FUTURE MIGRATION SCENARIOS FOR EUROPE

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Quantifying and modelling future migration

Development of the migration models from global, through regional/national to local levels

- Global Model

- Regional Model

- Local Model

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Global Population Model

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Global Population Model

Mortality

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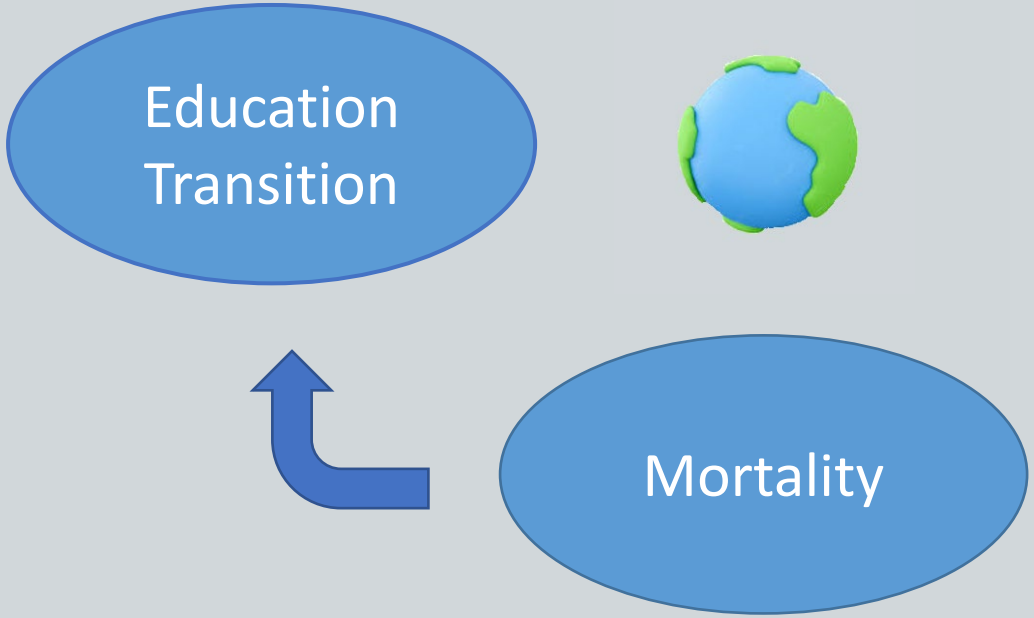

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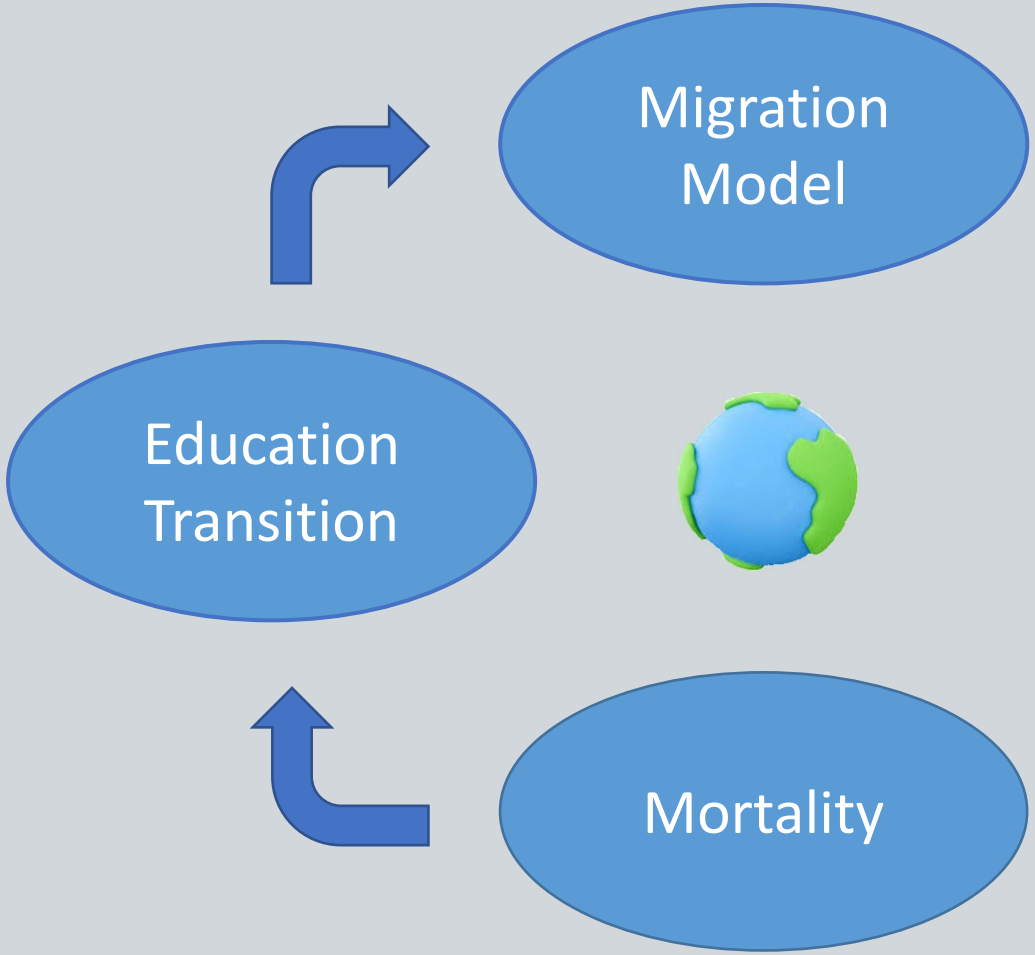
Global Population Model



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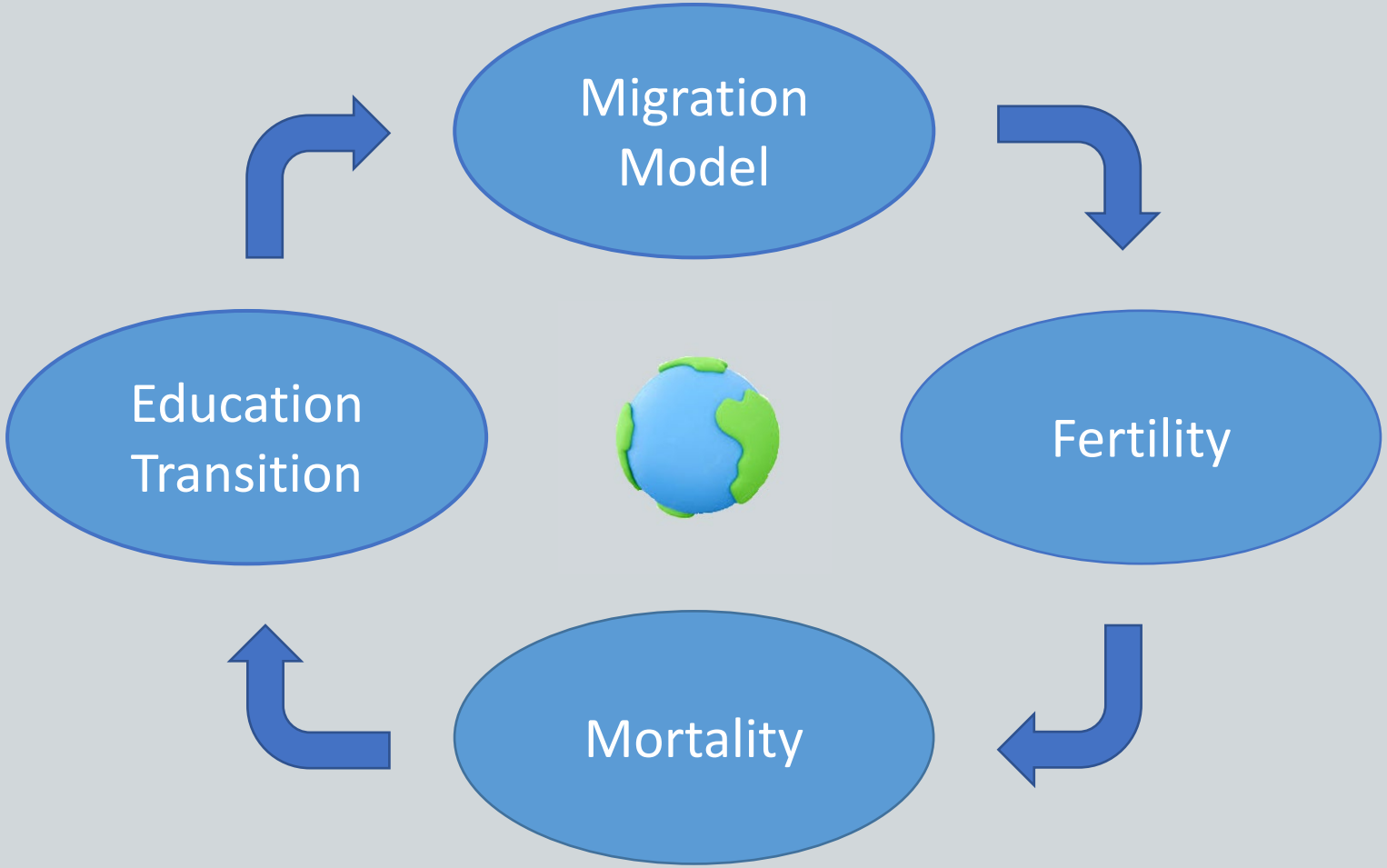

