# Localized scenario technique considering societal dimension of SDGs

2019/Nov.19 AIM International Workshop, Tsukuba

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# Necessity of localized SSP

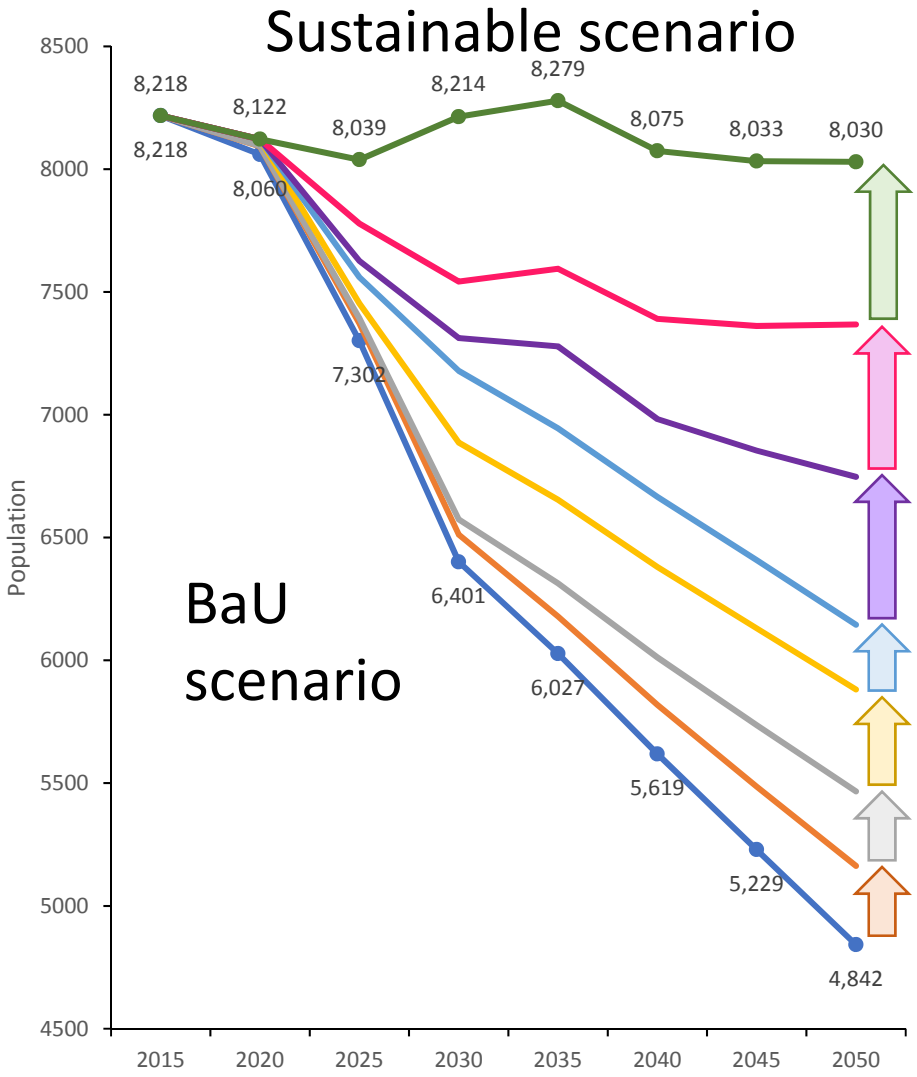
- Actions at local (municipal) scale
  - ICLEI, C40
  - Own mitigation target of local governments
    - E.g. State Government of US

- Adaptation assessment needs socio-economic scenarios
  - Demography, Economy,Land-use

  → Population projection in *one* scenario at municipal scale in Japan is provide by MHLW

- SDGs – Integrated approach
  - Economic, environmental, societal
  - Societal dimension:
    - Gender, Education, Community, Equity/Equality, Decent work
  - Demography and economy  scenario is inevitable

# Societal dimensions: ex. Demography




Impact to population increase against BaU

| | Total | Single | Com-bined |
|---|---|---|---|
| **Education/Local human resource development** | 662 | 427 | 235 |
| **Sustainable agriculture and food business** | 621 | 558 | 62 |
| **Electric and Information industry** | 602 | 413 | 189 |
| **Local consumption** | 263 | 184 | 80 |
| **Commuters' town development** | 415 | 386 | 29 |
| **Childcare support** | 303 | 219 | 84 |
| **Sustaining existing industries** | 321 | 199 | 122 |

