these macro-totals ?



2) What are the **most relevant micro-data sources** that cover the four dimensions of interest (Income, Consumption, Wealth and Demographics) ?

- Administrative and survey data have pro's and con's
- **How to join** these various micro-data sources without losing the relationships between the 4 dimensions of interest?

3) How to build a **robust production process** ?

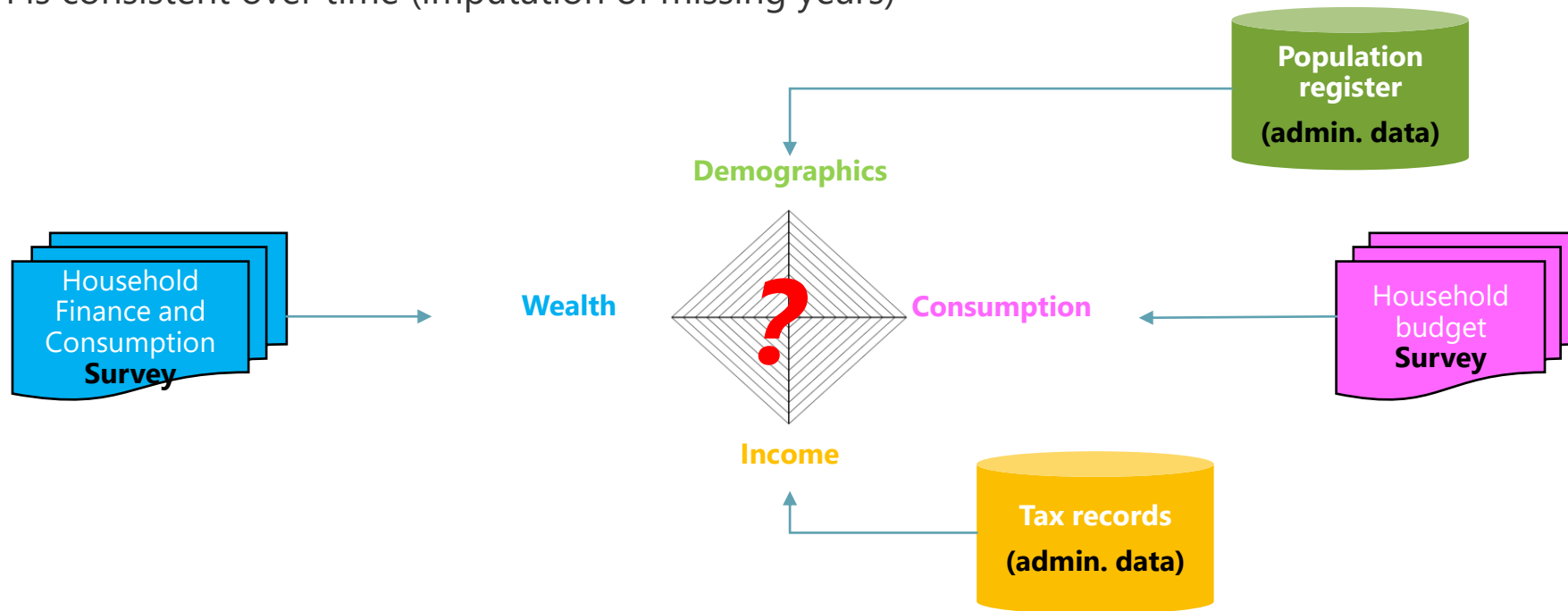
- that capture economic events
- that is stable and easy enough to maintain

The data model

The Data Model

Challenges

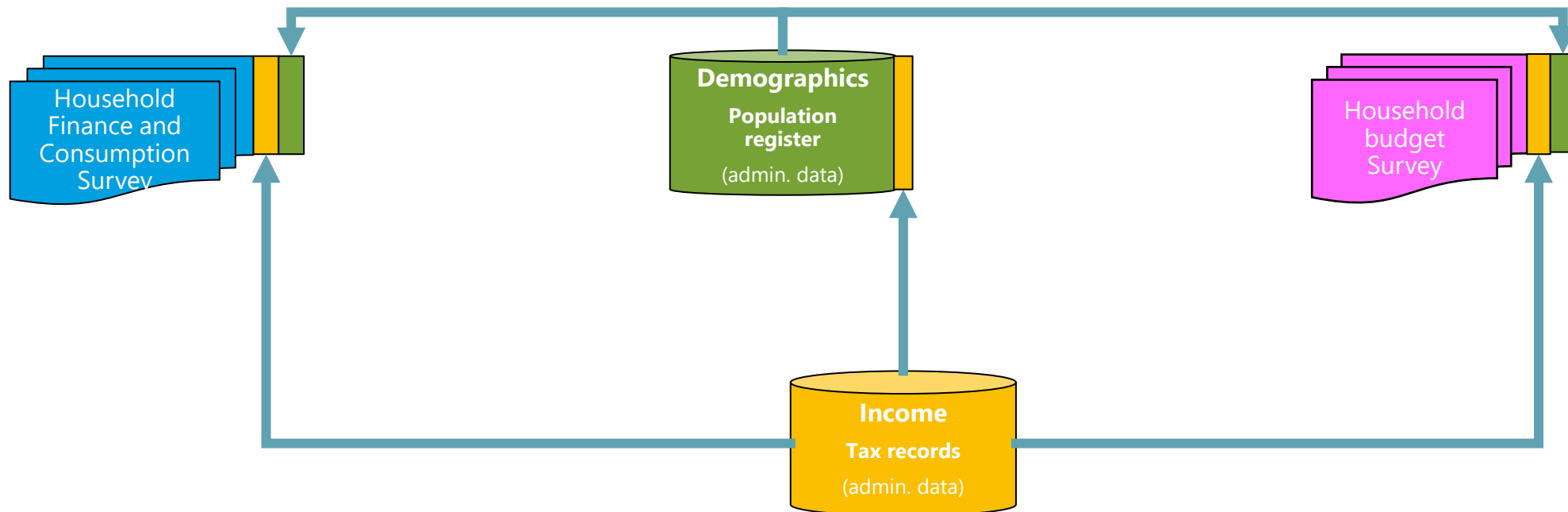
- building a data model
 - where **relations** between income, consumption expenditures, wealth and demographics **are preserved**
 - which is consistent over time (imputation of missing years)



The Data Model

Joining the dimensions

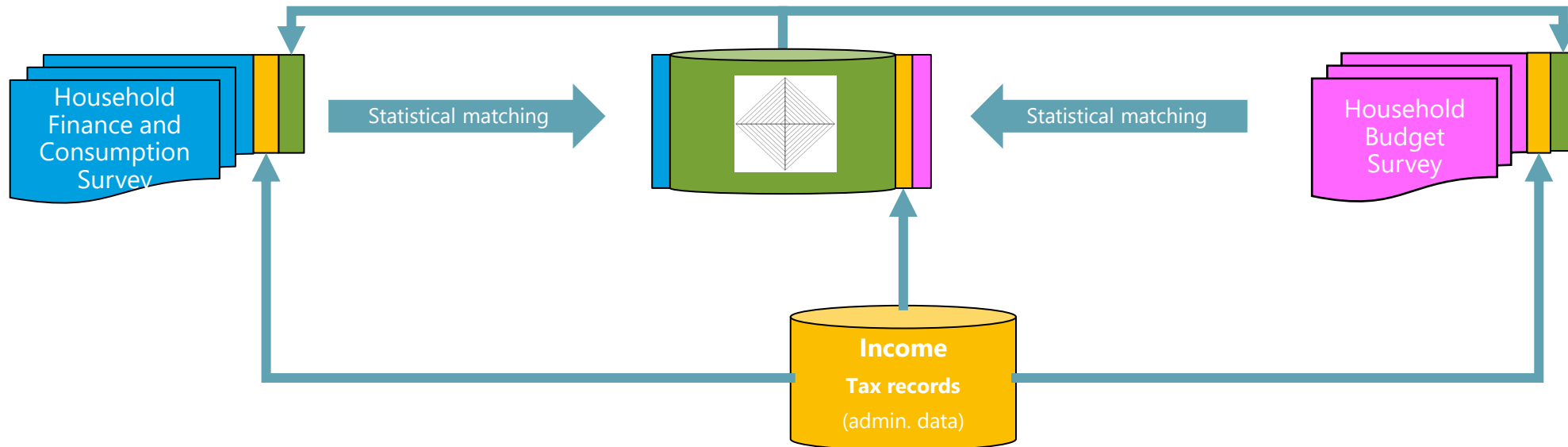
A) Direct linking between sources is used to add a set of “common variables” in each data sources