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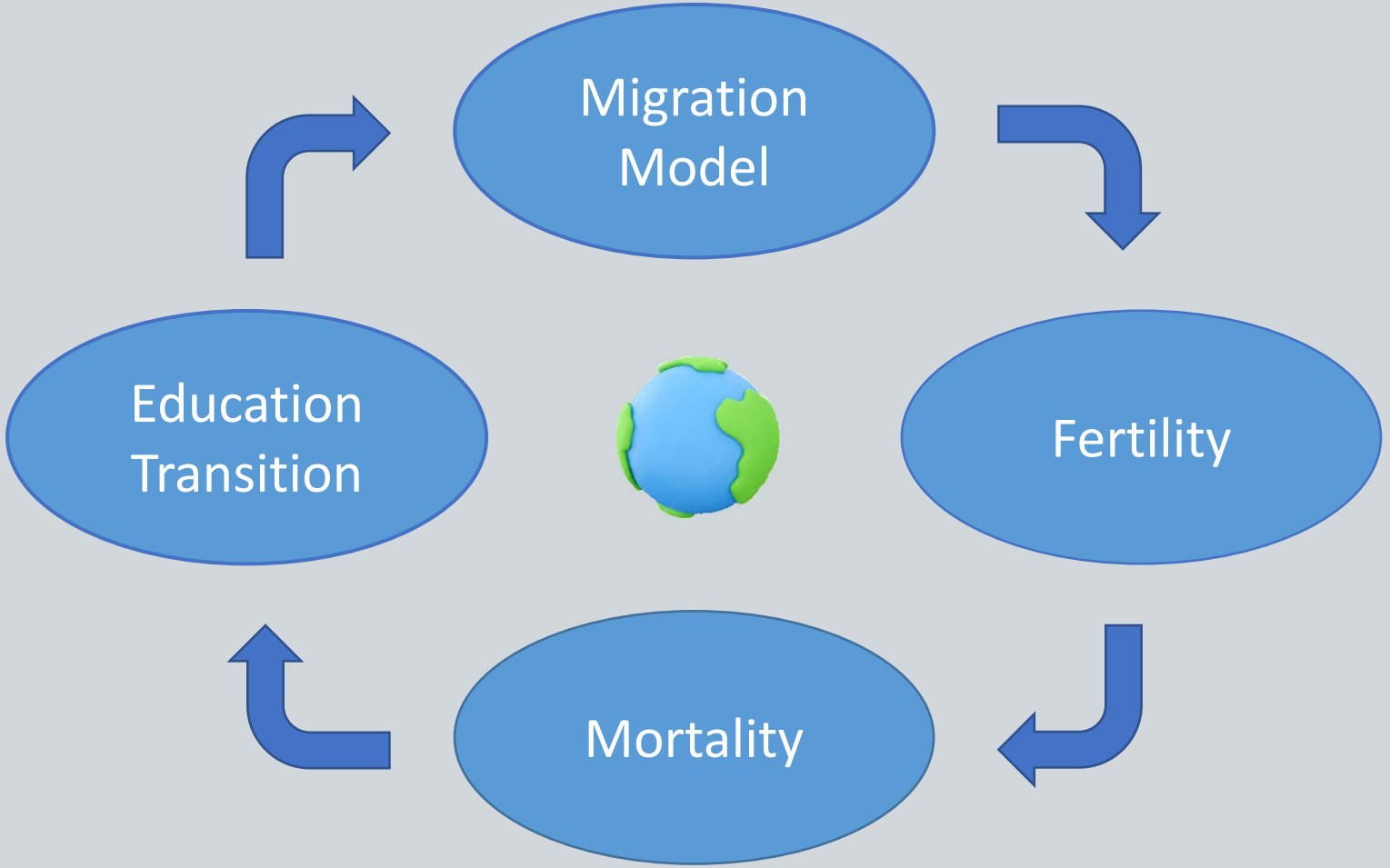

Age	(21)
Education	(6)
Sex	(2)
COB	
COR	

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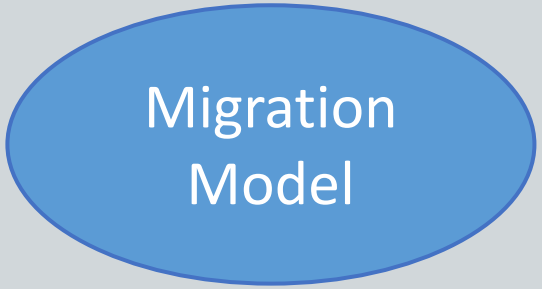
Global Population Model



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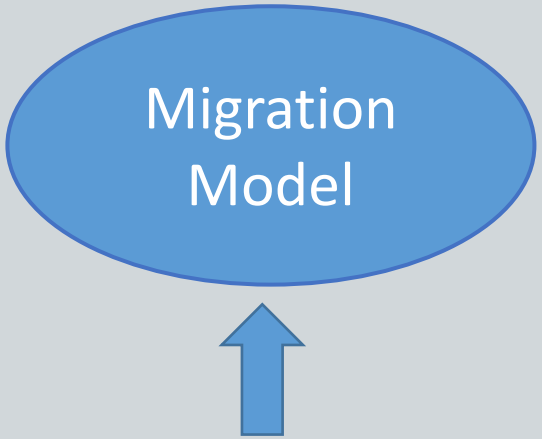

Migration rates based on past migration trends

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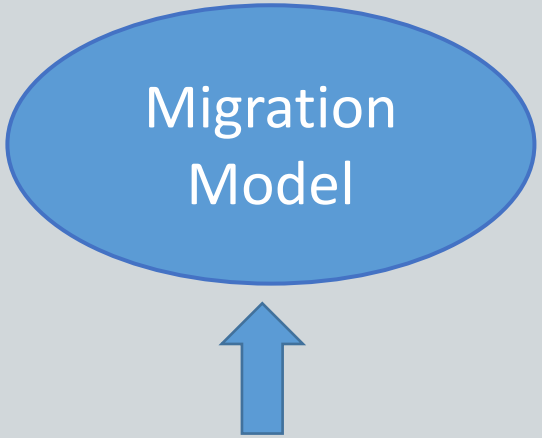

$m_{S,A,k,i \to j}$	Emigration/Transit Migration
$m_{S,A,i,j \to i}$	Return Migration

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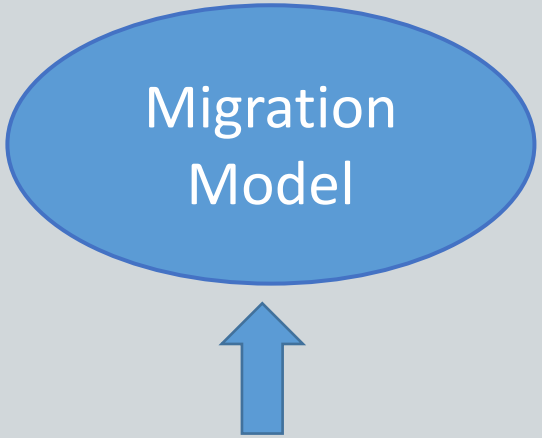
Global Population Model



s = Skill A = Age k = Place of birth i = Place of residence j = Destination	$m_{s,A,k,i \to j}$	Emigration/Transit Migration
	$m_{s,A,i,j \to i}$	Return Migration

