



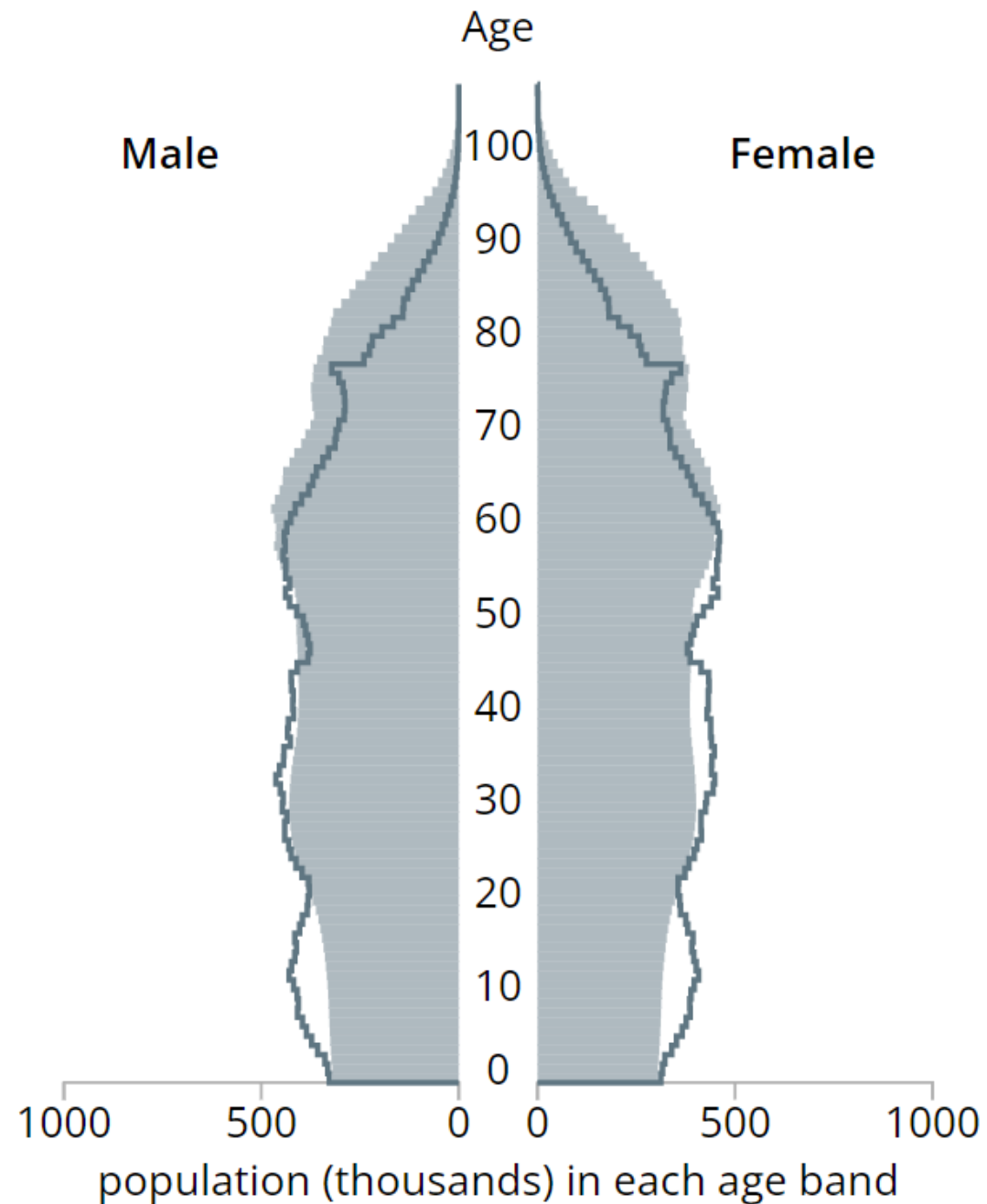
Department
for Work &
Pensions



Modelling &
Forecasting

Developing long-term pensioner microsimulation modelling in Great Britain

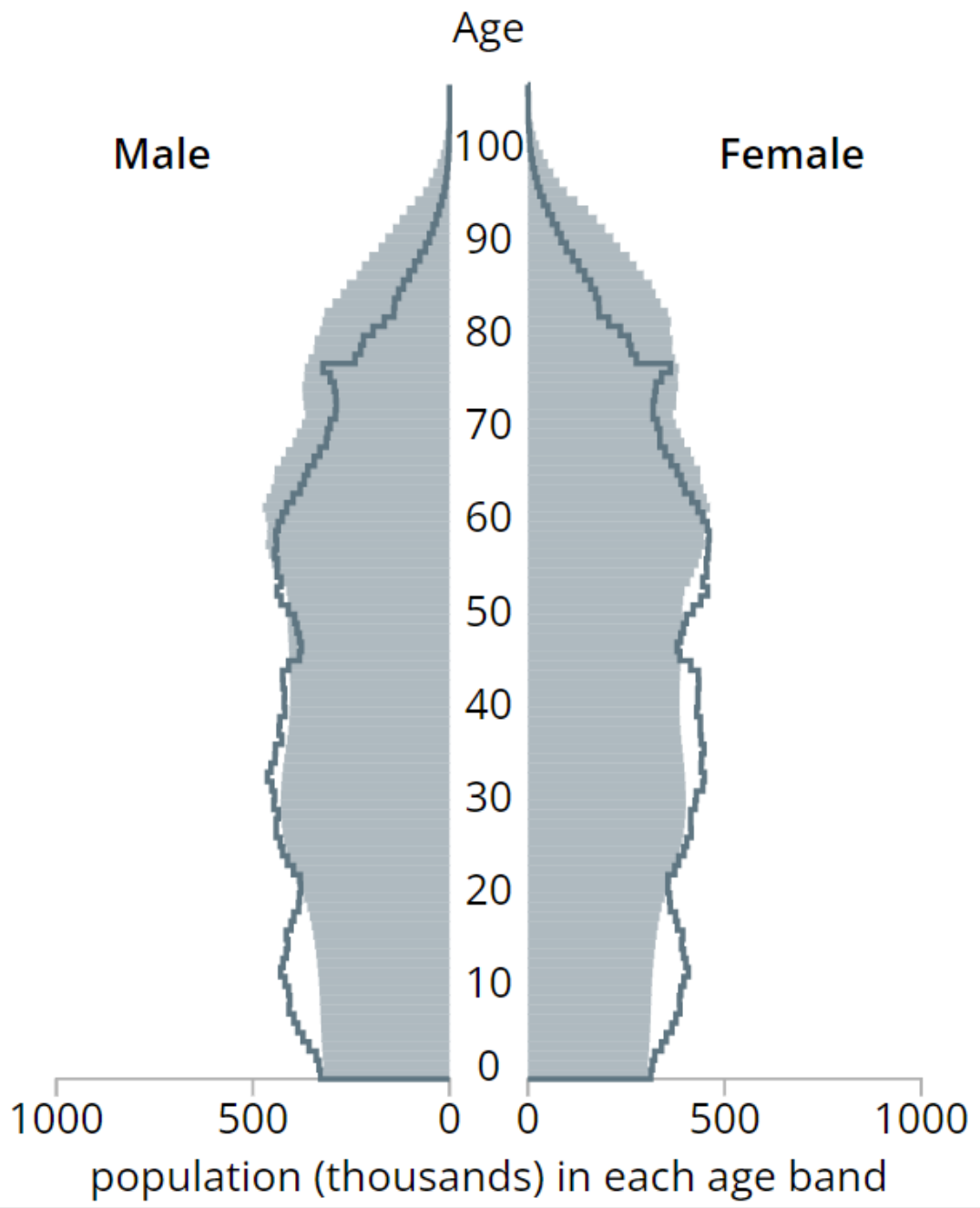
Stuart Grant, stuart.grant@dwp.gov.uk
Pensions and Later Life Analysis Division
Department for Work and Pensions,
United Kingdom



Current projections show more older people and fewer children by 2073

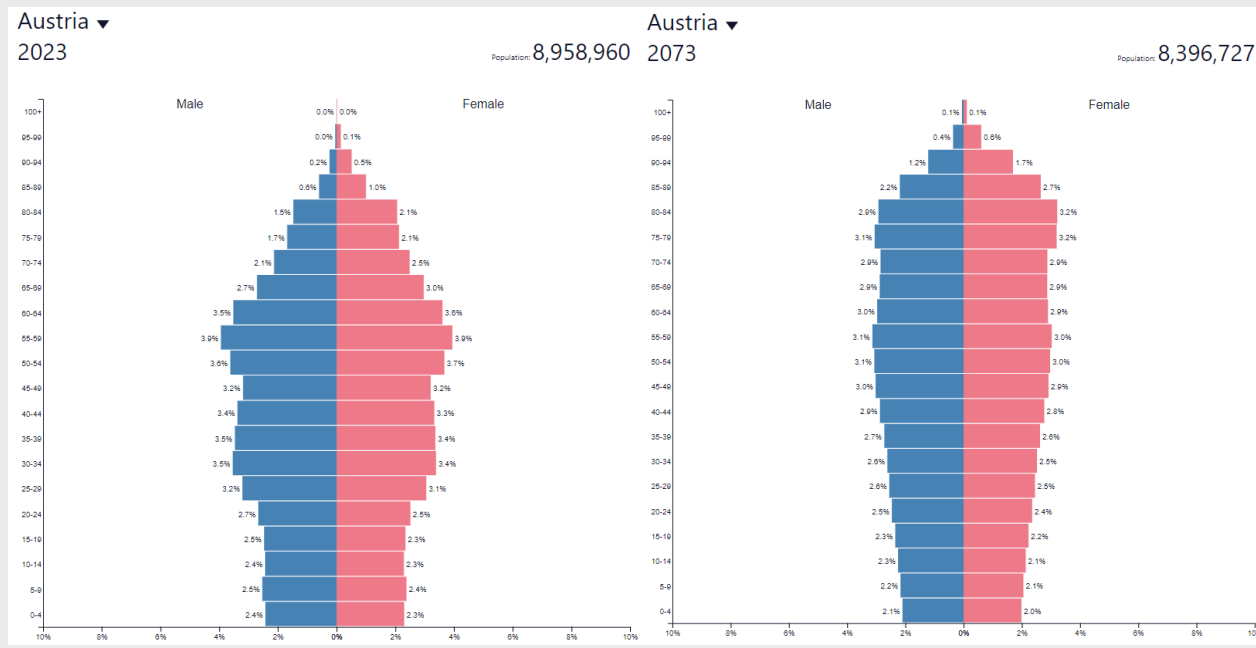
Great Britain Principal Population Projections by age and sex:
Line = 2023; Grey bars = 2073.