The Data Model

Joining the dimensions

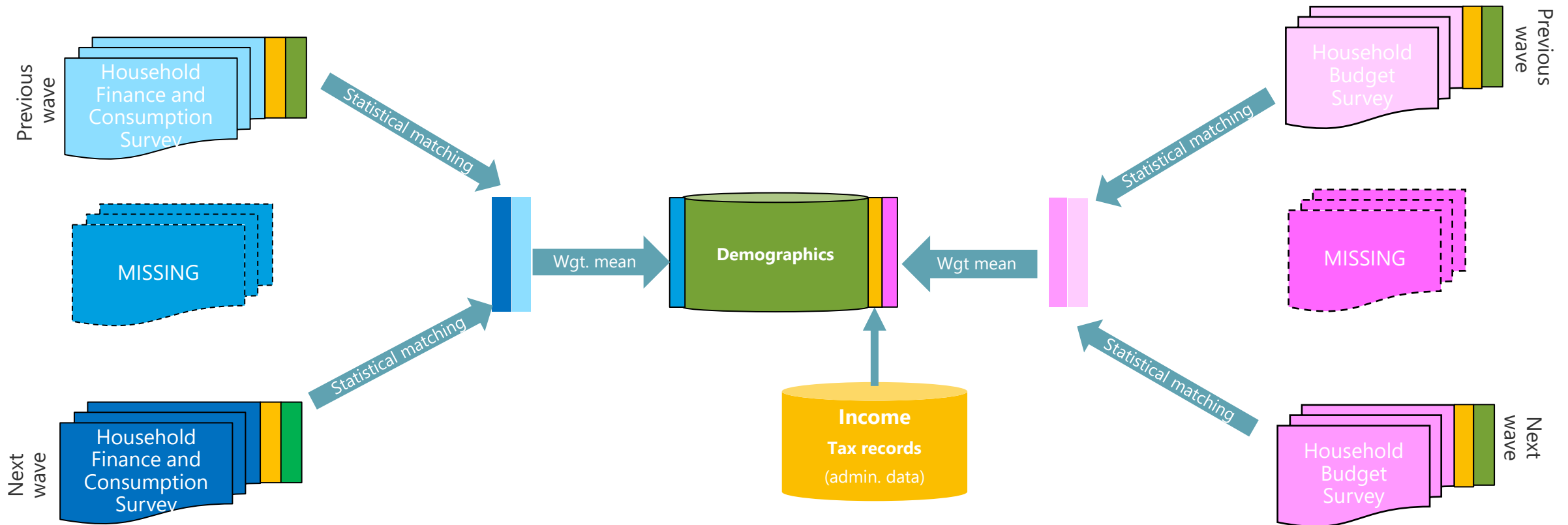
B) Statistical matching is used to add missing dimensions at **population** level.
Set of common variables = explanatory variables



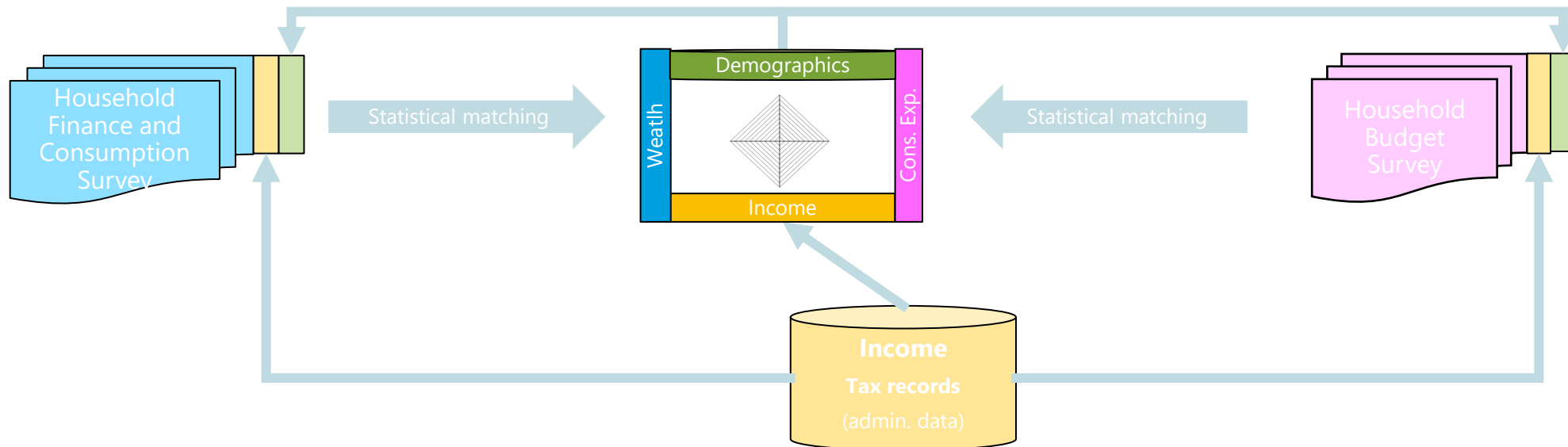
The Data Model

Joining the dimensions

C) Missing years are imputed at micro-data and population level



D) Complete set of variables of interest at population level



The data process

The Data process

Bridging the gap



Data collection



Clean Survey micro-data



Prepare Survey sample



Impute Consumption & Wealth at pop. level

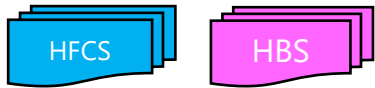


Gap allocation

Administrative data



Survey data



Discarding Households not 'linkable' with population

Discarding Outliers (Mahalanobis)



Variable selection

Enriching sample with administrative data

Post-stratification

Transformation (log) and standardisation



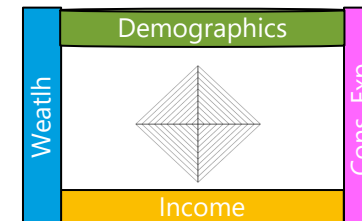
Statistical matching

Canonical correlation + hotdeck

Identifying implausible null consumption expenditure (logistic regression)

Correcting implausible low consumption expenditure (quantile regression + Pareto adjustment)

Proportional allocation of remaining gap



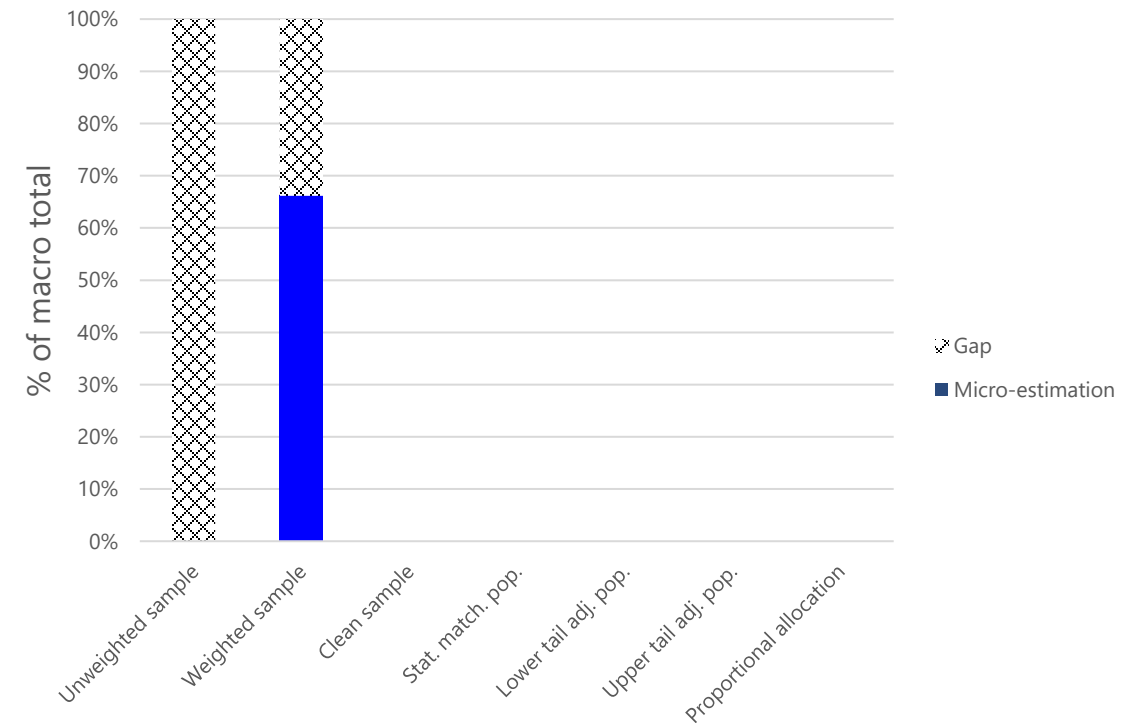
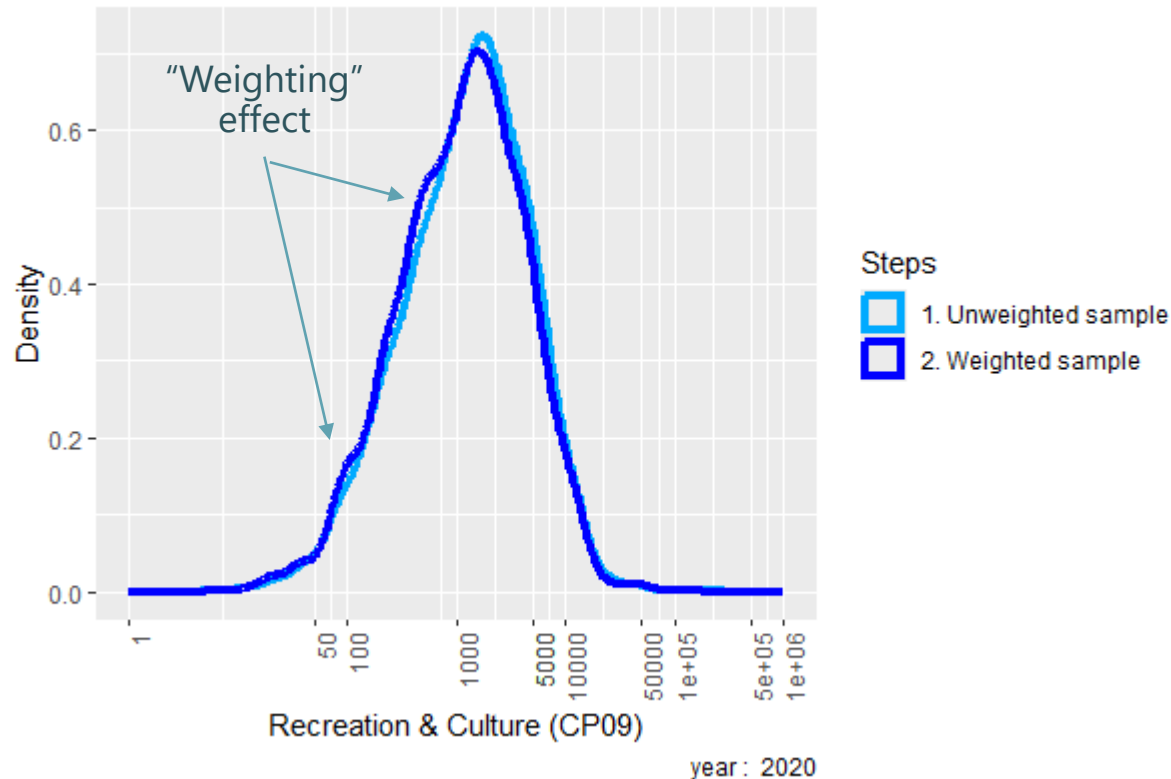
The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”