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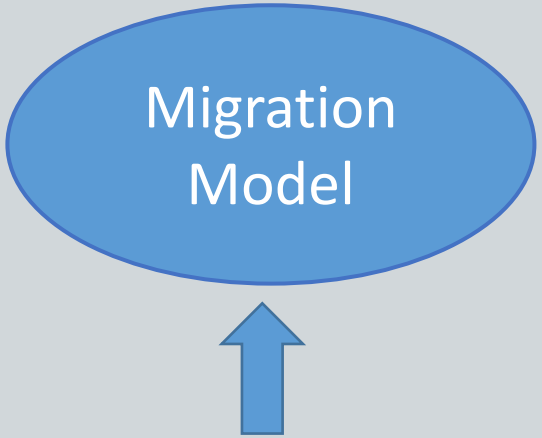
Global Population Model



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Age ∈ {0-24, 25-64, 65+}
Skill ∈ (High-Skill, Low-Skill)

High Skill: upper secondary education or higher
Low Skill: below upper secondary education

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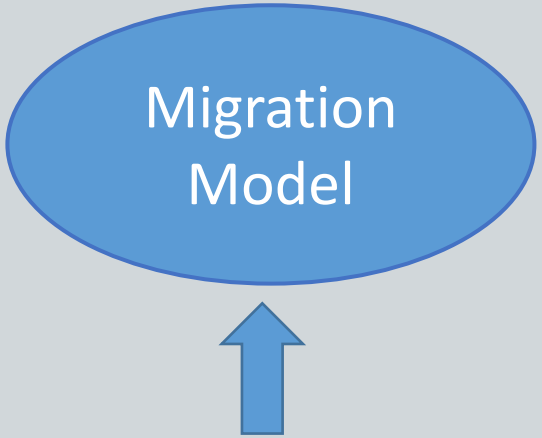
Global Population Model



s = Skill
A = Age
k = Place of birth
i = Place of residence
j = Destination

$$m_{s,A,k,i\to j} = a_A F(G_i) \left(\frac{w_{s,j}}{w_{s,i}}\right)^{\alpha_g} p_{k,j}^{\alpha_p}$$ Emigration/Transit Migration

$$m_{s,A,i,j\to i} = b_A$$ Return Migration

Age ∈ {0-24, 25-64, 65+}
Skill ∈ (High-Skill, Low-Skill)

High Skill: upper secondary education or higher
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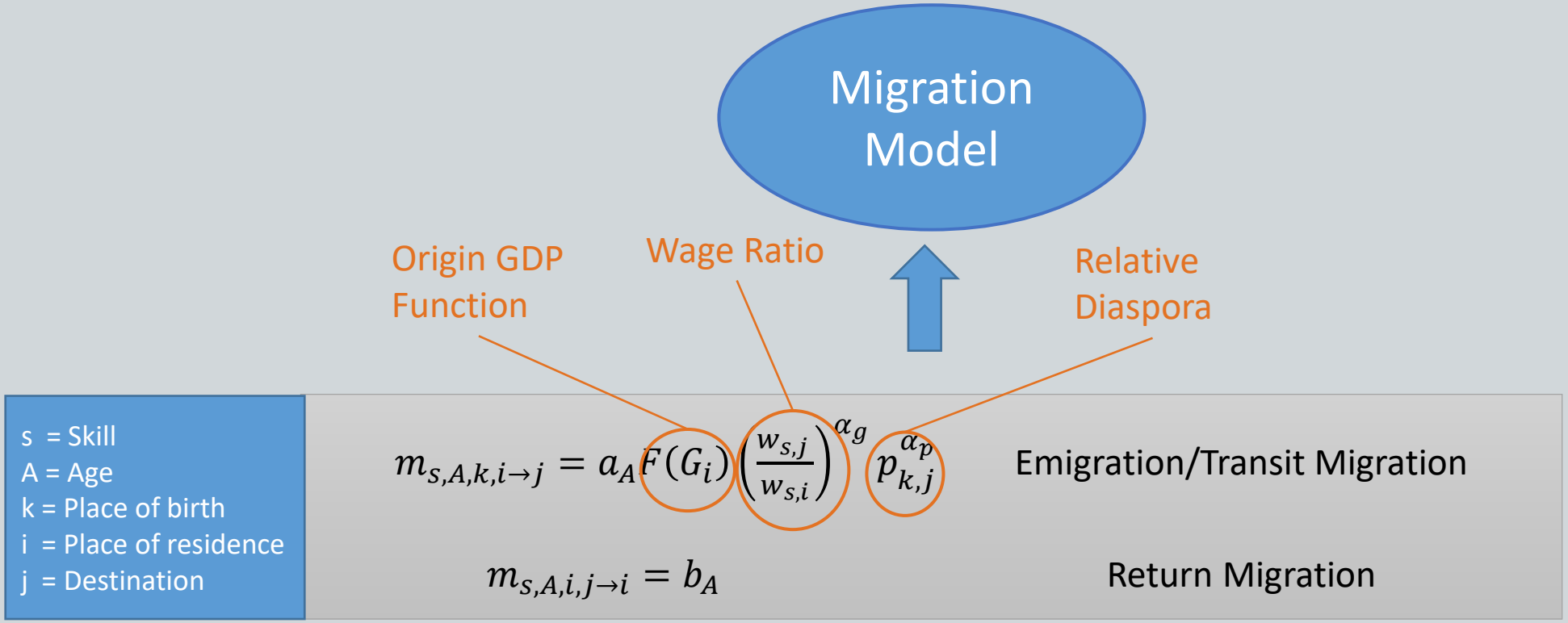
Global Population Model



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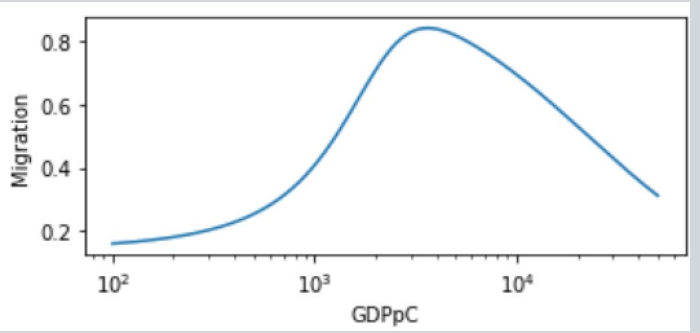
Global Population Model

Origin GDP Function



Migration Model

Origin GDP Function

Wage Ratio

Relative Diaspora

s = Skill
A = Age
k = Place of birth
i = Place of residence
j = Destination

$$m_{s,A,k,i\to j} = a_A F(G_i)\left(\frac{w_{s,j}}{w_{s,i}}\right)^{\alpha_g} p_{k,j}^{\alpha_p}$$

Emigration/Transit Migration

$$m_{s,A,i,j\to i} = b_A$$

Return Migration

Age ∈ {0-24, 25-64, 65+}
Skill ∈ (High-Skill, Low-Skill)