Source: Office for National Statistics



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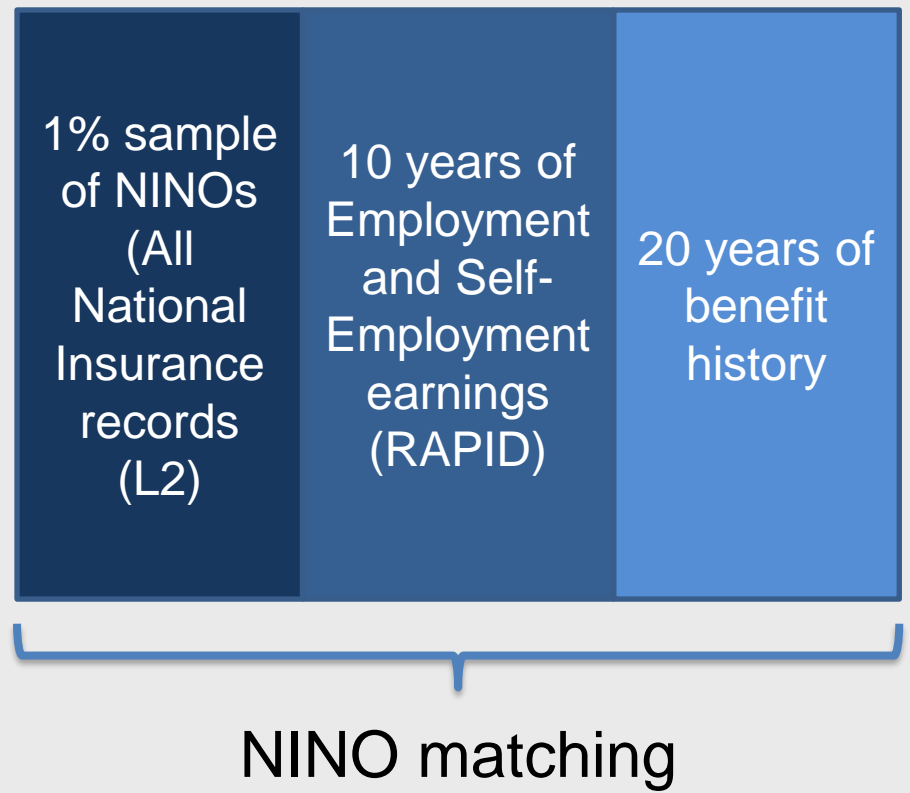
Develop existing model or do something new?

- Long term dynamic micro simulation – Pensim3
 - 20+ years old
 - Survey data based
 - Needs development to deliver what we need

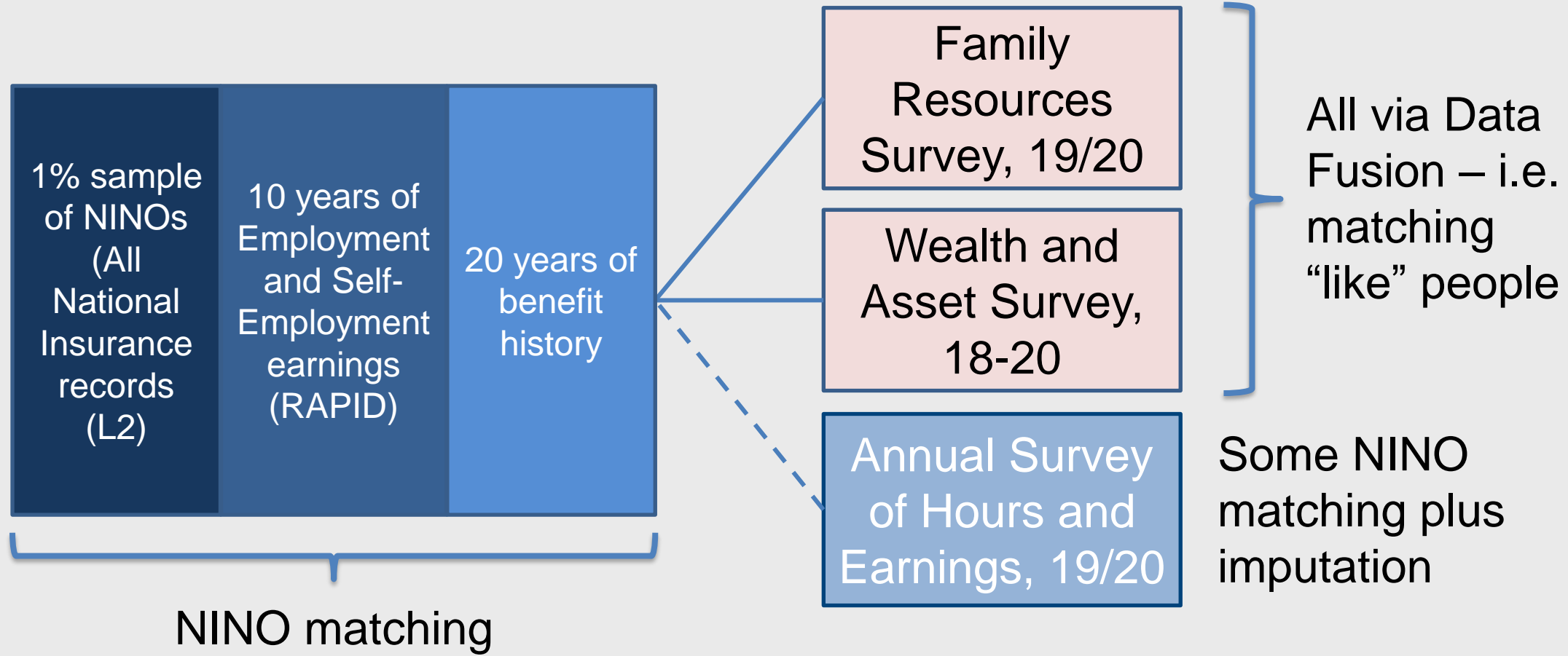
Develop existing model or do something new?

- Long term dynamic micro simulation – Pensim3
 - 20+ years old
 - Survey data based
 - Needs development to deliver what we need
- Why do something new?
 - Scope to tackle new functionality
 - Admin data focus
 - Using new tools and techniques

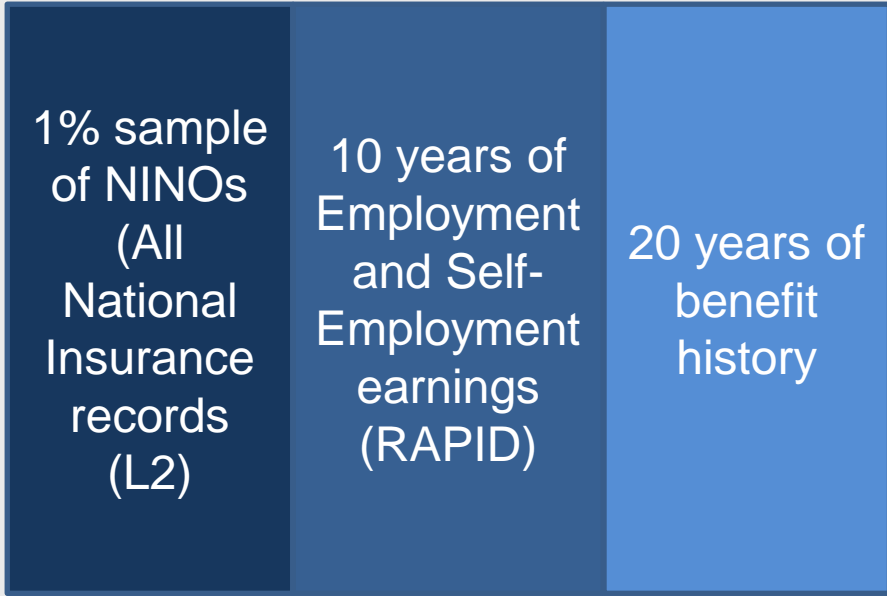
Base data (or model starting point)