- **Source** : Household Budget Survey 
- **Year of reference** : 2020
- **Sample size** : 6.105
- **Recreation & culture (COICOP 09)**
 - Audio-visual, photographic & information processing equipment
 - Other major durables for recreation & culture (camper vans, boats, horses, musical instruments ...)
 - Other recreational items and equipment (card games, sport equipment, plants, pets, veterinary, ...)
 - Recreational and cultural services (sports stadiums, ski slopes, hire of sport equipment, cinema, theatre, ...)
 - Newspapers, book,...
 - Package holidays (all inclusive, tours, ...)
- **National Account Total (Macro)** : 16.672 m€

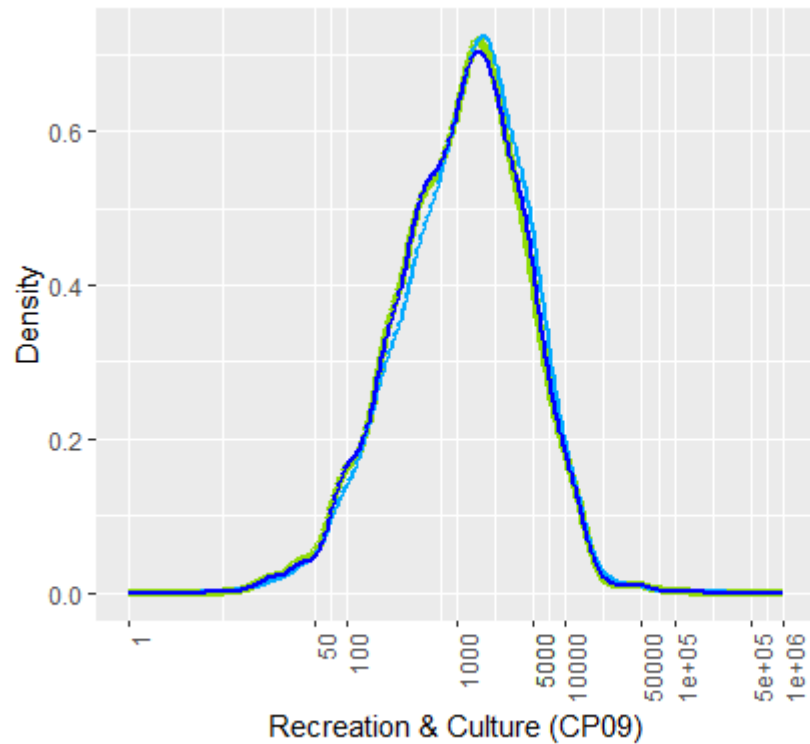
The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”

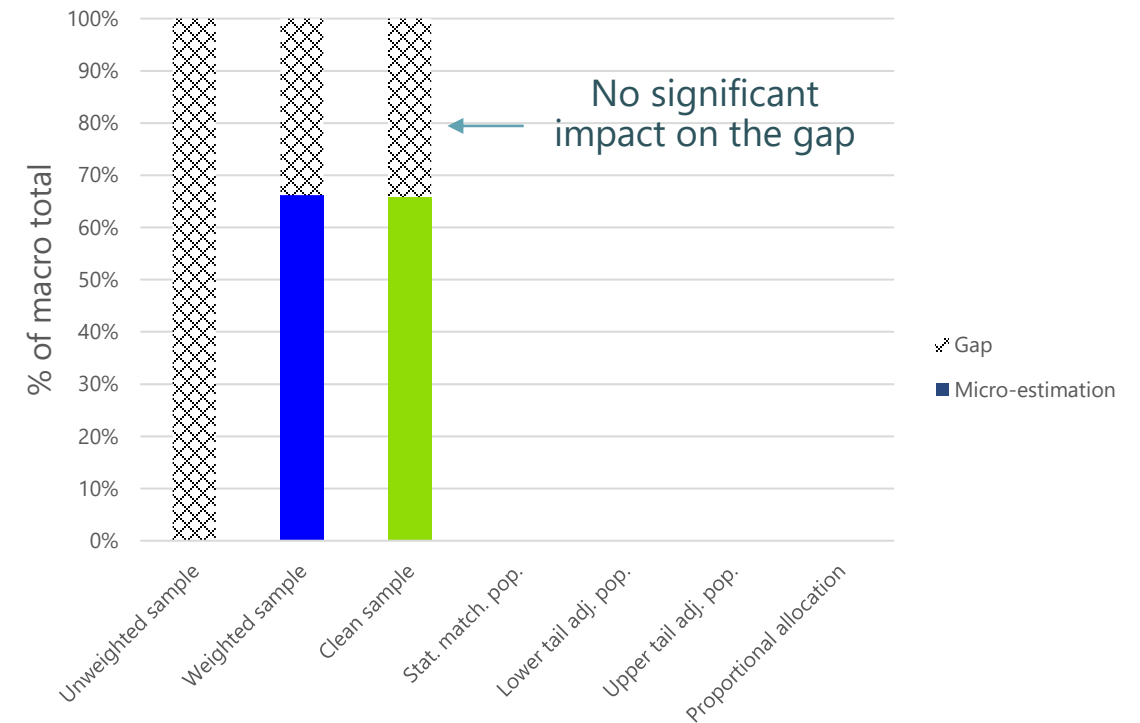


The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”