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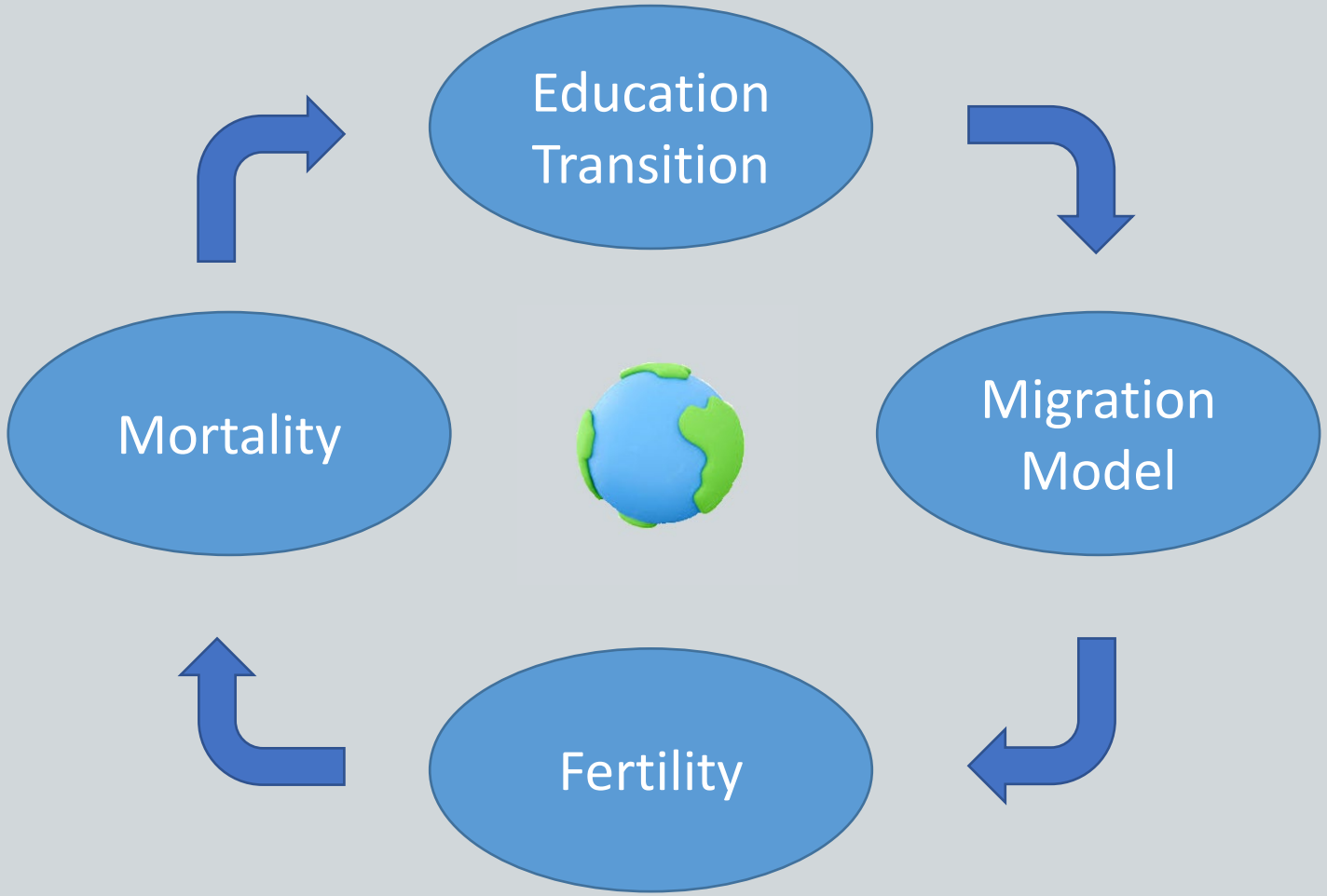
Global Population Model



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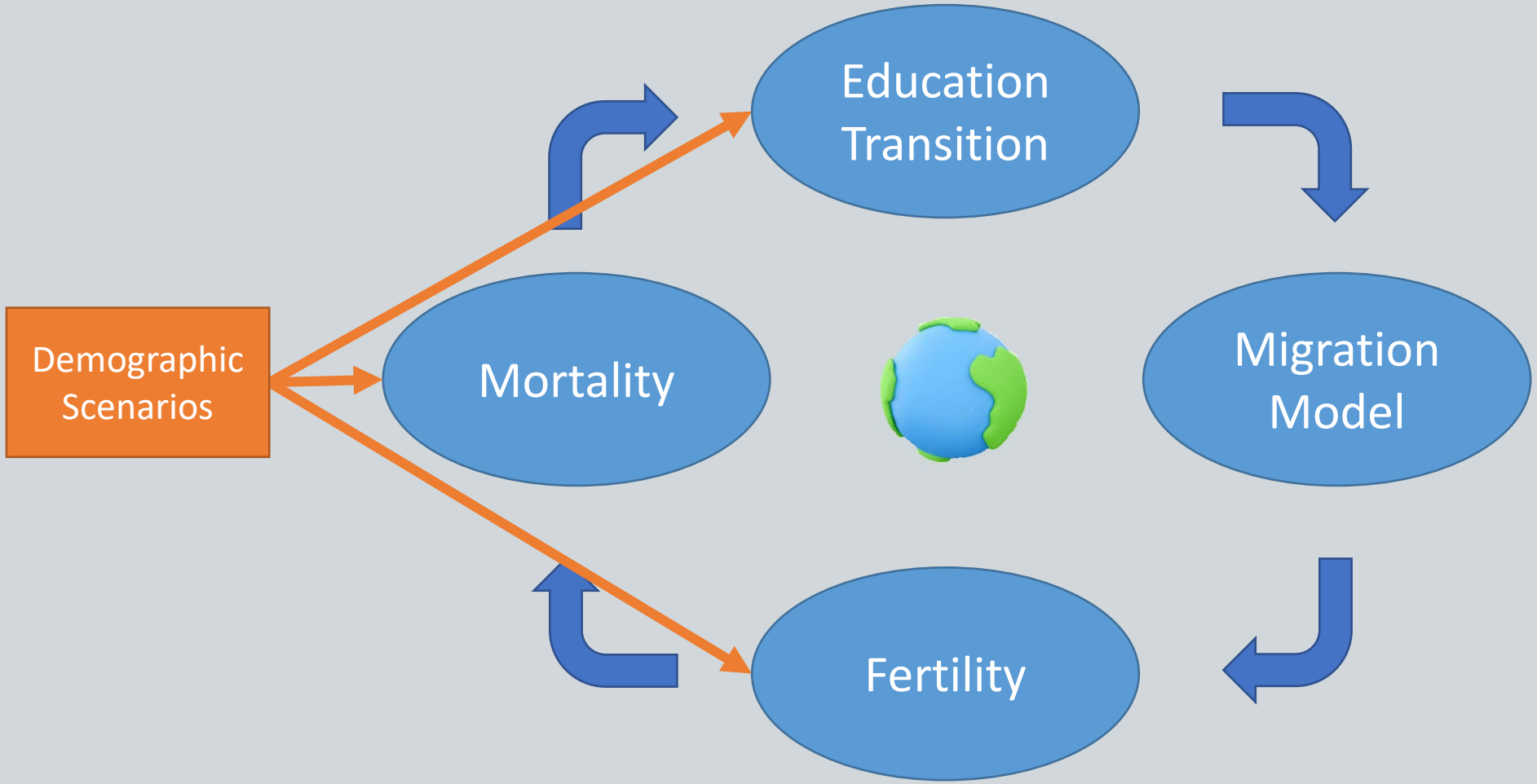

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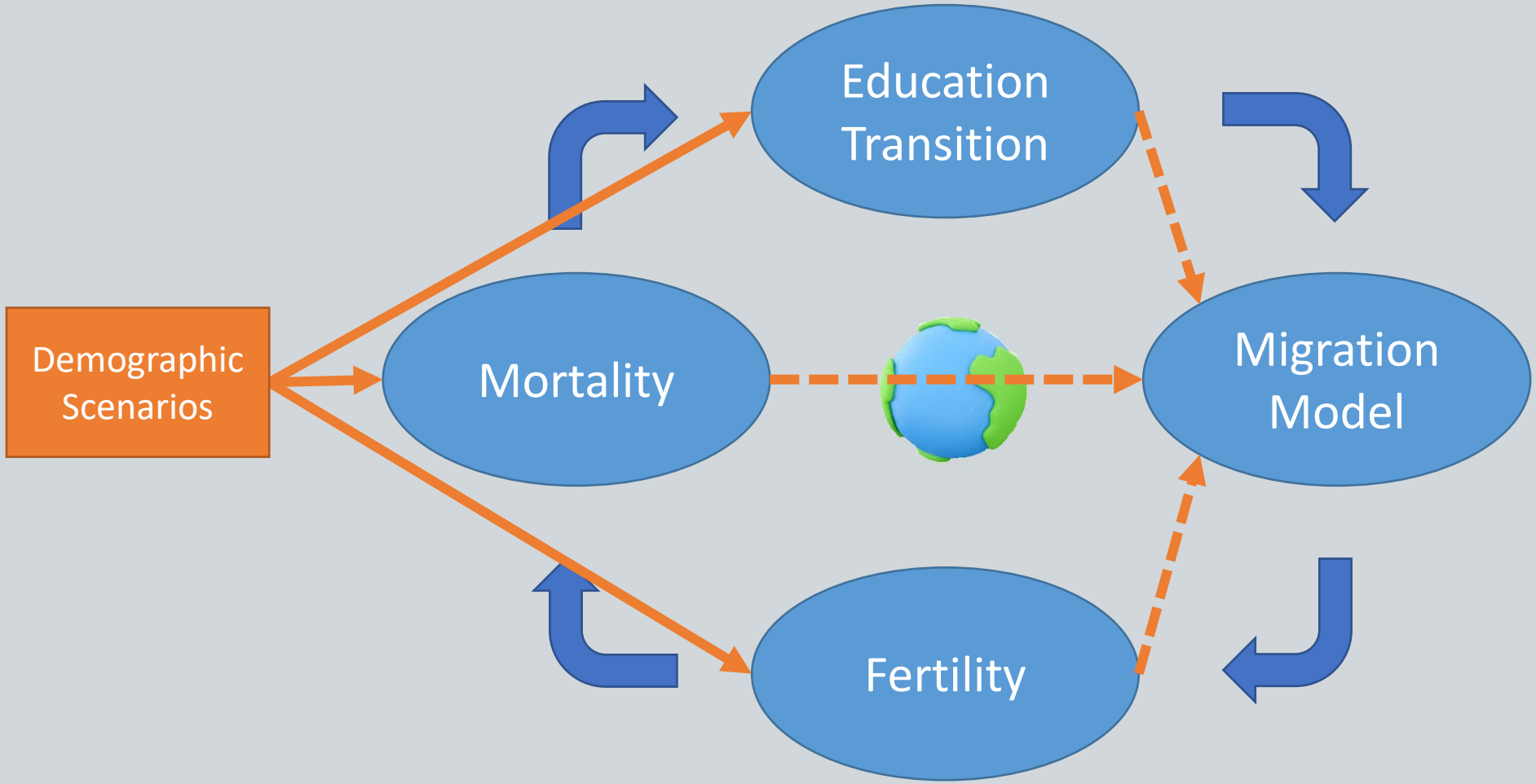