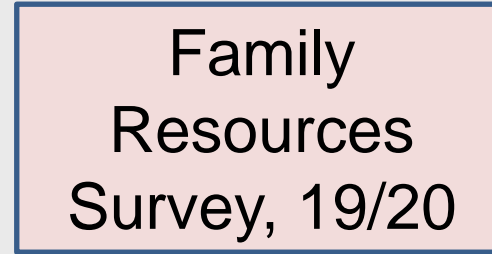
Base data (or model starting point)



Data Fusion

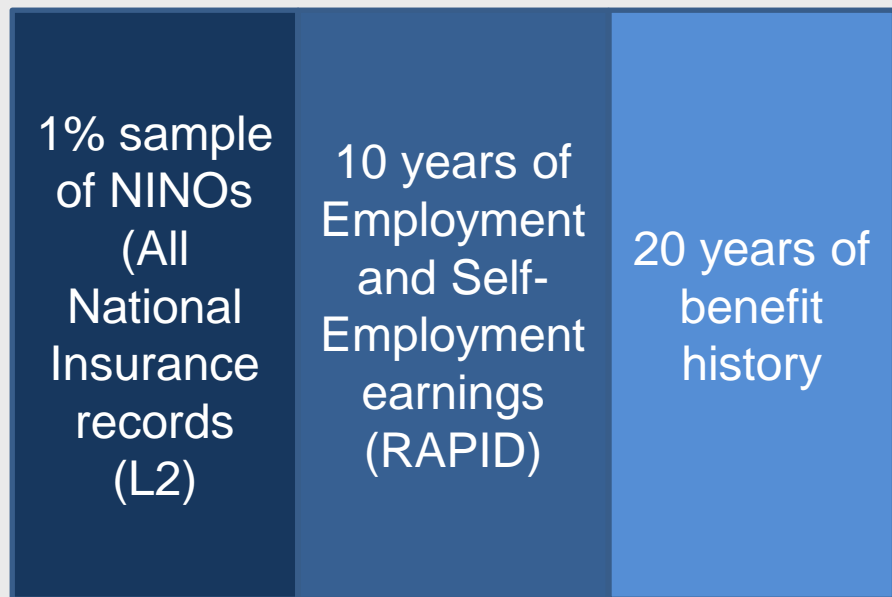


530,000 rows (adults)

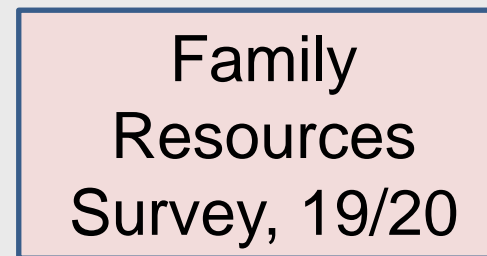


31,000 rows (adults)

Data Fusion



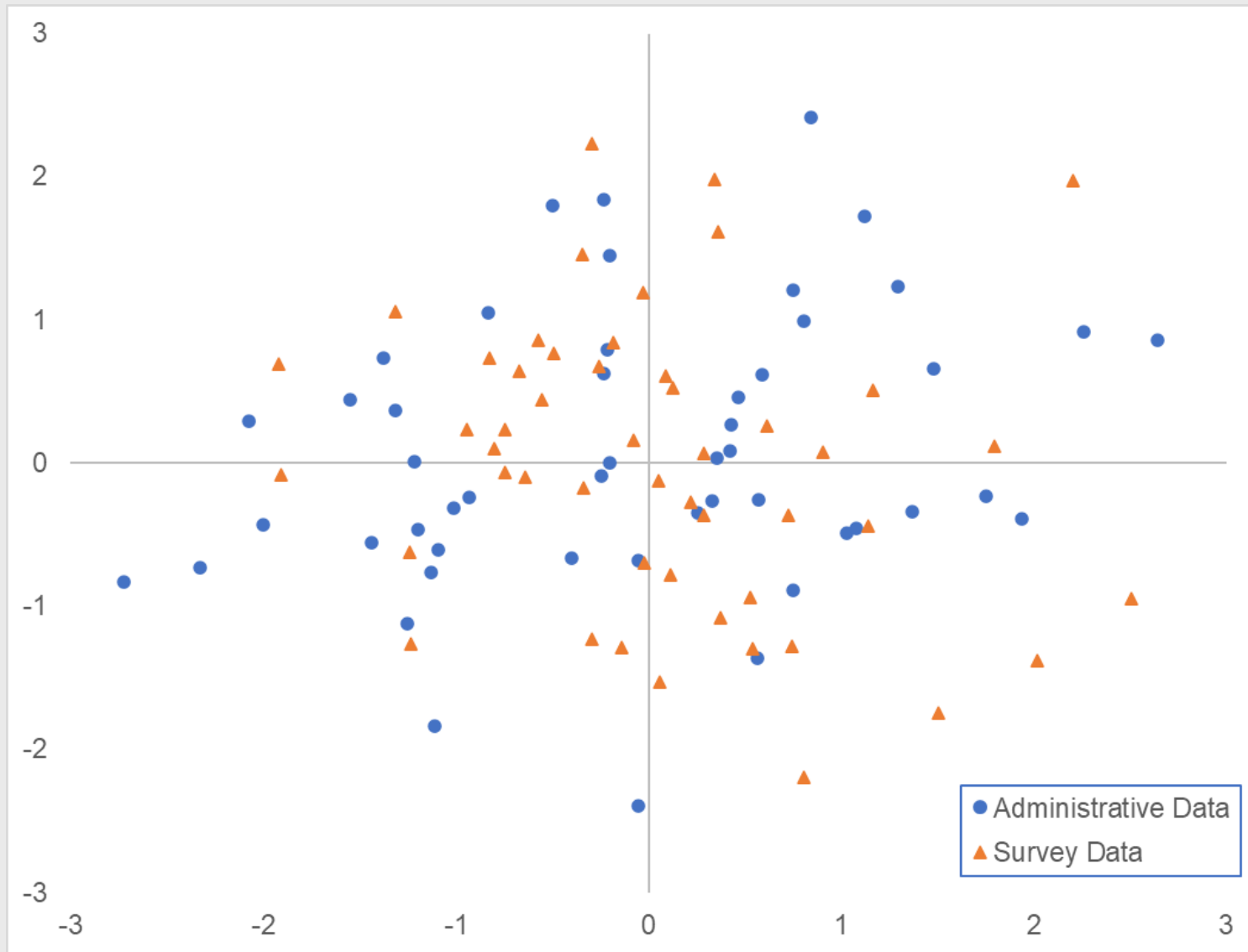
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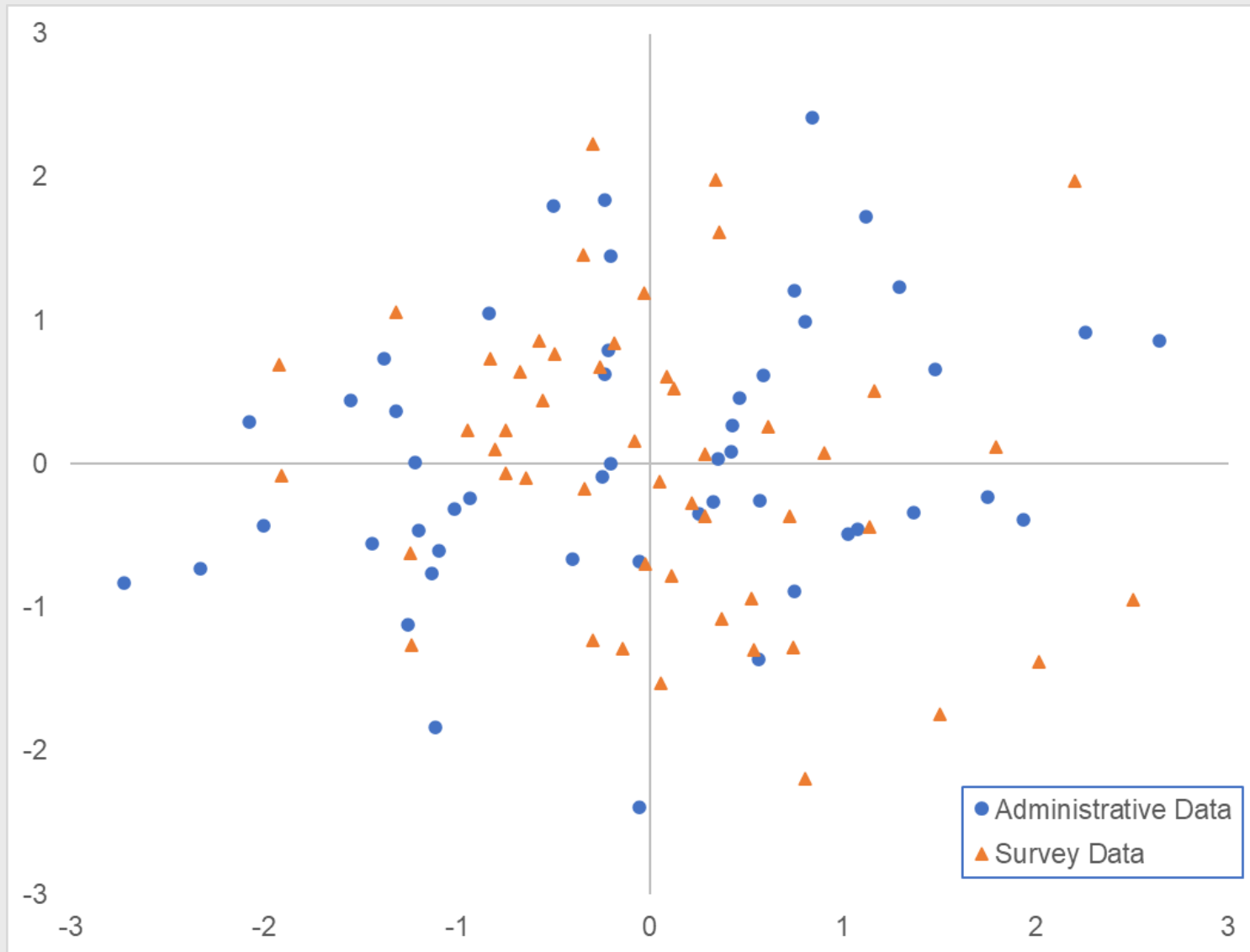
31,000 rows (adults)