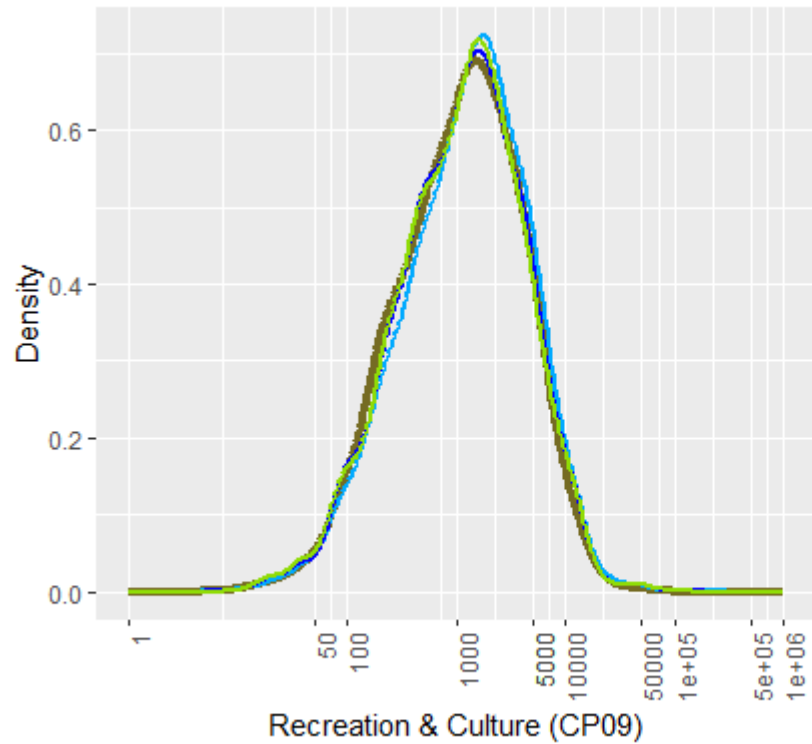


- Steps
- 1. Unweighted sample
 - 2. Weighted sample
 - 3. Clean sample

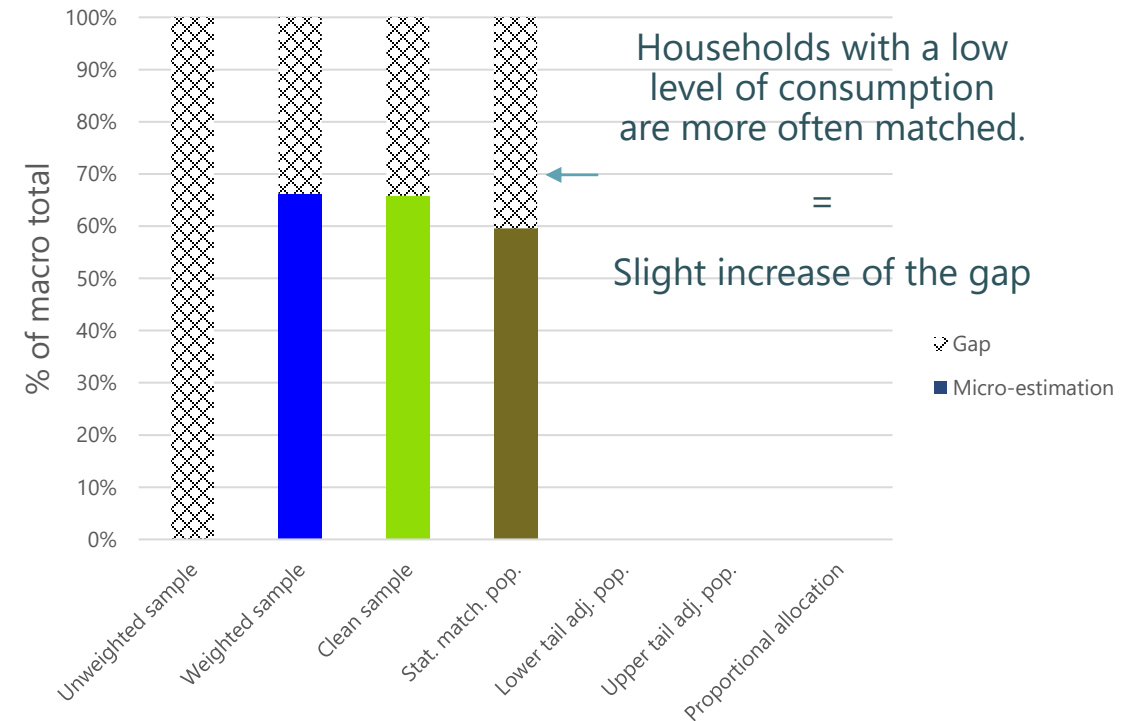


The Data process

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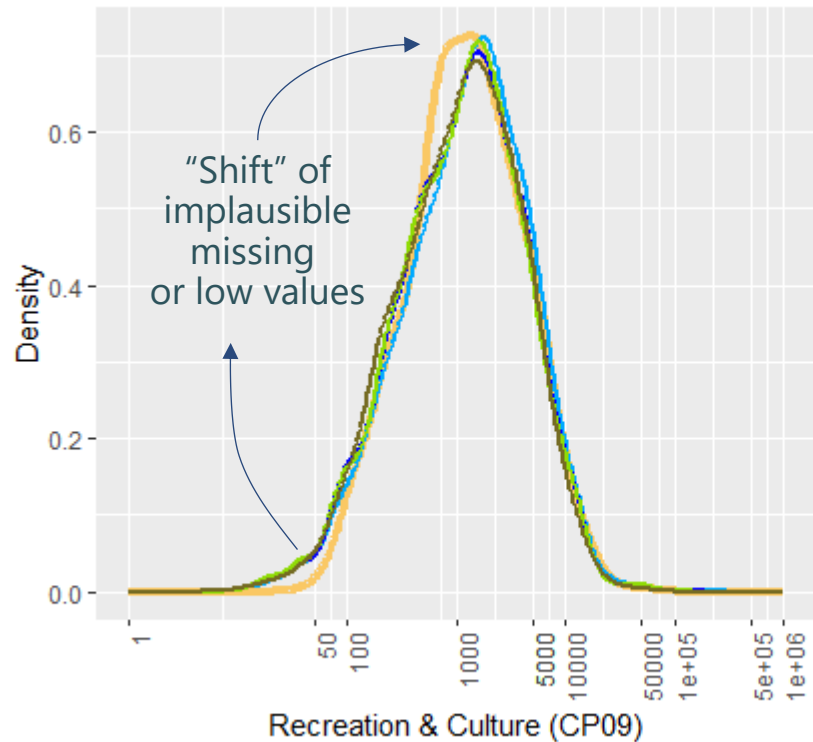


- Steps
- 1. Unweighted sample
 - 2. Weighted sample
 - 3. Clean sample
 - 4. Stat. match. pop.

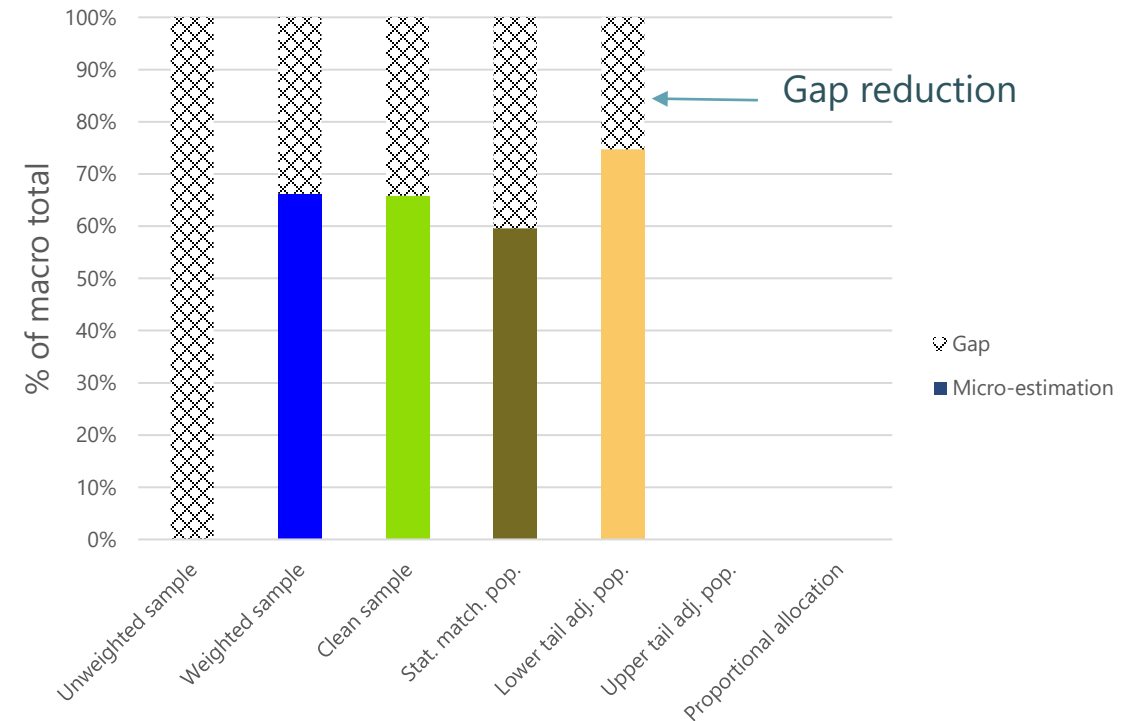


The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”



- Steps
- 1. Unweighted sample
 - 2. Weighted sample
 - 3. Clean sample
 - 4. Stat. match. pop.
 - 5. Lower tail adj. pop.