# Objective

- Provide reference socio-economic variables in Municipalities in Japan

"Japan Local SSP"

- Useful at the ground of local policy making process
- Consistent with SSP
- Easy interpretation
- Transparent
- Accountable and accessible

# Procedure

- Develop “Japan SSP” (by Dr. Matsuhashi and other members)
  - Narratives
  - Direction of population and population distribution
  - Direction of economy
- Finding important local factors corresponding to Japan SSP elements
- Develop population scenarios
  - Qualitative interpretation
  - Parameter settings
  - Projection in 5 SSPs
- Develop economic scenarios
  - Growth rate by industries
  - Labor participation
  - Employment distribution

# Japan SSP

- A three year project lead by Dr. Matsuhashi funded by MOEJ
- Develop localized SSP for adaptation
- World → Japan → Municipalities

World SSP

| | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|
| **Birth rate** | **0** | **0** | **-** | **-** | **+** |
| **Death rate** | **-** | **0** | **+** | **0** | **-** |
| **Immigrants** | **0** | **0** | **0** | **0** | **+** |

Japan SSP

| | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|
| **Birth rate** | **+** | **0** | **-** | **-** | **0** |
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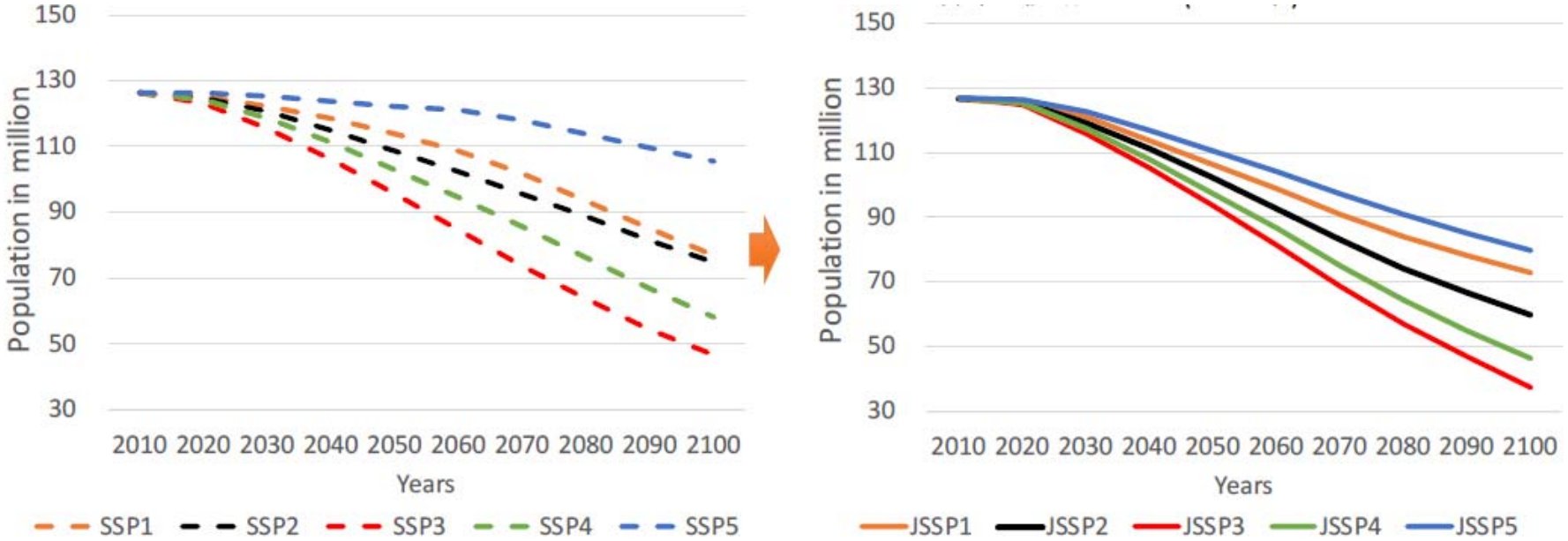


# Japan SSP: Population distribution

Relative population size in comparison to SSP2

| | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|
| Metropolitan & Urban | ＋ | 0 | － | － | ＋＋ |
| Metropolitan & Rural | 0 | 0 | － | 0 | ＋ |
| Other & Urban | ＋ | 0 | － | － | ＋ |
| Other & Rural | 0 | 0 | － | 0 | 0 |

Parameters for population projection

- Birth rate (Woman-child ratio)
- Surviving rate
- Net migration rate (NMR)

→ Control population distribution by modifying net migration rate.