1. Design and select “Critical Subsets”
2. Resample the survey data so that
 - a) Identical numbers of individuals in each critical subset
 - b) Resampling is at a household level
 - c) Survey weights are preserved (as close as possible)
3. Match survey records to closest admin data neighbour

Order of Decreasing Difference Methodology

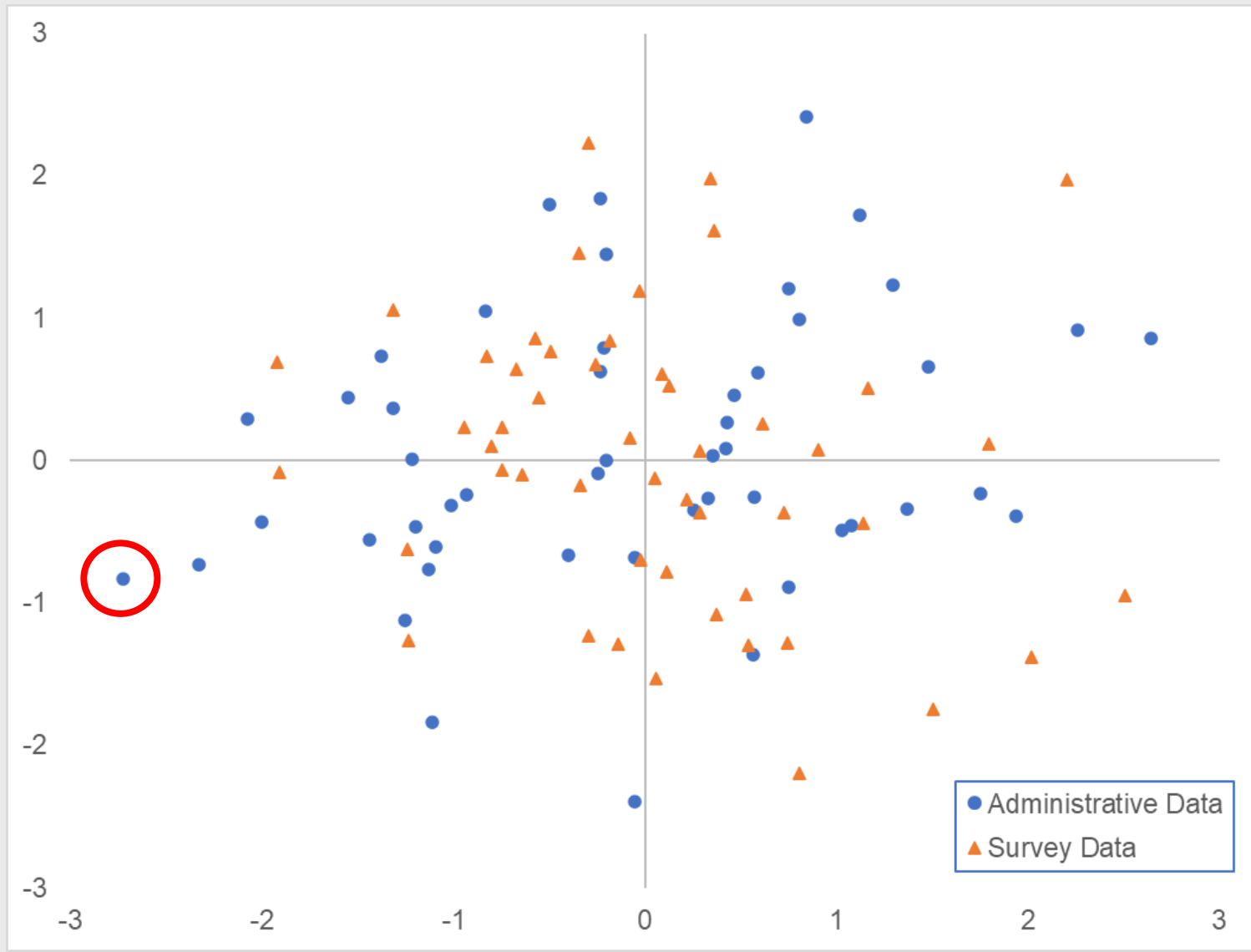


Order of Decreasing Difference Methodology



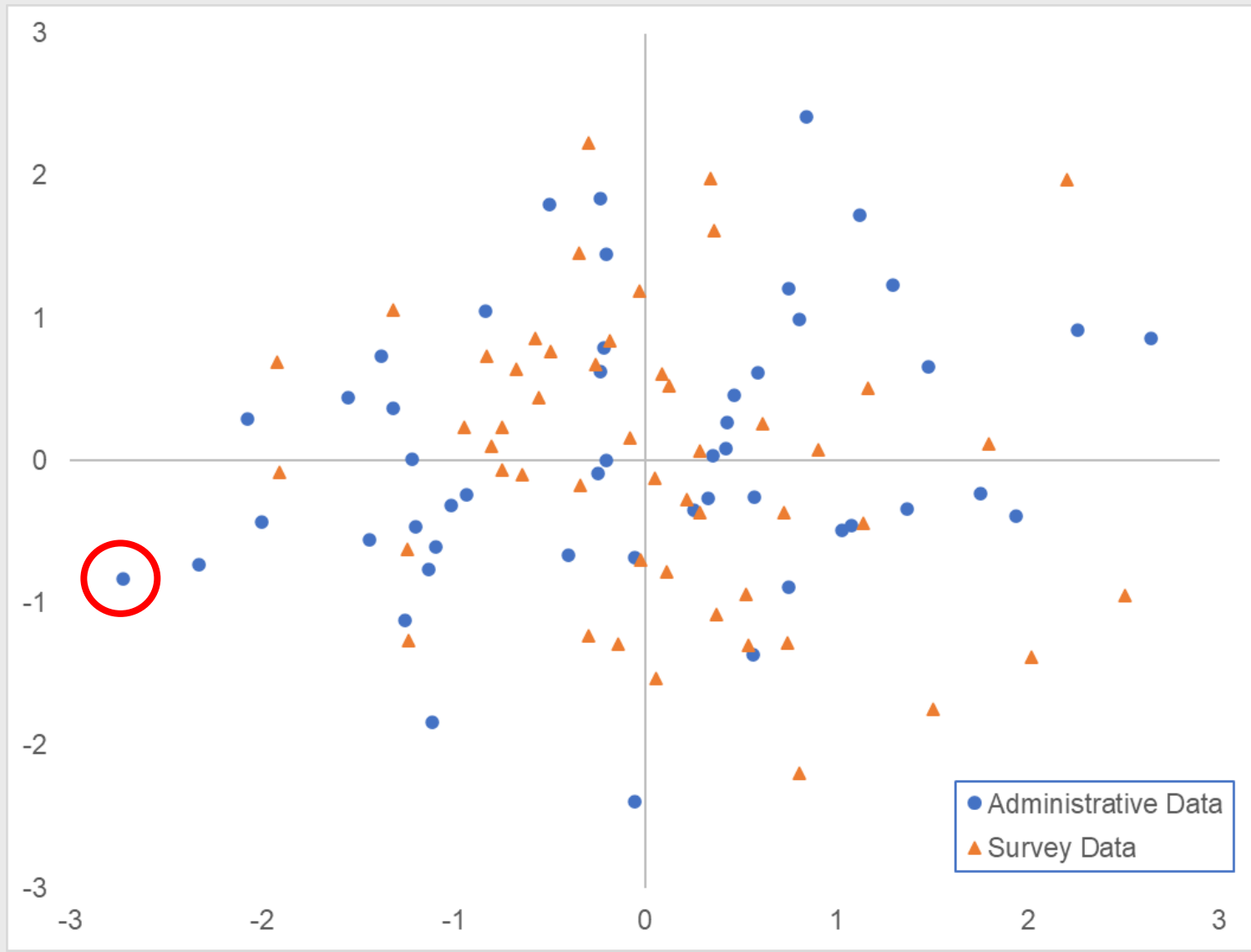
- Two-dimensional example...
 - Find the admin data person furthest away from the origin.