The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”



Sample



Clean
Survey micro-data



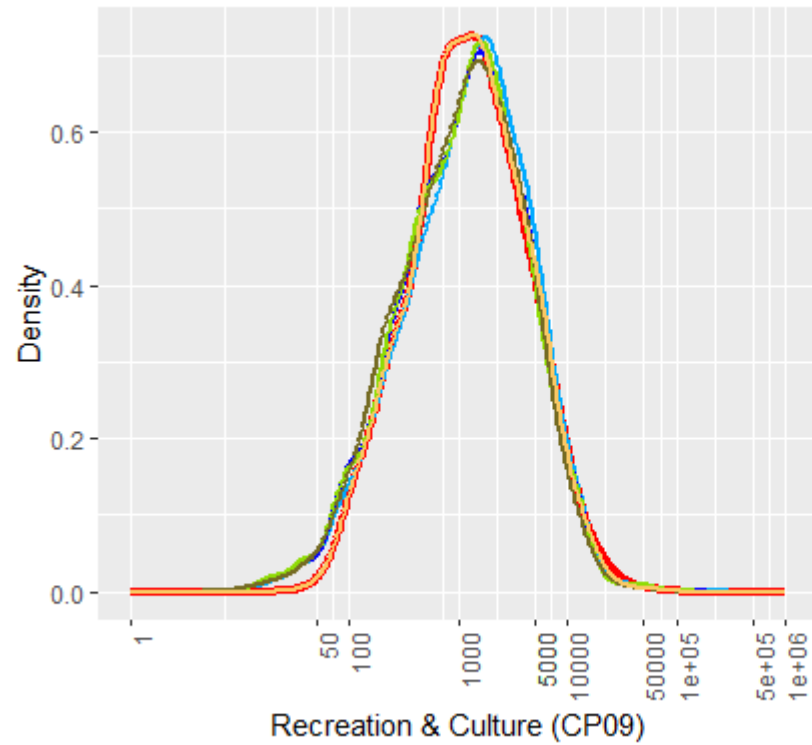
Prepare
Survey sample



Impute Consumption &
Wealth at pop. level

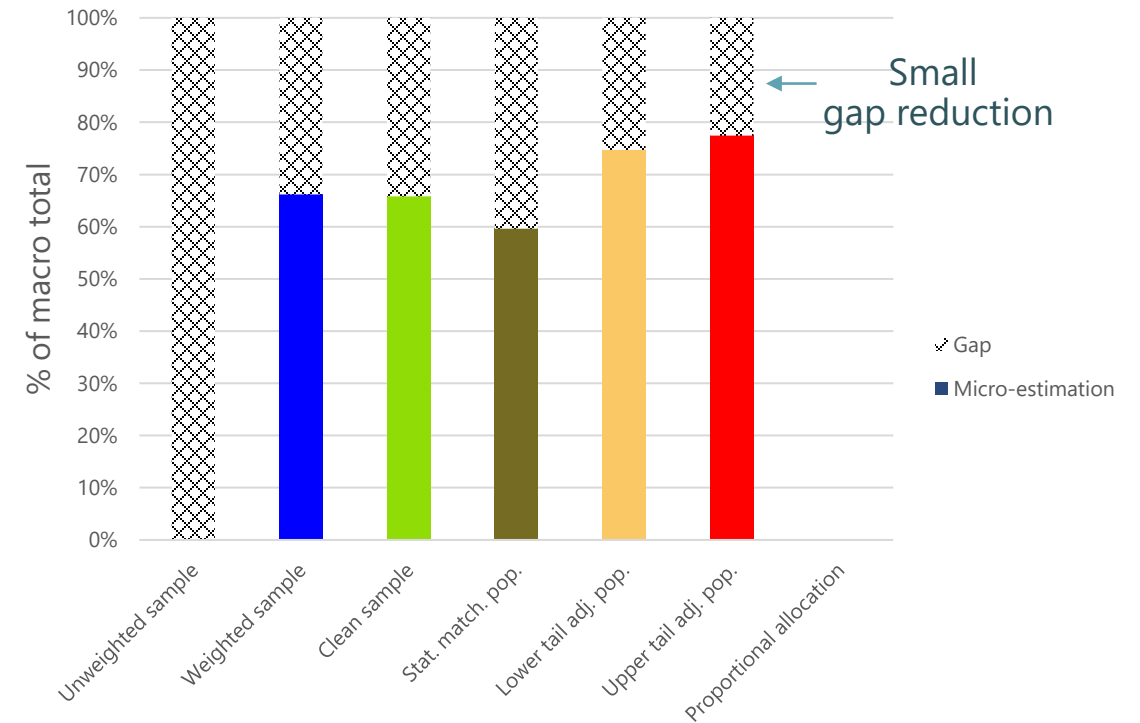


Gap allocation
Lower tail
Upper tail



Steps

- 1. Unweighted sample
- 2. Weighted sample
- 3. Clean sample
- 4. Stat. match. pop.
- 5. Lower tail adj. pop.
- 6. Upper tail adj. pop.



The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”



Sample



Clean
Survey micro-data



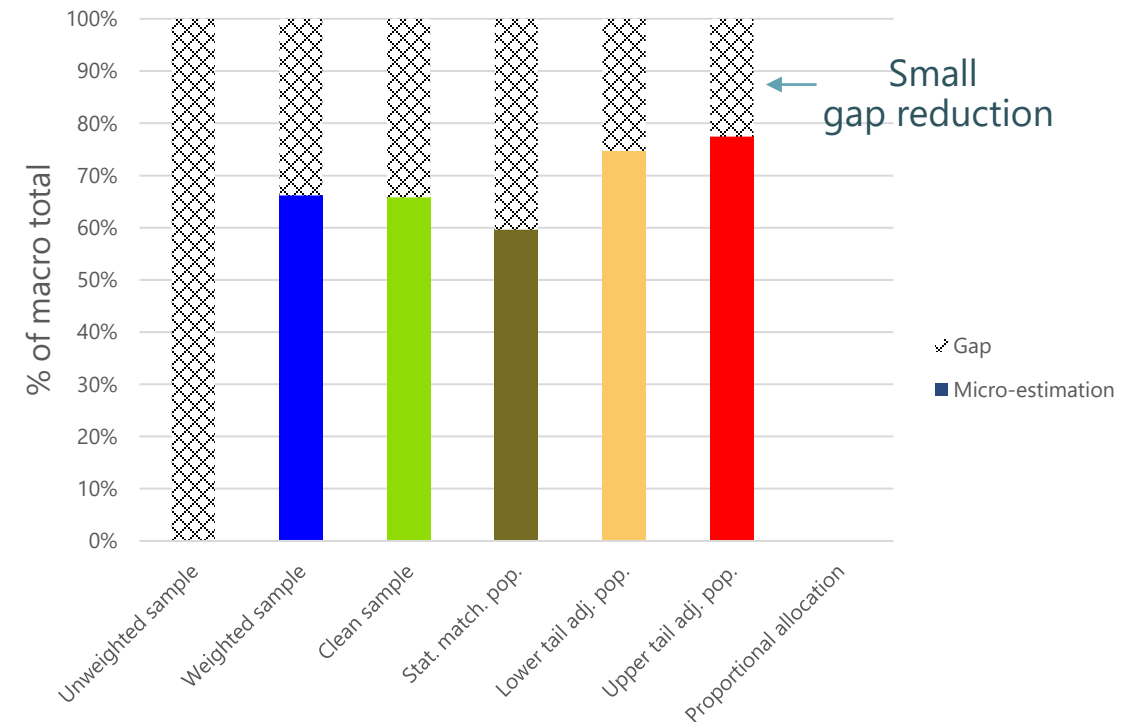
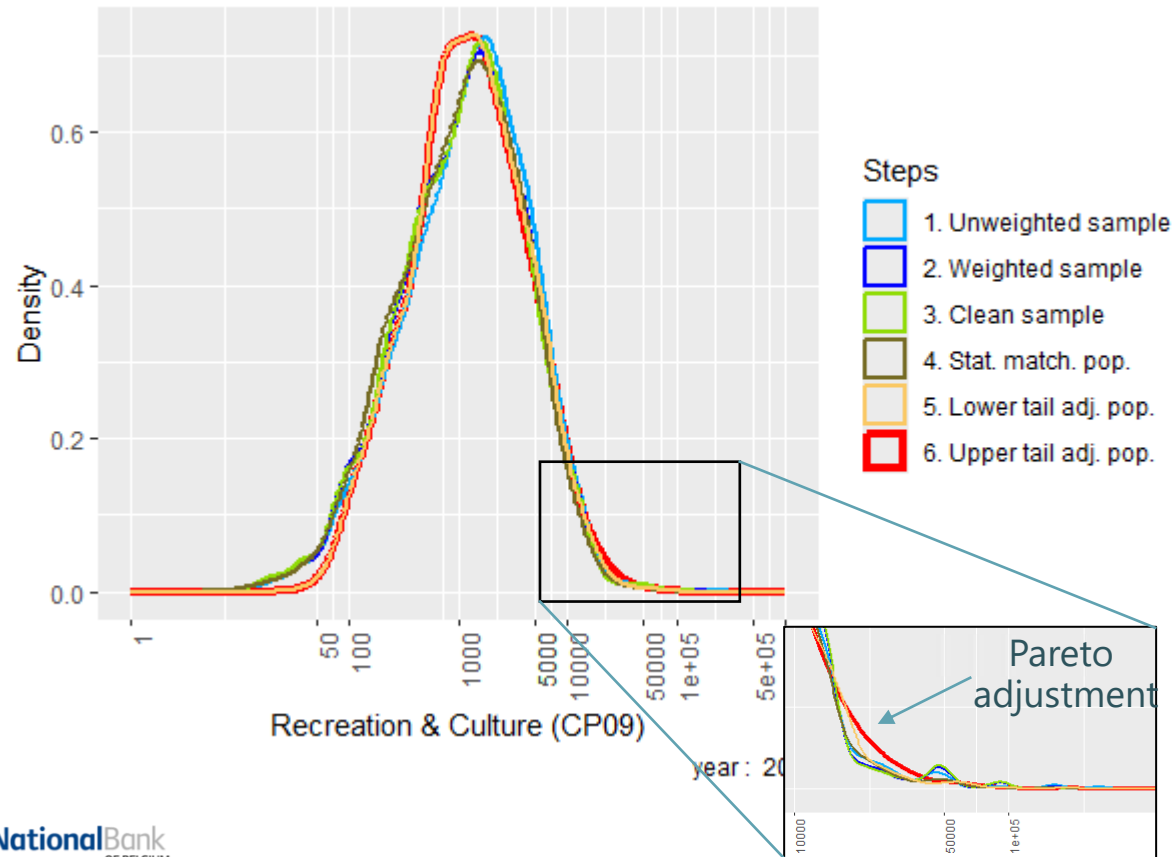
Prepare
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Impute Consumption &
Wealth at pop. level