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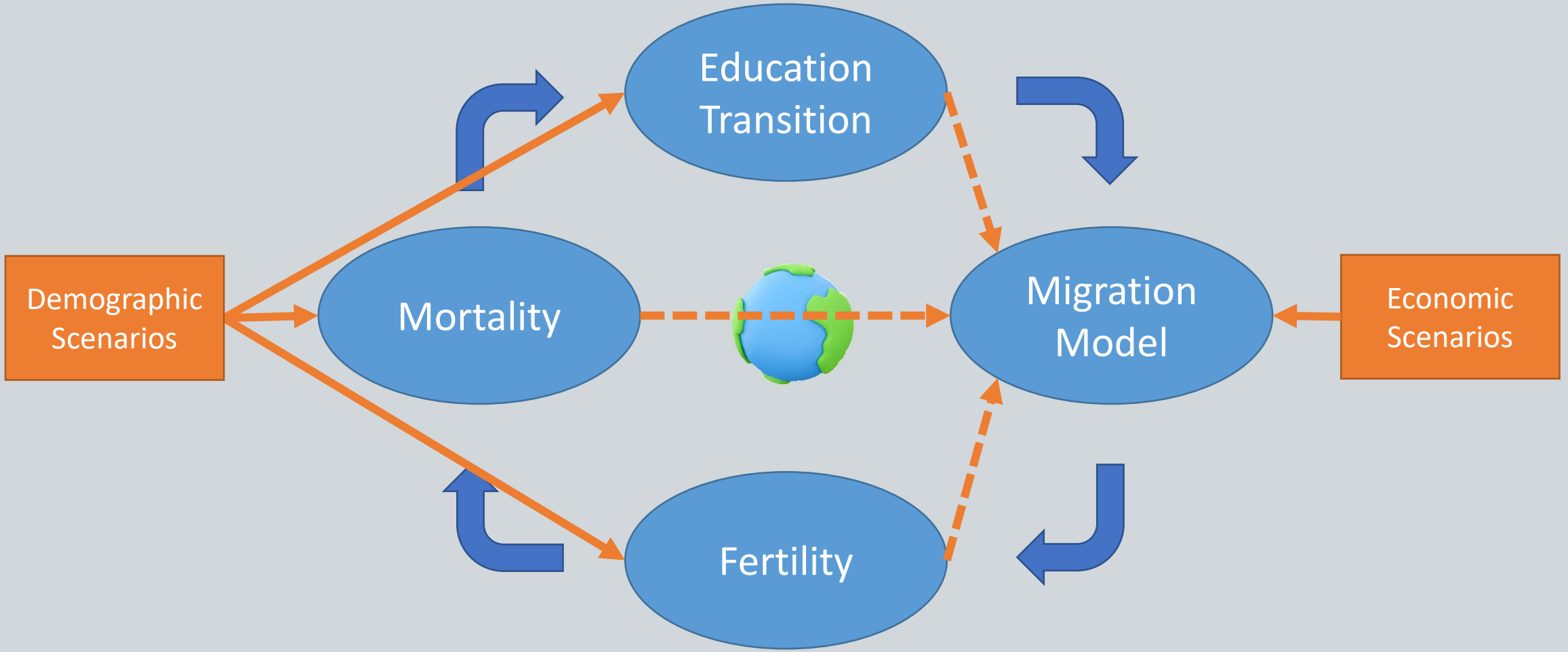

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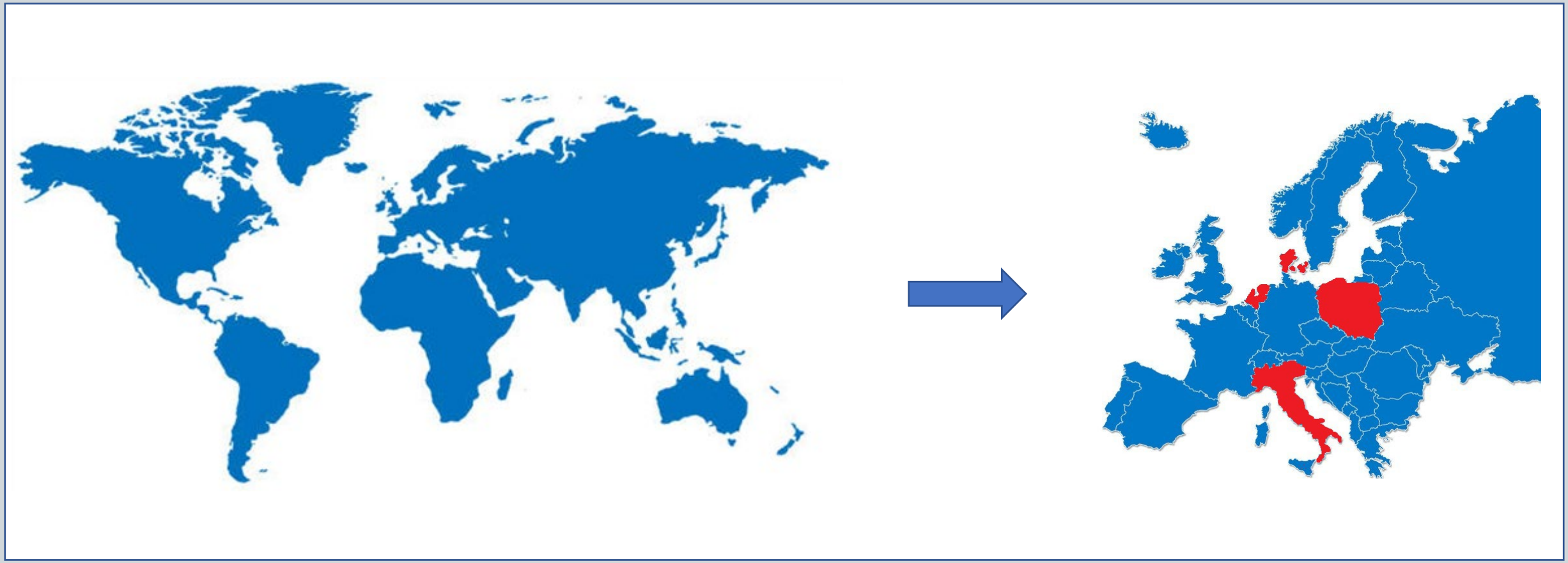
Global to Regional



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Regional Model

- Bi-directional model (City/Rest) consisting of: **Age (A), Sex (S), Migrant status (M), Education (E)**
- Estimate of population in 2020 as the starting population for the regional scenarios