Order of Decreasing Difference Methodology



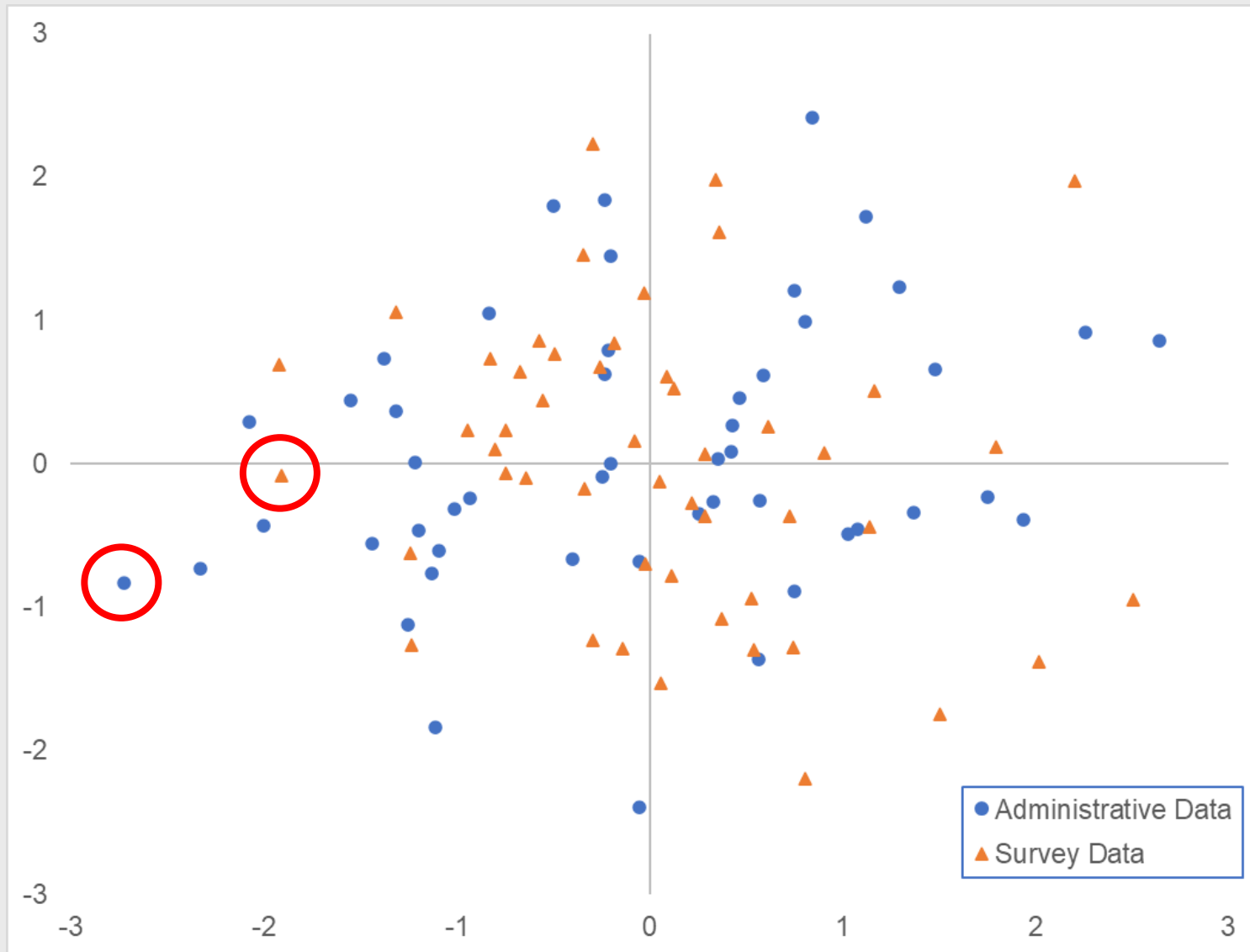
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Order of Decreasing Difference Methodology



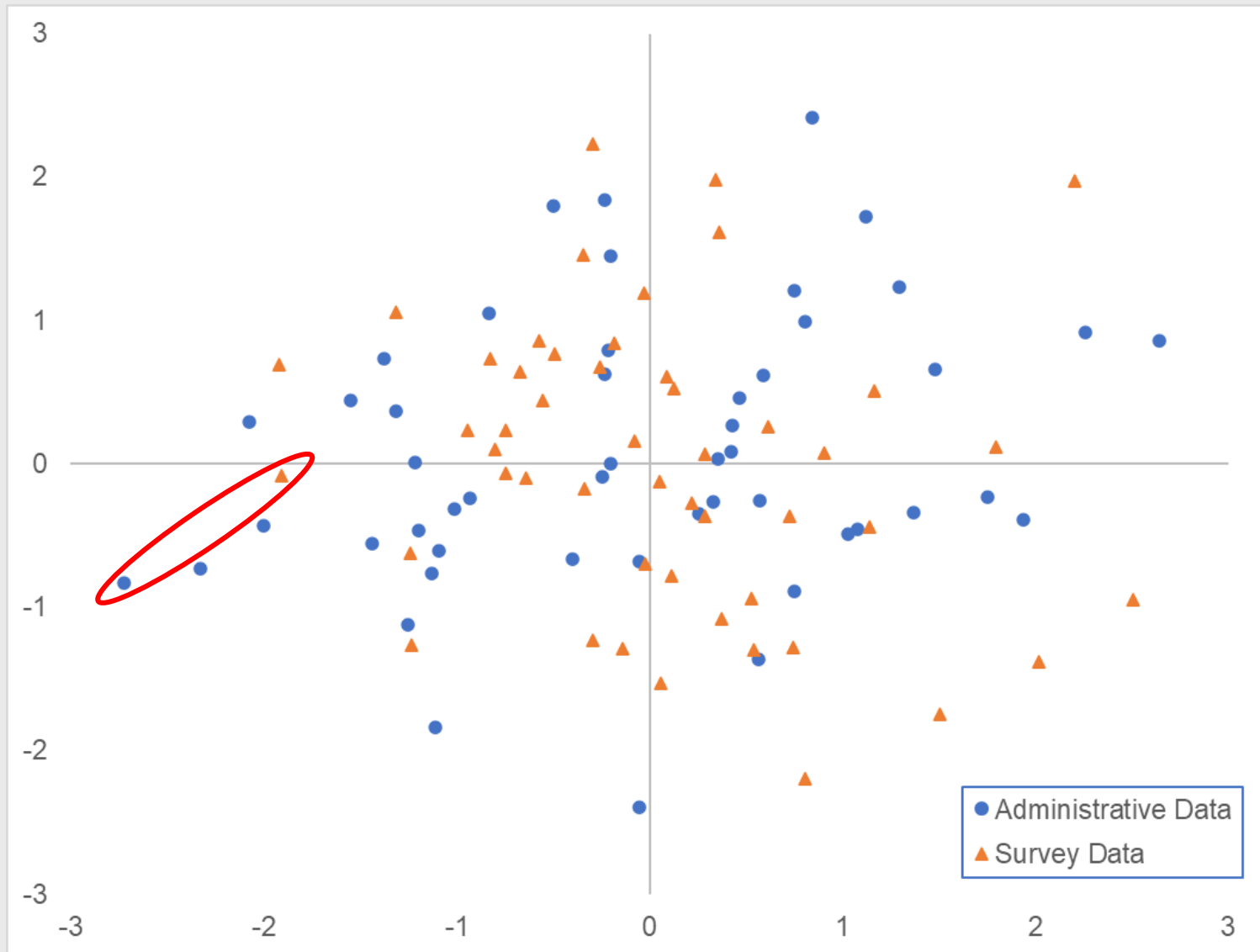
- Two-dimensional example...
 - Find the admin data person furthest away from the origin.
 - Find the closest survey respondent to that person.

Order of Decreasing Difference Methodology



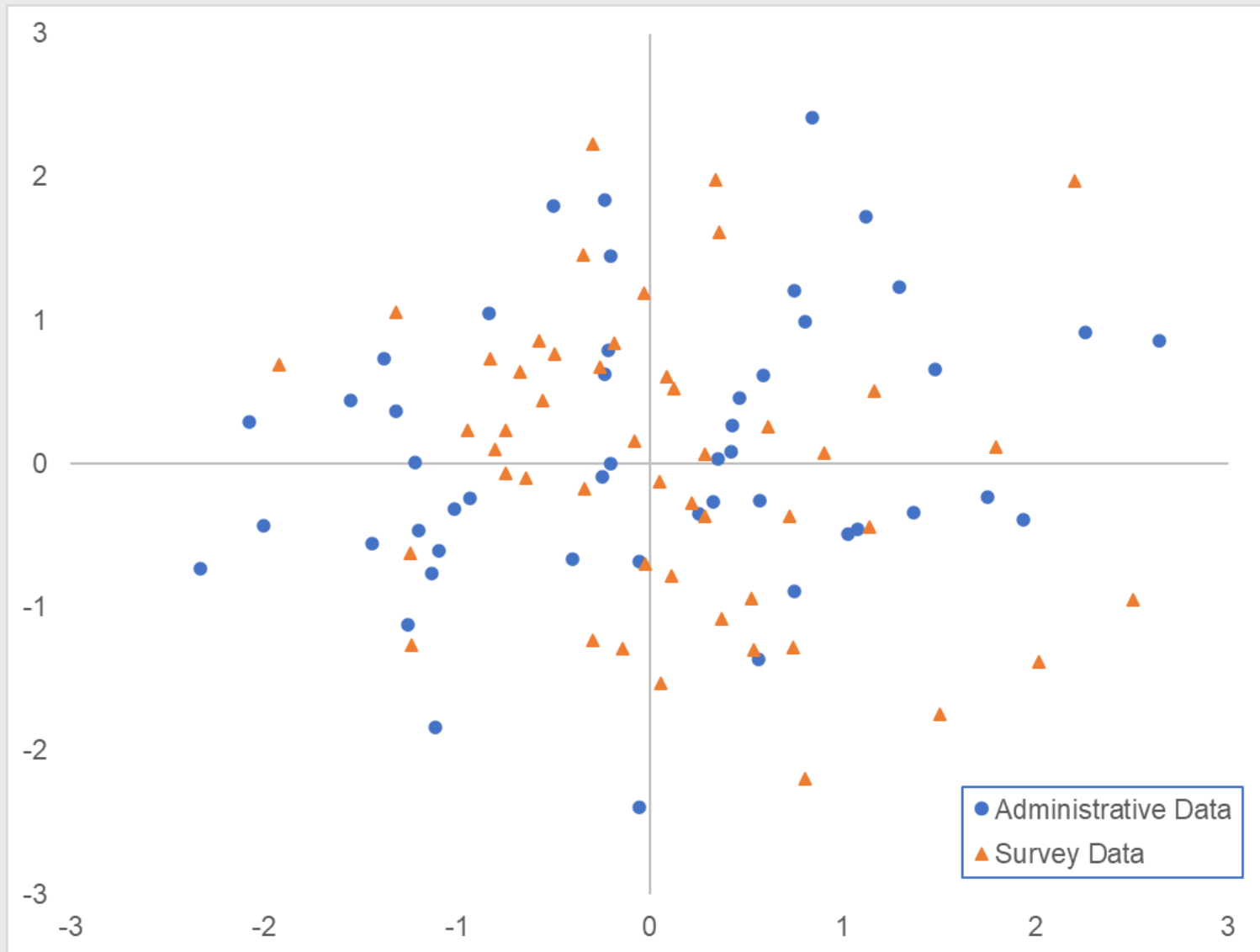
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Order of Decreasing Difference Methodology