Gap allocation
Lower tail
Upper tail



The Data process

Bridging the gap – Example : Consumption expenditure of “Recreation and culture”



Sample



Clean
Survey micro-data



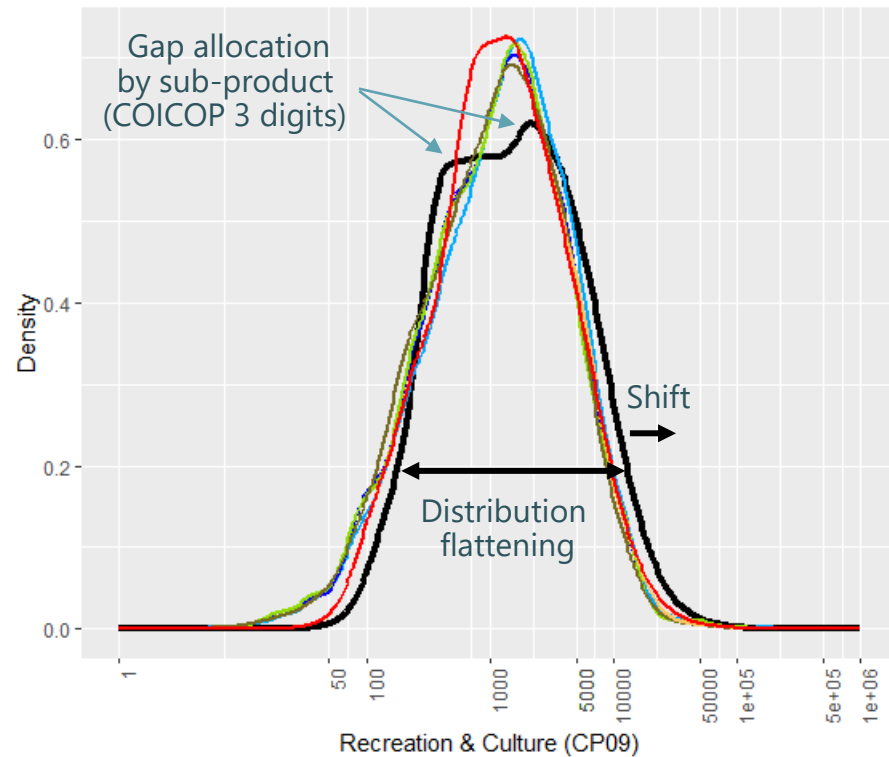
Prepare
Survey sample



Impute Consumption &
Wealth at pop. level

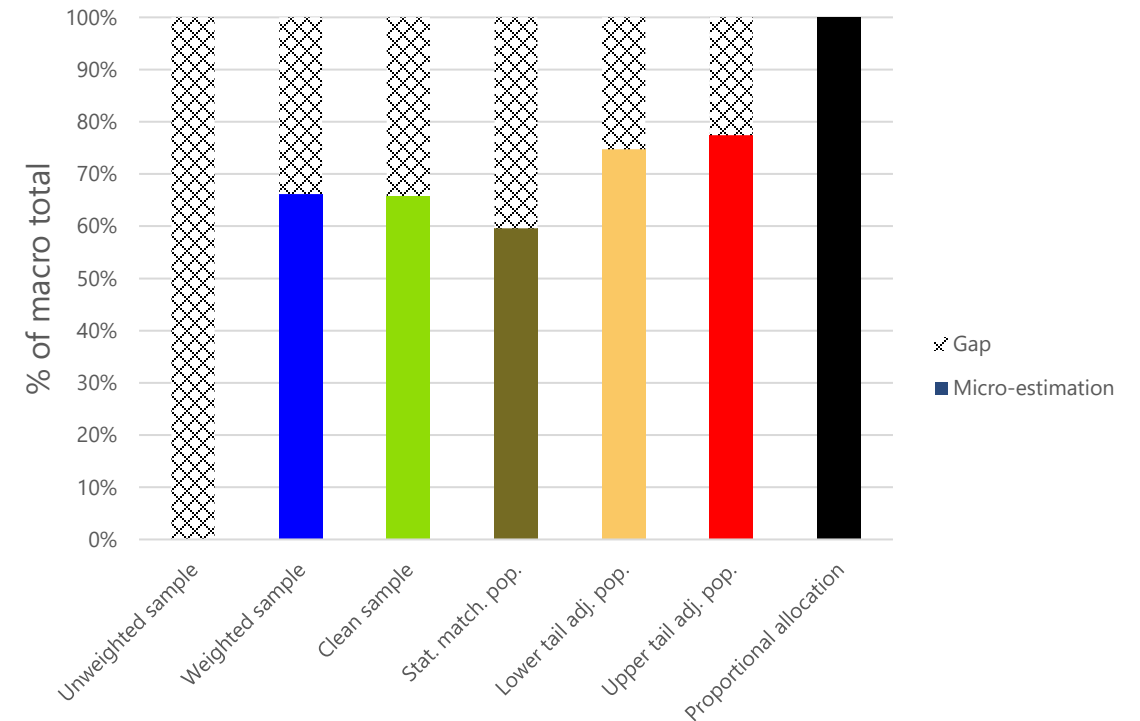


Gap allocation
Lower tail
Upper tail
Proportional allocation



Steps

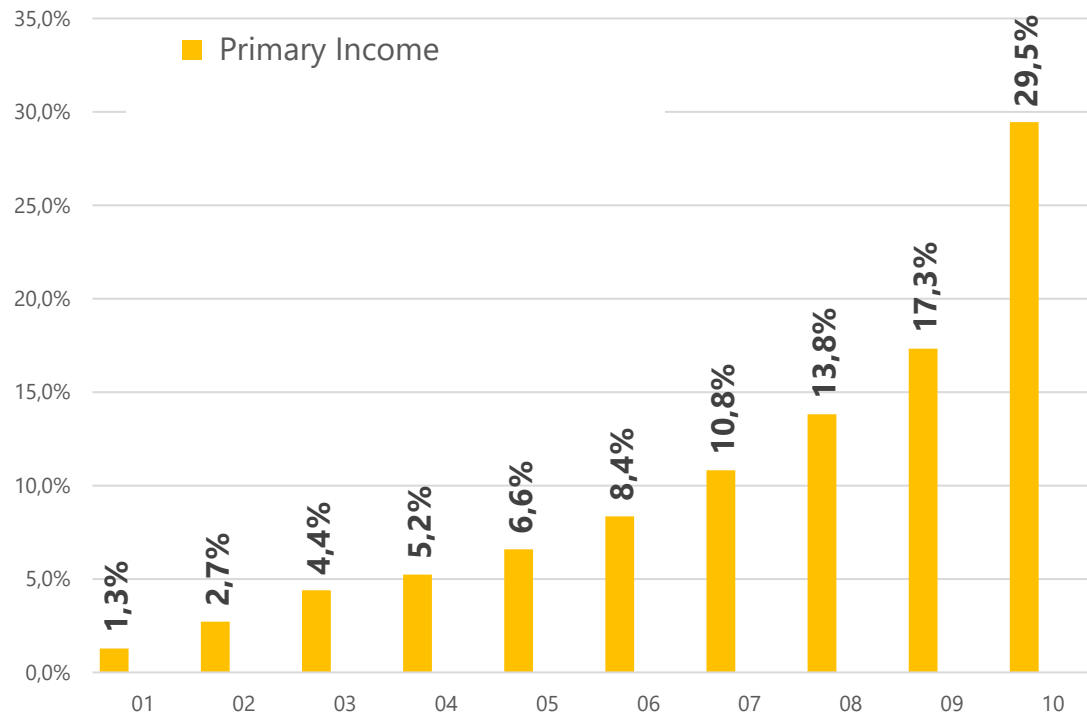
- 1. Unweighted sample
- 2. Weighted sample
- 3. Clean sample
- 4. Stat. match. pop.
- 5. Lower tail adj. pop.
- 6. Upper tail adj. pop.
- 7. prop. alloc. pop.



A foretaste of the results

DNA results : main concepts (2022)

- How is income distributed ?

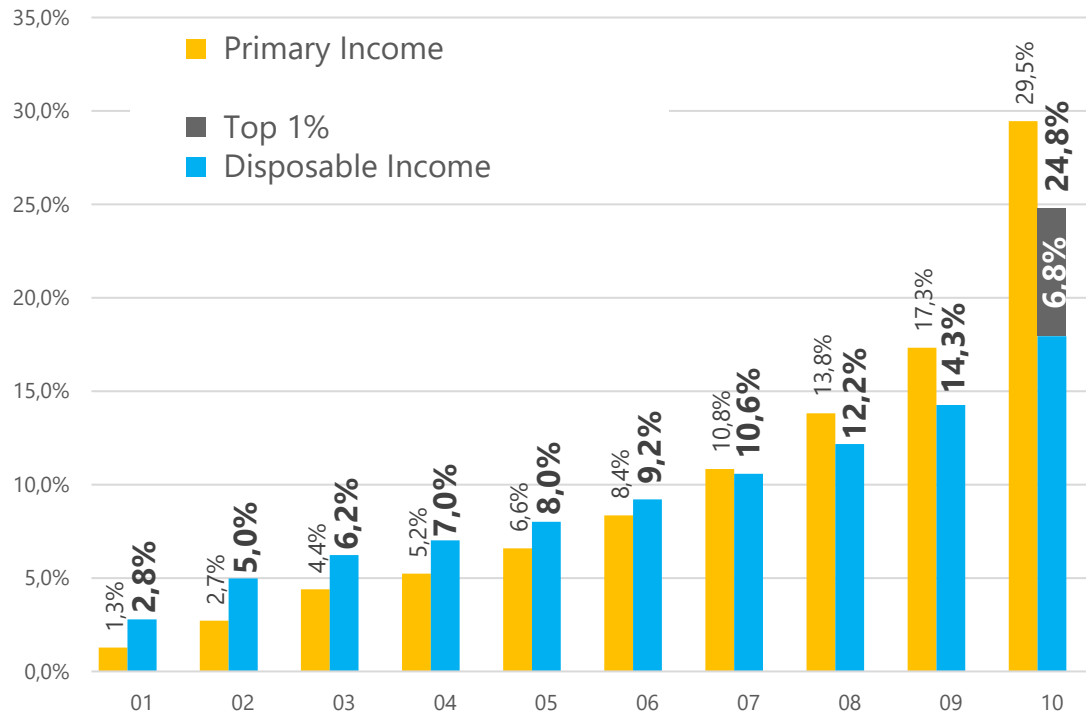


Distribution of primary income is skewed. About 30% of the total **primary income** is concentrated in Decile 10.