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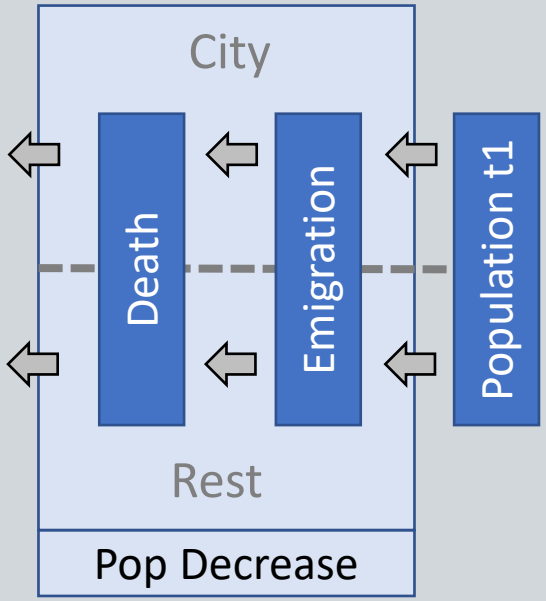
Regional Model



- Bi-directional model (City/Rest) consisting of: **Age (A), Sex (S), Migrant status (M), Education (E)**
- Estimate of population in 2020 as the starting population for the regional scenarios
- Analysis of regional mortality
- Analysis of regional emigration rates in accordance with global results

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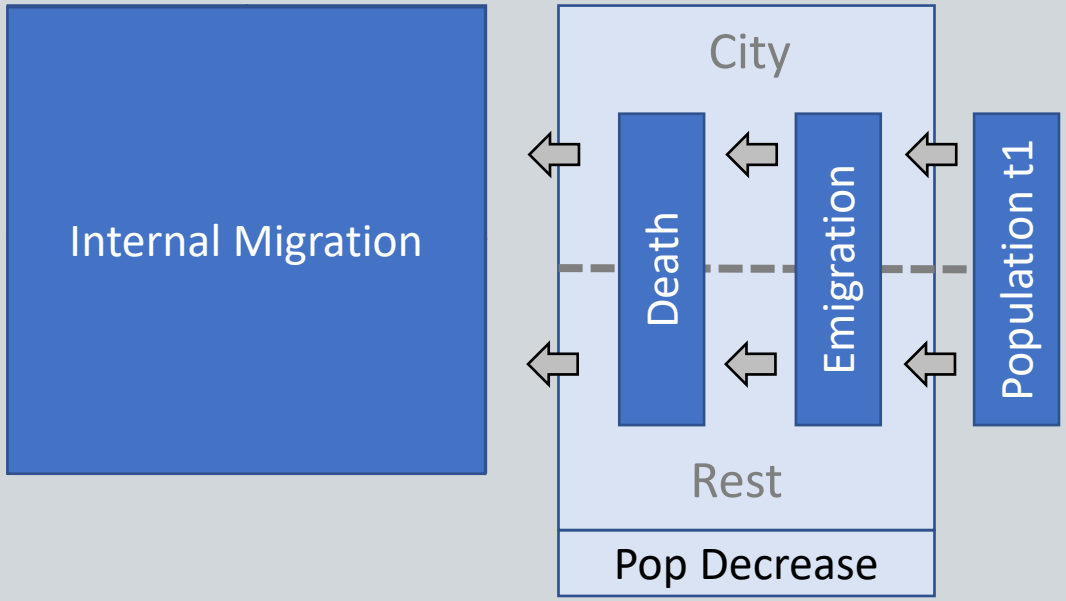
Regional Model



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- Analysis of internal migration

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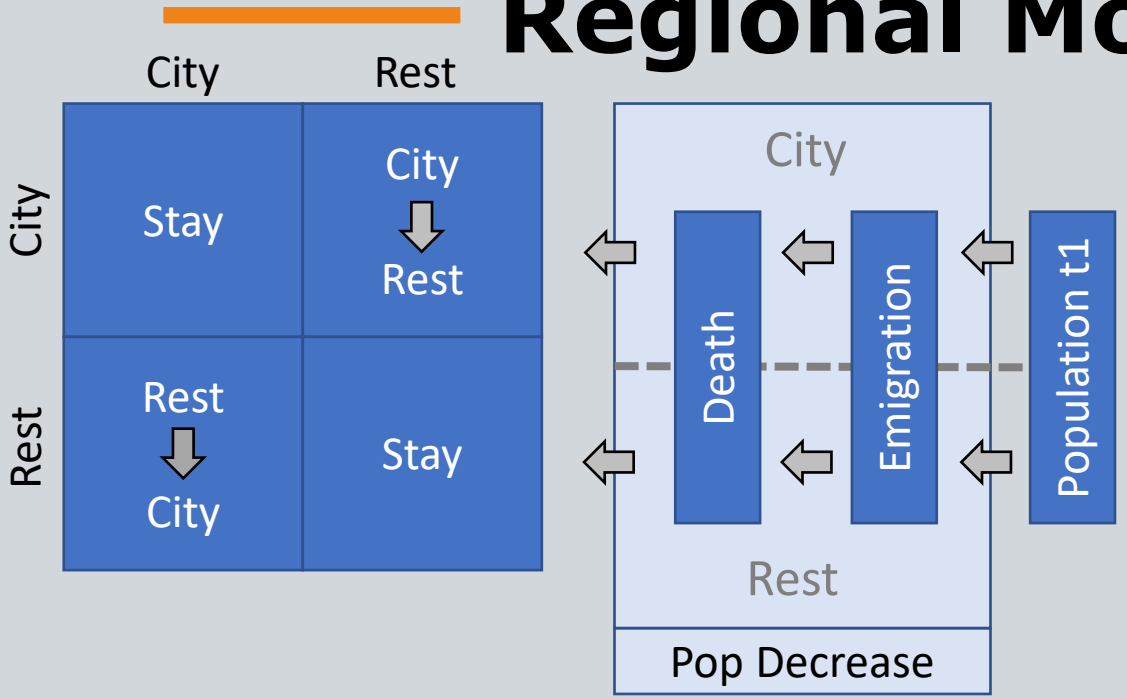

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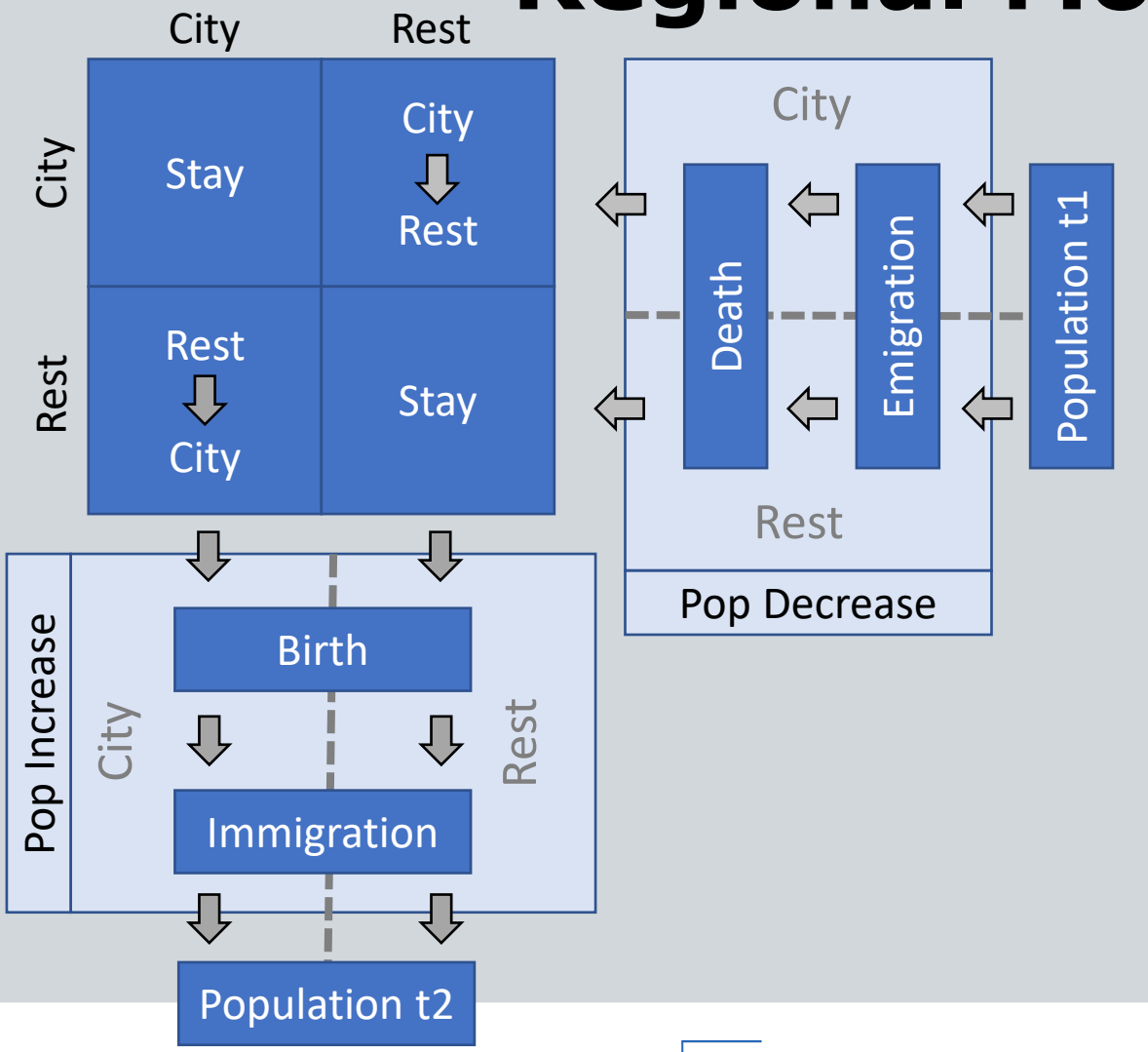
Regional Model