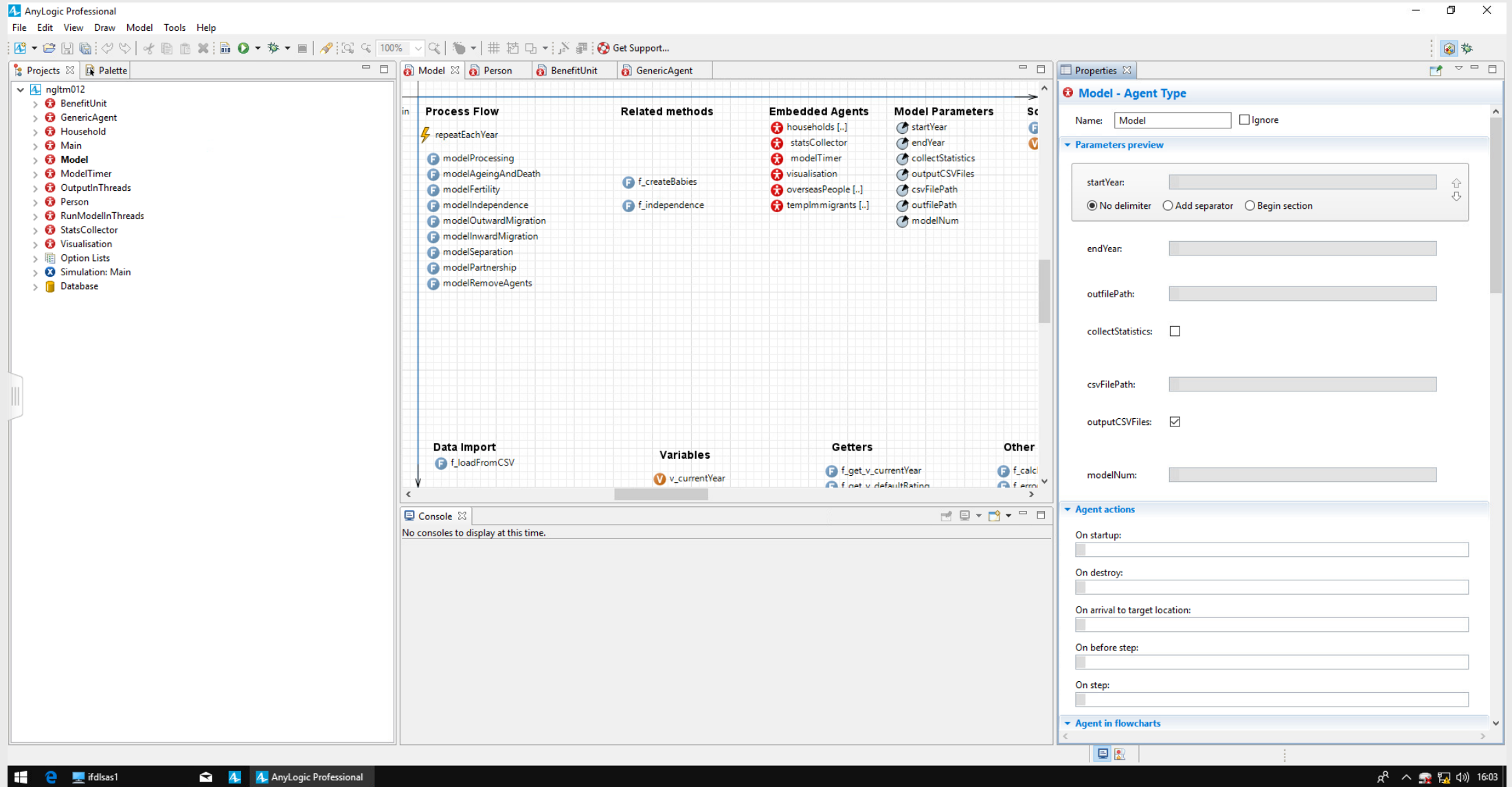
- Two-dimensional example...
 - Find the admin data person furthest away from the origin.
 - Find the closest survey respondent to that person.
 - Pair them

Order of Decreasing Difference Methodology



- Two-dimensional example...
 - Find the admin data person furthest away from the origin.
 - Find the closest survey respondent to that person.
 - Pair them
 - Remove and repeat!

Using AnyLogic



The screenshot displays the AnyLogic Professional software interface. The main workspace is divided into several sections:

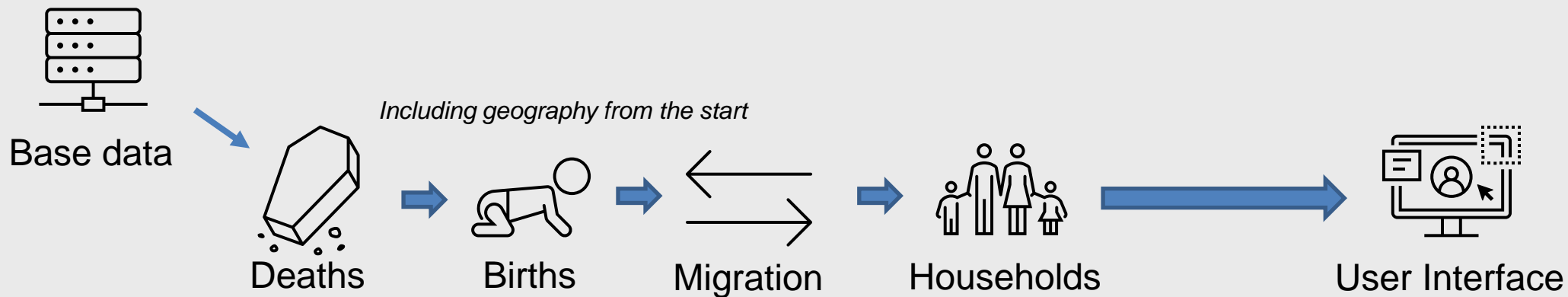
- Process Flow:** A central area with a grid background showing a flowchart. It includes a 'repeatEachYear' block and several 'model' blocks such as 'modelProcessing', 'modelAgeingAndDeath', 'modelFertility', 'modelIndependence', 'modelOutwardMigration', 'modelInwardMigration', 'modelSeparation', 'modelPartnership', and 'modelRemoveAgents'.
- Related methods:** A section containing 'f_createBabies' and 'f_independence'.
- Embedded Agents:** A section containing 'households [-]', 'statsCollector', 'modelTimer', 'visualisation', 'overseasPeople [-]', and 'templmigrants [-]'.
- Model Parameters:** A section containing 'startYear', 'endYear', 'collectStatistics', 'outputCSVFiles', 'csvFilePath', 'outfilePath', and 'modelNum'.
- Data Import:** A section containing 'f_loadFromCSV'.
- Variables:** A section containing 'v_currentYear'.
- Getters:** A section containing 'f_get_v_currentYear' and 'f_get_v_defaultRating'.
- Other:** A section containing 'f_calci' and 'f_arrp'.

On the left, the 'Projects' palette shows a tree view of the project structure, including 'ngitm012', 'BenefitUnit', 'GenericAgent', 'Household', 'Main', 'Model', 'ModelTimer', 'OutputInThreads', 'Person', 'RunModelInThreads', 'StatsCollector', 'Visualisation', 'Option Lists', 'Simulation: Main', and 'Database'.