Primary income = Gross operating surplus (ex: actual, imputed rent) + Gross mixed income (ex: self-employment) + Compensation of employees (ex: wages and salaries) + Net property income (ex: interest, dividends ...)

DNA results : main concepts (2022)

• How is income distributed ?



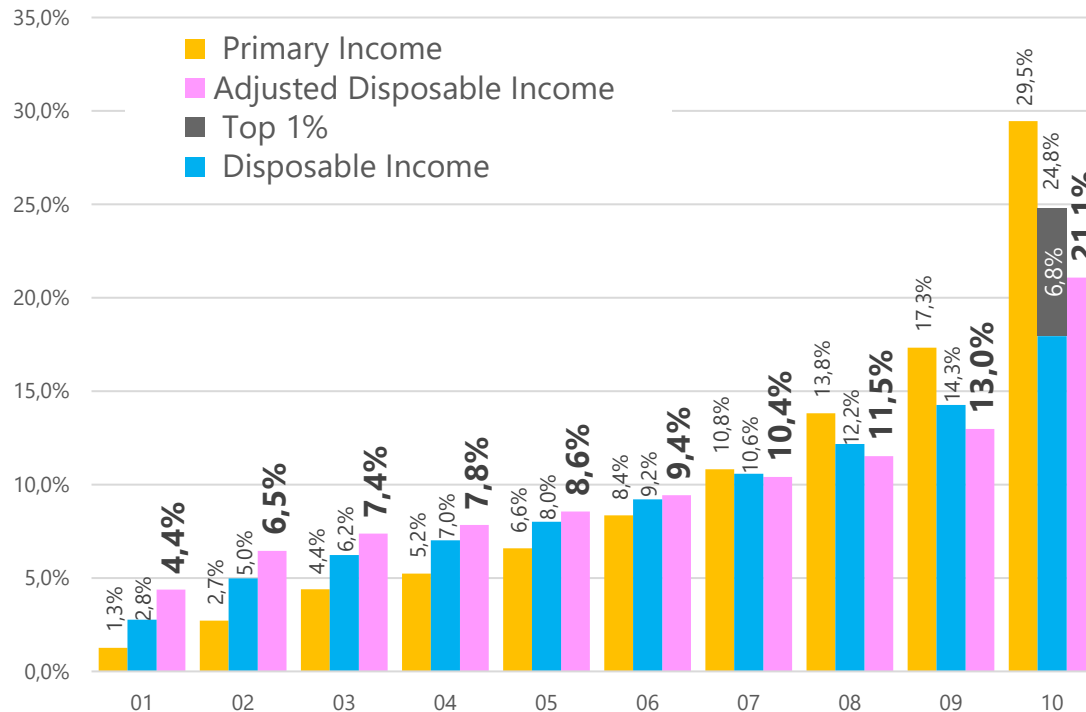
Distribution of primary income is skewed. About 30% of the total **primary income** is concentrated in Decile 10.

Taking the **redistribution mechanisms** into account (= social benefits, taxes and social contributions) reduce the skewness of the distribution. **The top 1%** has as much disposable income as decile 04.

Disposable income = (Primary income + Net Social Benefits) – (Taxes on income & wealth + Net social contributions) + Net other current transfers

DNA results : main concepts (2022)

• How is income distributed ?



Distribution of primary income is skewed. About 30% of the total **primary income** is concentrated in Decile 10.