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- Estimate of population in 2020 as the starting population for the regional scenarios
- Analysis of regional mortality
- Analysis of regional emigration rates in accordance with global results
- Analysis of internal migration
- Analysis of regional fertility
- Analysis of regional immigration shares in accordance with global results

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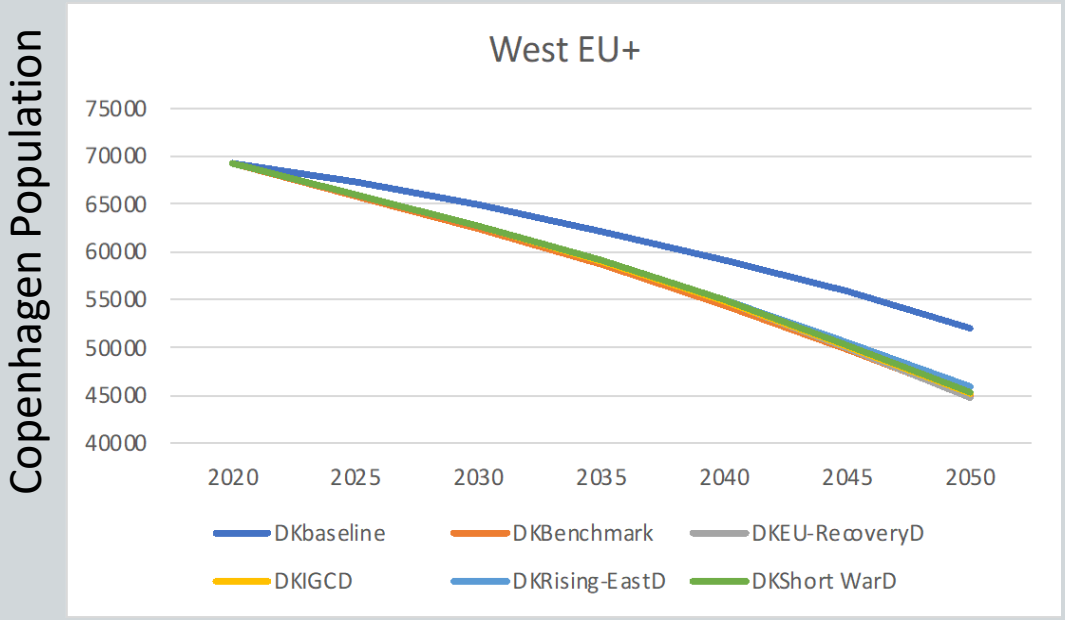
Regional Model



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- Estimate of population in 2020 as the starting population for the regional scenarios
- Analysis of regional mortality
- Analysis of regional emigration rates in accordance with global results
- Analysis of internal migration
- Analysis of regional fertility
- Analysis of regional immigration shares in accordance with global results

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Regional to Local

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Local Model

The proposed approach is based on a **spatial disaggregation methodology** that combines the output of the subnational projection model to local development plans for the future of the cities. It relies on a Machine Learning (ML) regression model employing multi-output Convolutional Neural Network (CNN).

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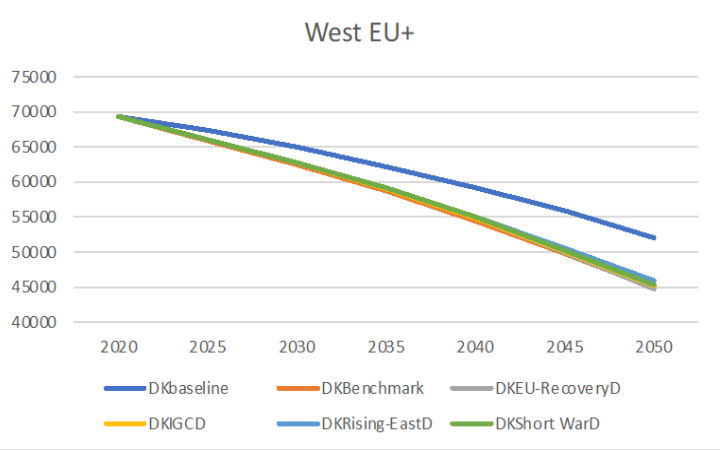
Local Model

The proposed approach is based on a spatial disaggregation methodology that combines the output of the **subnational projection model to local development plans for the future of the cities**. It relies on a Machine Learning (ML) regression model employing multi-output Convolutional Neural Network (CNN).



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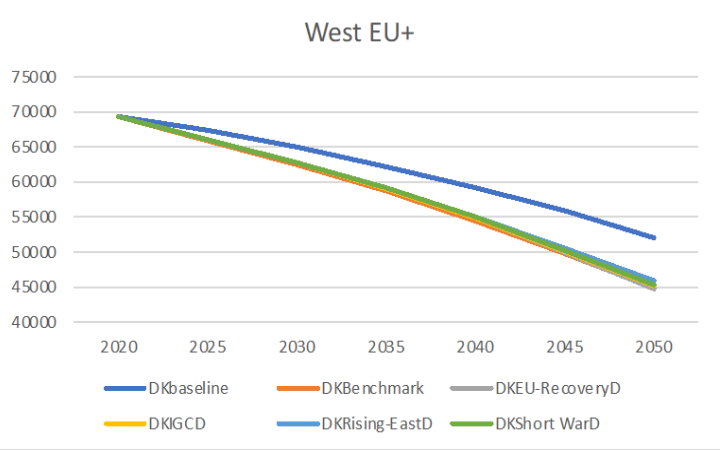