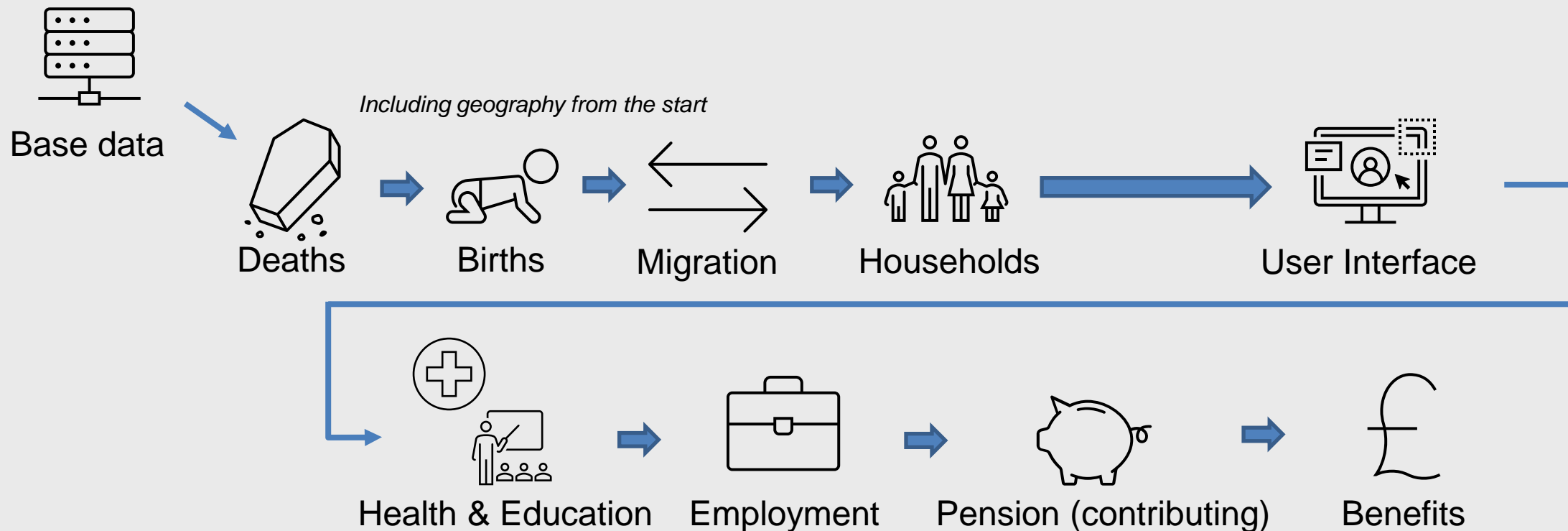
On the right, the 'Properties' window is open for the 'Model - Agent Type'. It shows the 'Name' as 'Model' and an 'Ignore' checkbox. Below this, the 'Parameters preview' section includes input fields for 'startYear', 'endYear', 'outfilePath', 'collectStatistics' (checkbox), 'csvFilePath', 'outputCSVFiles' (checkbox), and 'modelNum'. The 'Agent actions' section has input fields for 'On startup:', 'On destroy:', 'On arrival to target location:', 'On before step:', and 'On step:'. The 'Agent in flowcharts' section is partially visible at the bottom.

The bottom of the screen shows the Windows taskbar with the 'AnyLogic Professional' application icon and the system clock showing '16:03'.