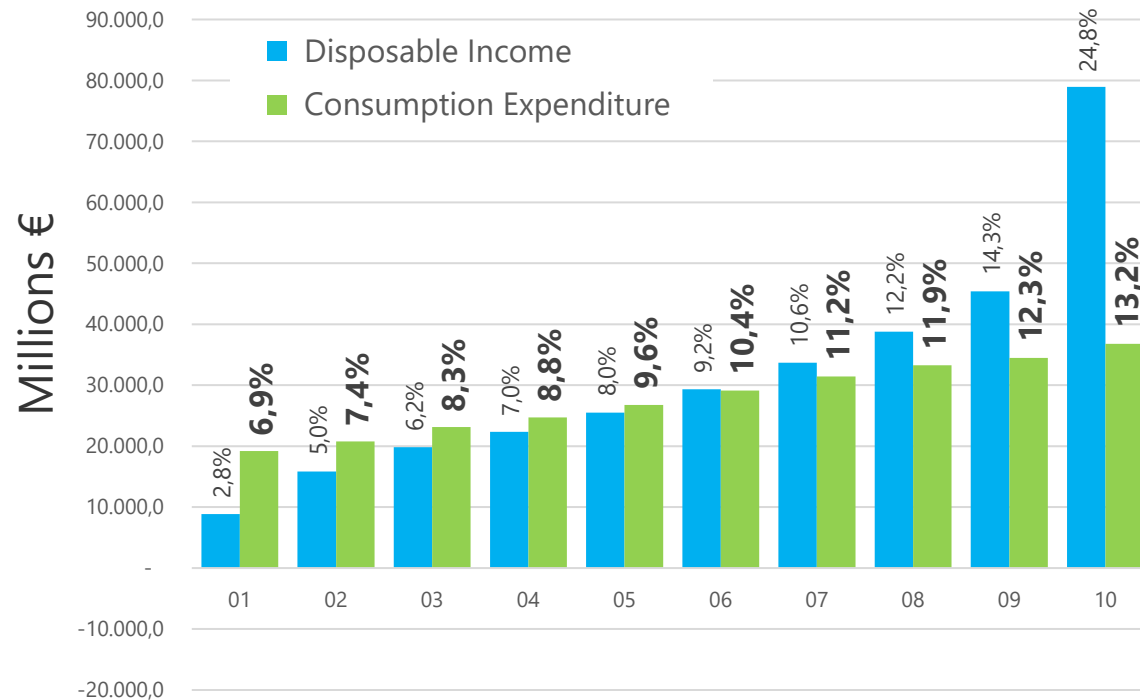
Taking the **redistribution mechanisms** into account (= social benefits, taxes and social contributions) reduces the skewness of the distribution. **The top 1%** has as much disposable income as decile 04.

The full picture: **taking into account social transfers in kind** further reduces inequality

Adjusted disposable income = Disposable income + Social Transfers in Kinds (= non-monetary support from government/NPISH on some core expenditure such as education, health, cultural services)

DNA results : main concepts (2022)

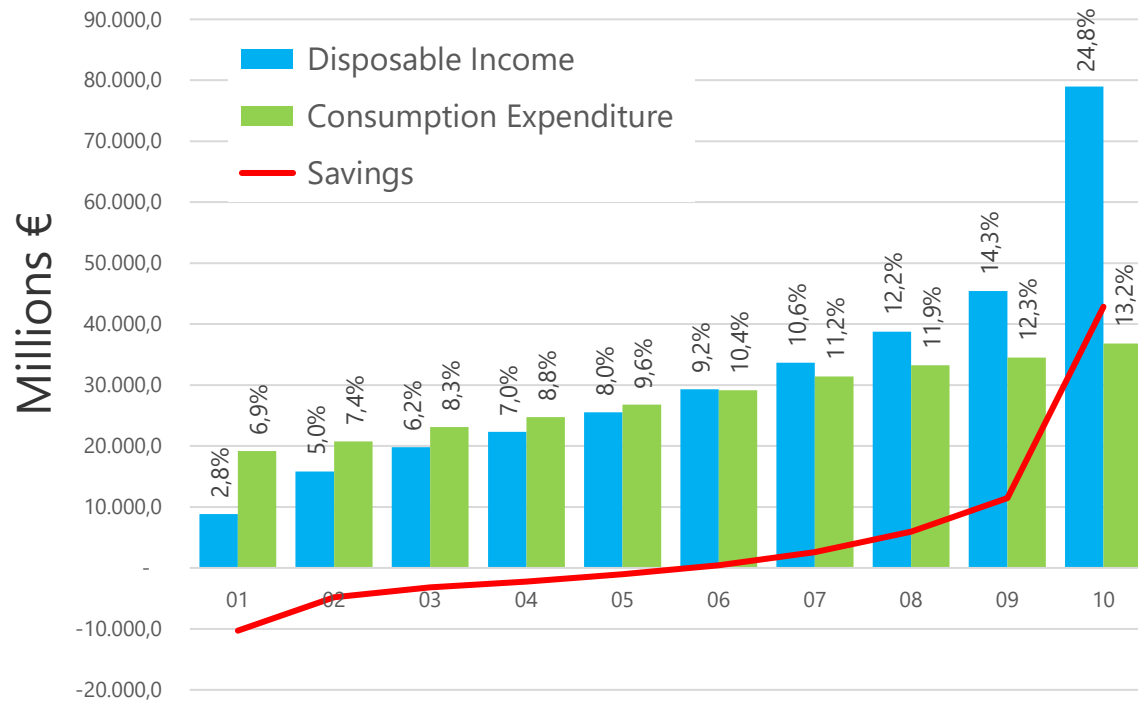
- How are savings distributed ?



Consumption expenditure is more **evenly distributed** across the population than income

DNA results : main concepts (2022)

• How are savings distributed ?



$$\text{Savings} = \text{Disposable Income} - \text{Consumption expenditure}$$

Consumption expenditure is more **evenly distributed** across the population than income.

As a result, **savings** are highly concentrated at the top end of the income distribution.

How should we approach **negative savings**?
Certain **conceptual questions** still need to be clarified to gain a better understanding of the economic reality of households (ex : inter-household transfers/assistance, taxation on capital gains, ...)

Further developments

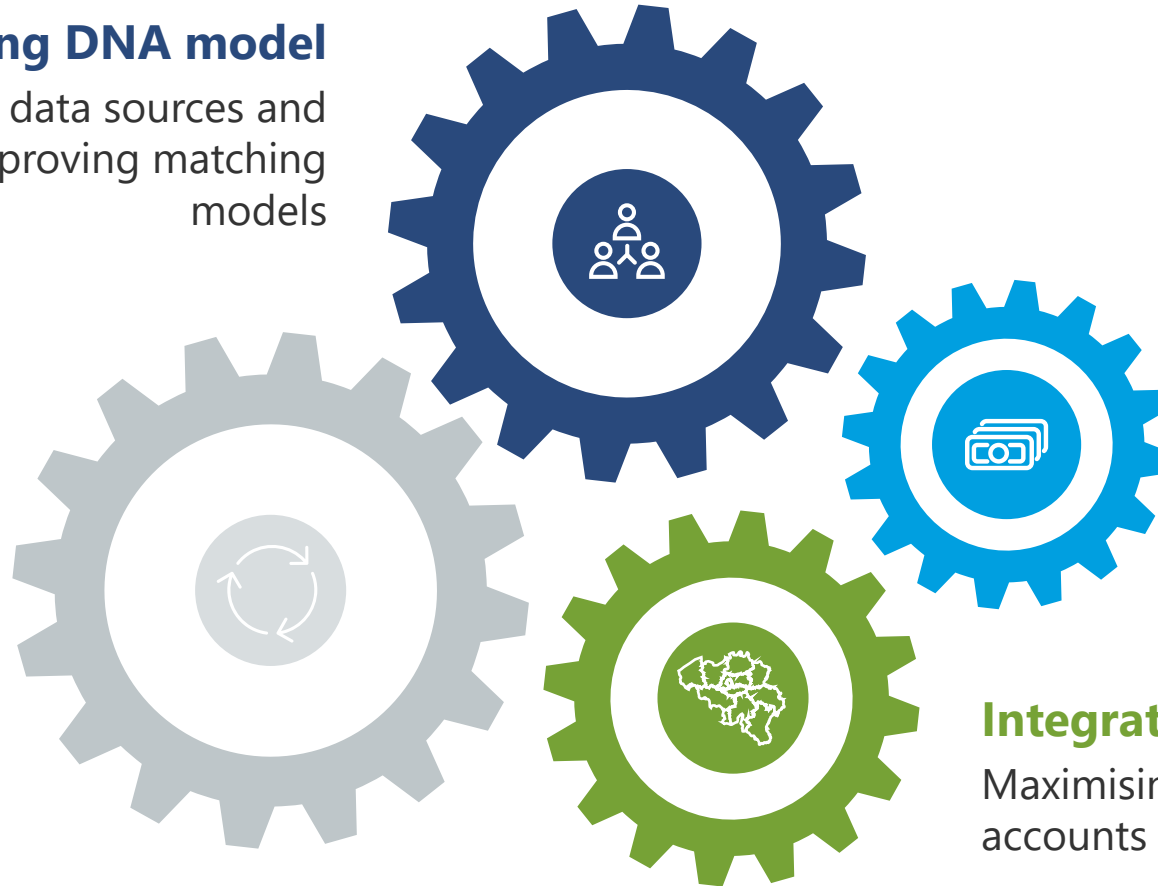
Developments

Improving DNA model

Adding new data sources and dimensions, and improving matching models

Process improvements

Preparing ESA integration and regular production cycles



Integrating income, consumption and wealth

Further integration towards a joint distribution

Integrating regional dimension

Maximising synergies between regional accounts and distributional accounts

Questions ?

More info on :

National/regional accounts | National Bank of Belgium

<https://www.nbb.be/en/statistics/topics/nationalregional-accounts>