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Local Model

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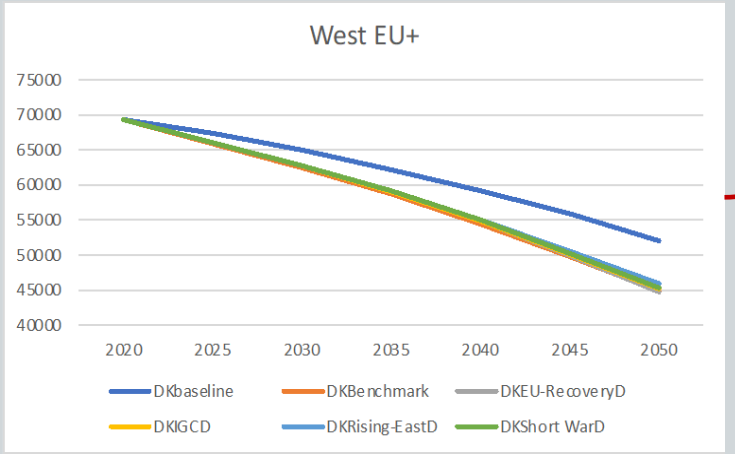
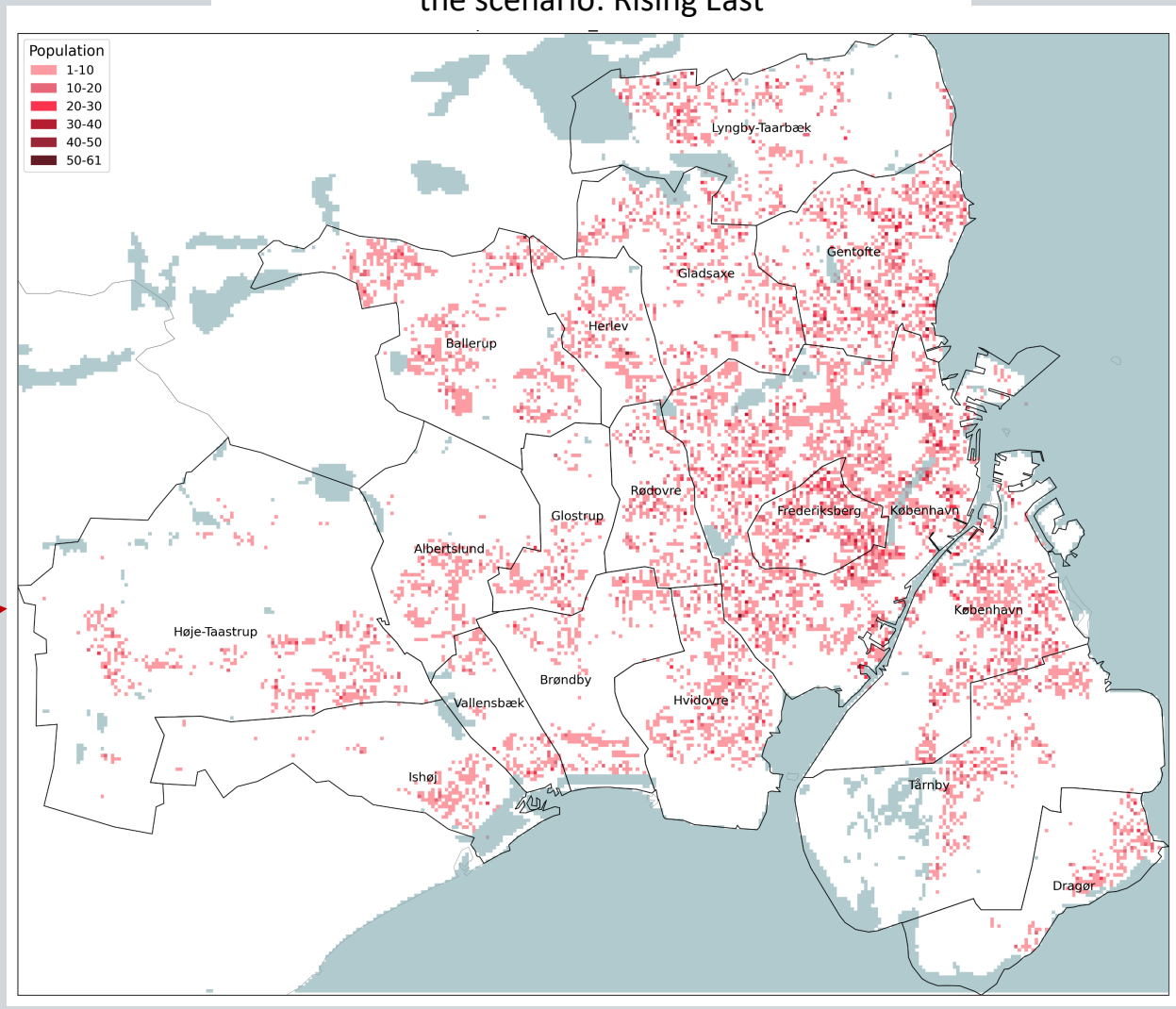


Distribution of West EU+ migrants in 2050 under the scenario: Rising East



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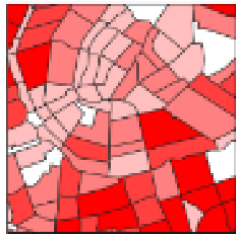
Local Model

Aggregated data



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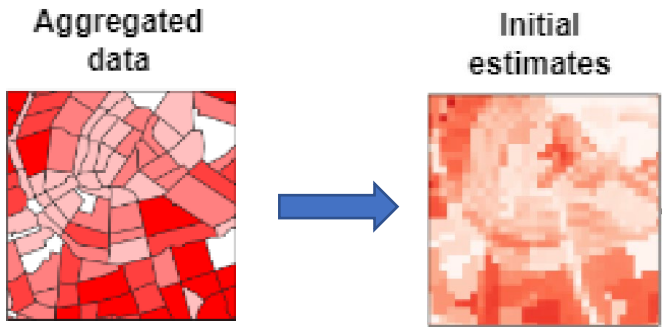
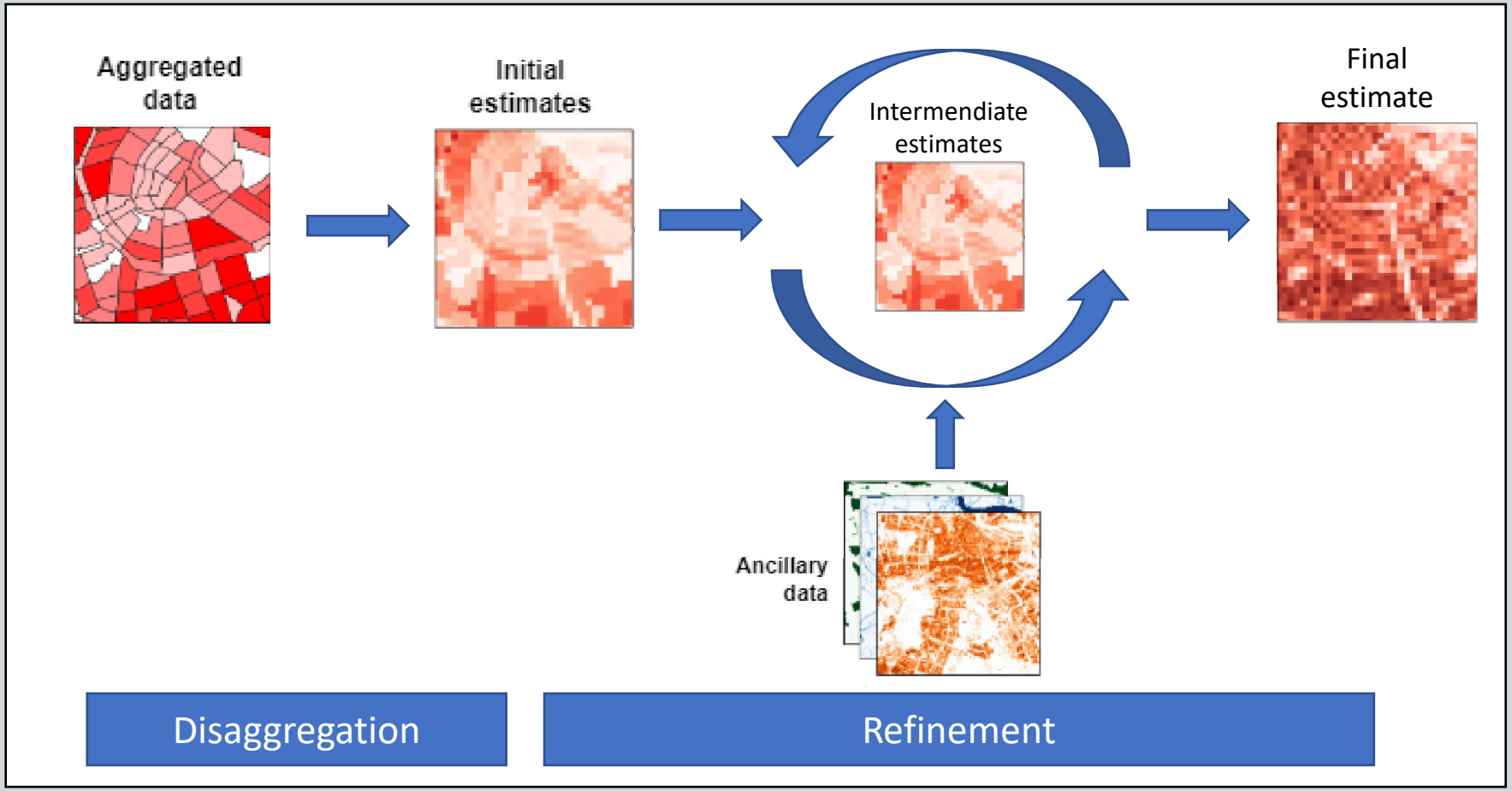
Local Model



Disaggregation

Local Model


Aggregated data
Initial estimates
Intermendiate estimates
Final estimate
Ancillary data
Disaggregation
Refinement

Thank you

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