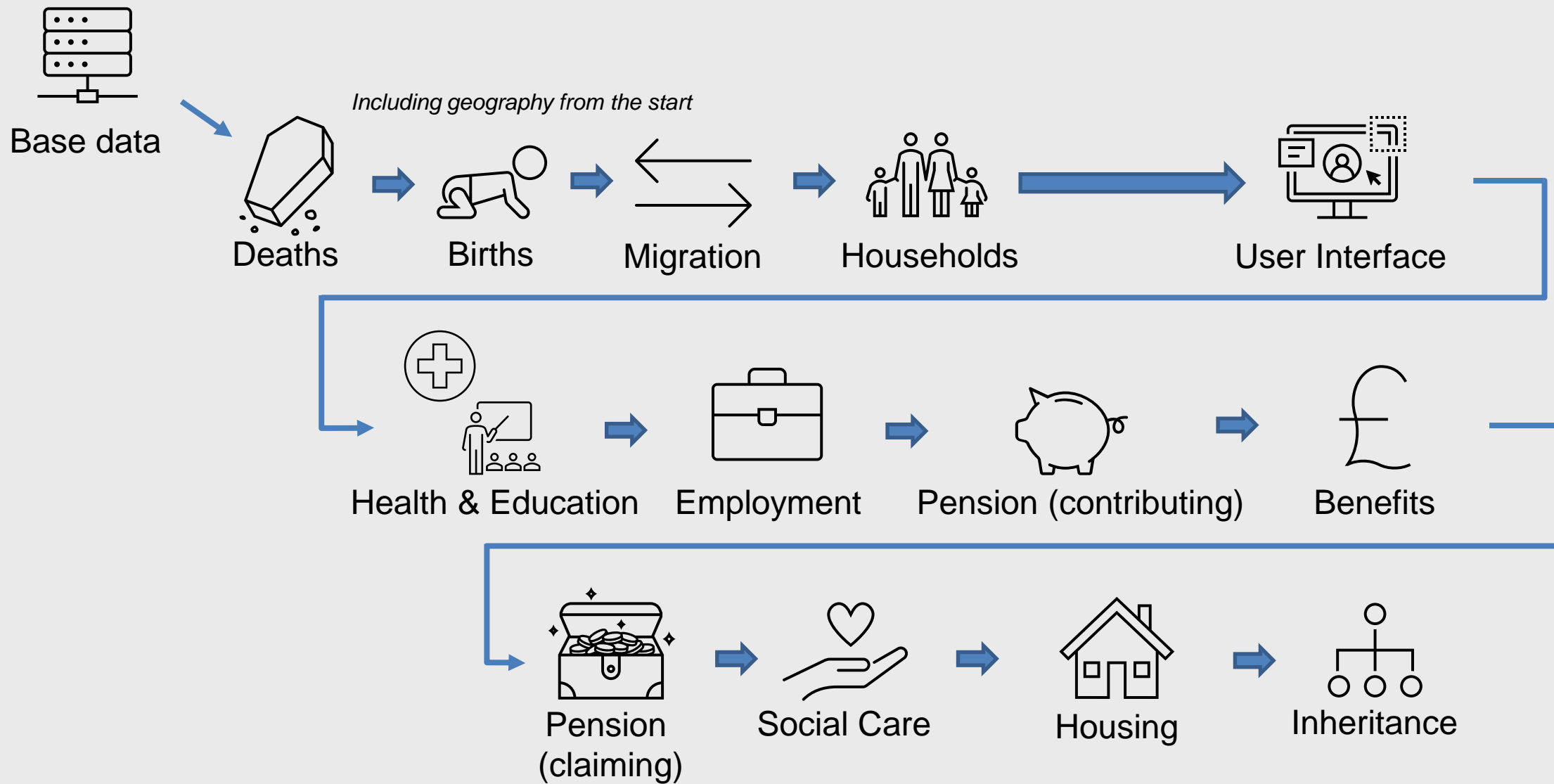
Development Road Map



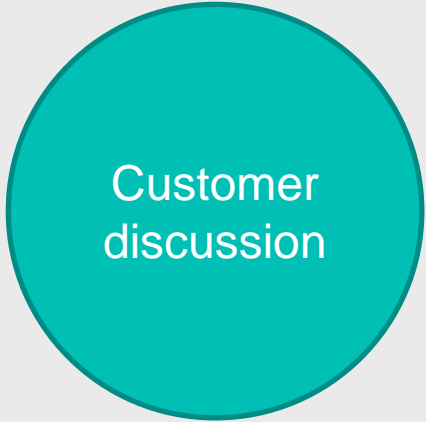
Development Road Map



Development Road Map

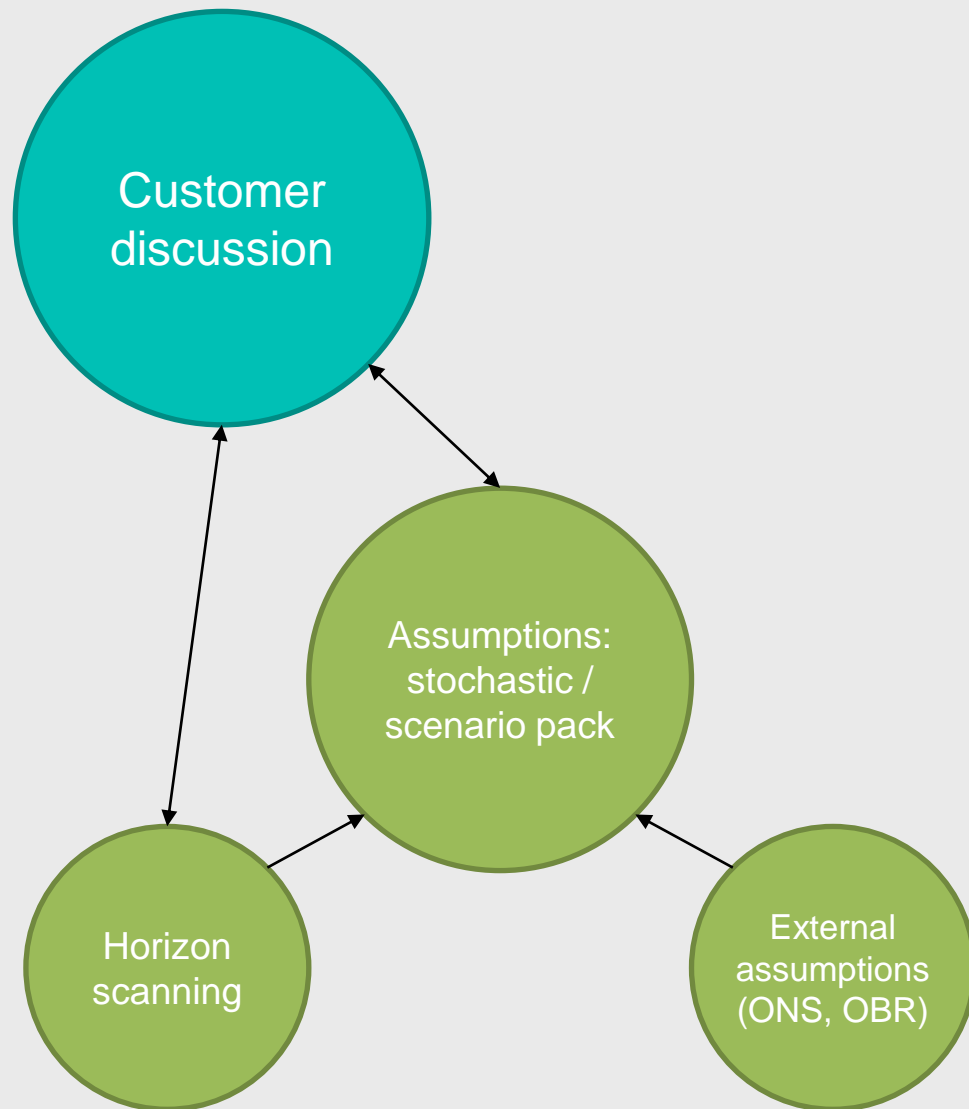


And how will we use it?

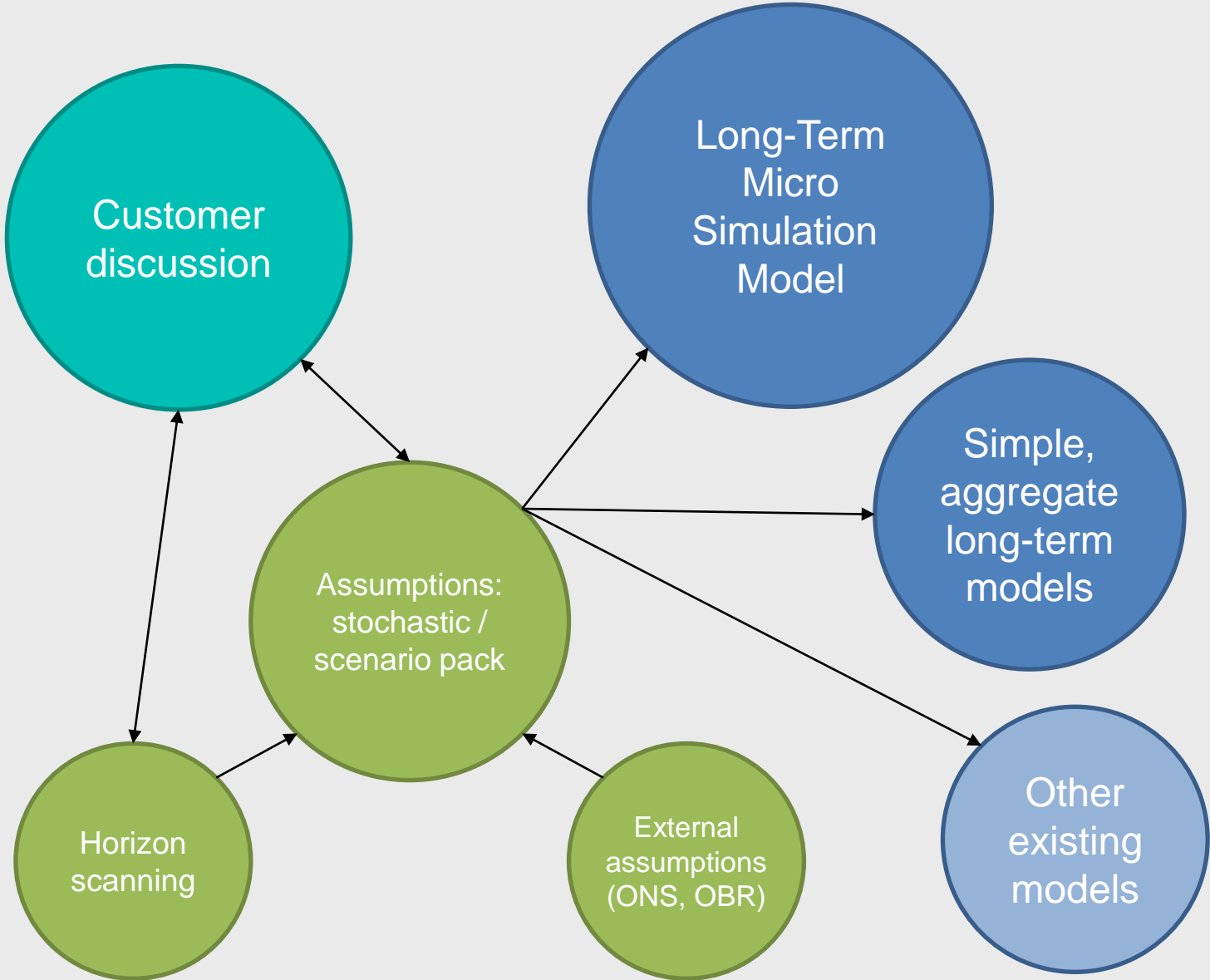


Customer
discussion

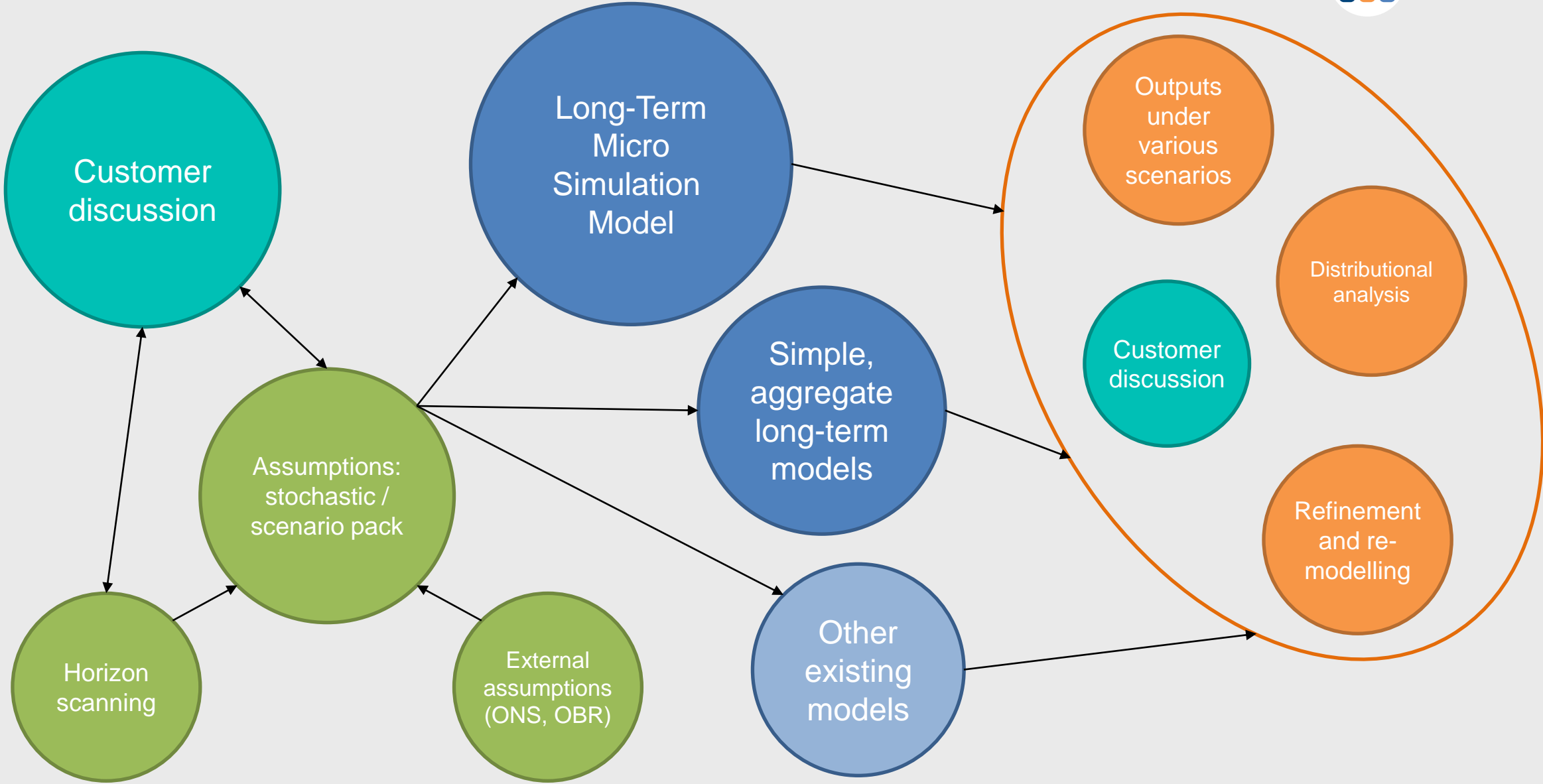
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Contact details



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