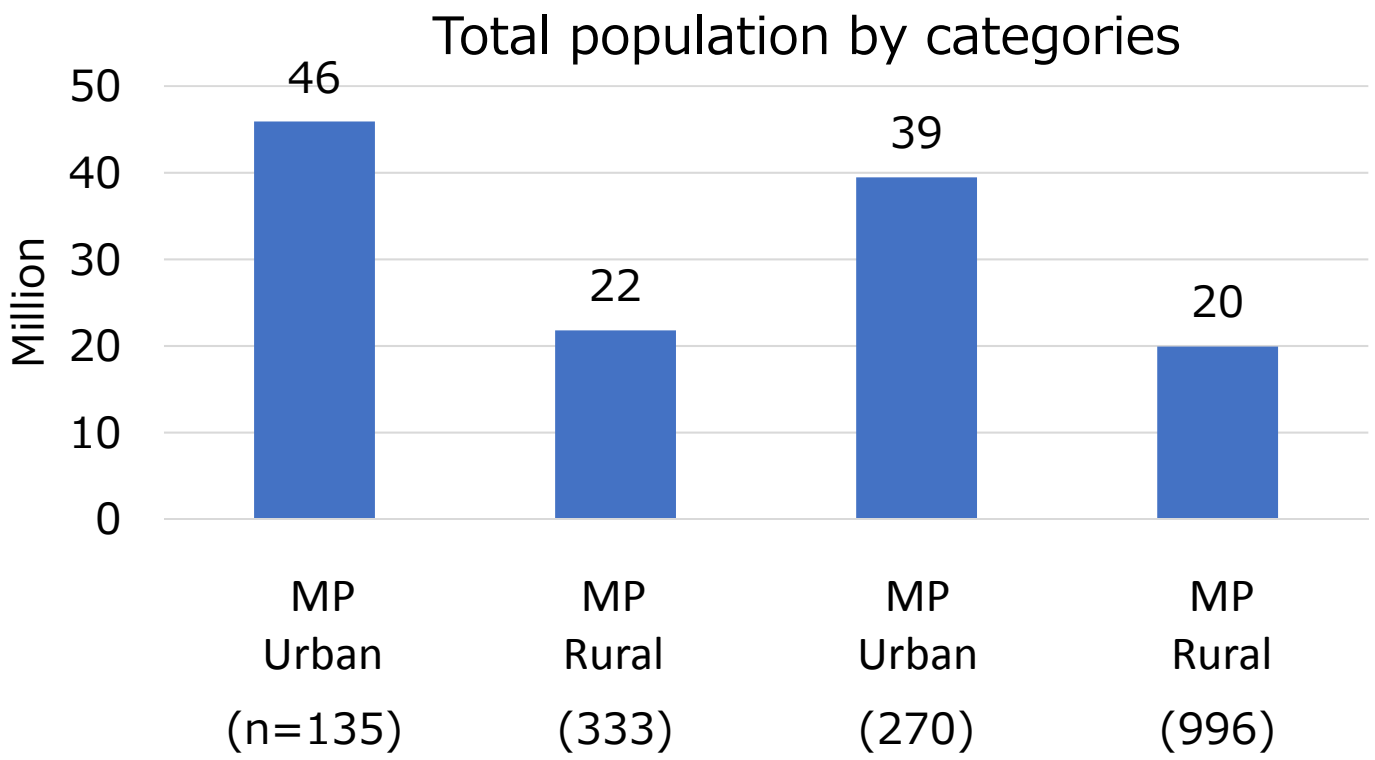
# Region Categories

- 2x2=4 regions: Metropolitan area (MP)/Other area,　Urban/Rural
- Unit: Municipalities (Cities, Towns, Villages, and Tokyo Special Wards) approx. 1700
  - 47 prefecture→ too large to differentiate urban/rural
  - Availability of data and easy-understanding of users
  - Fukushima prefecture: Treated as one region.
- Categorize 1700 municipalities
  - Metropolitan → MLIT's definition in PT survey
  - Urban/Rural → Threshold in four indicators ( Urban if ≧ 2pts)

Indicators and thresholds

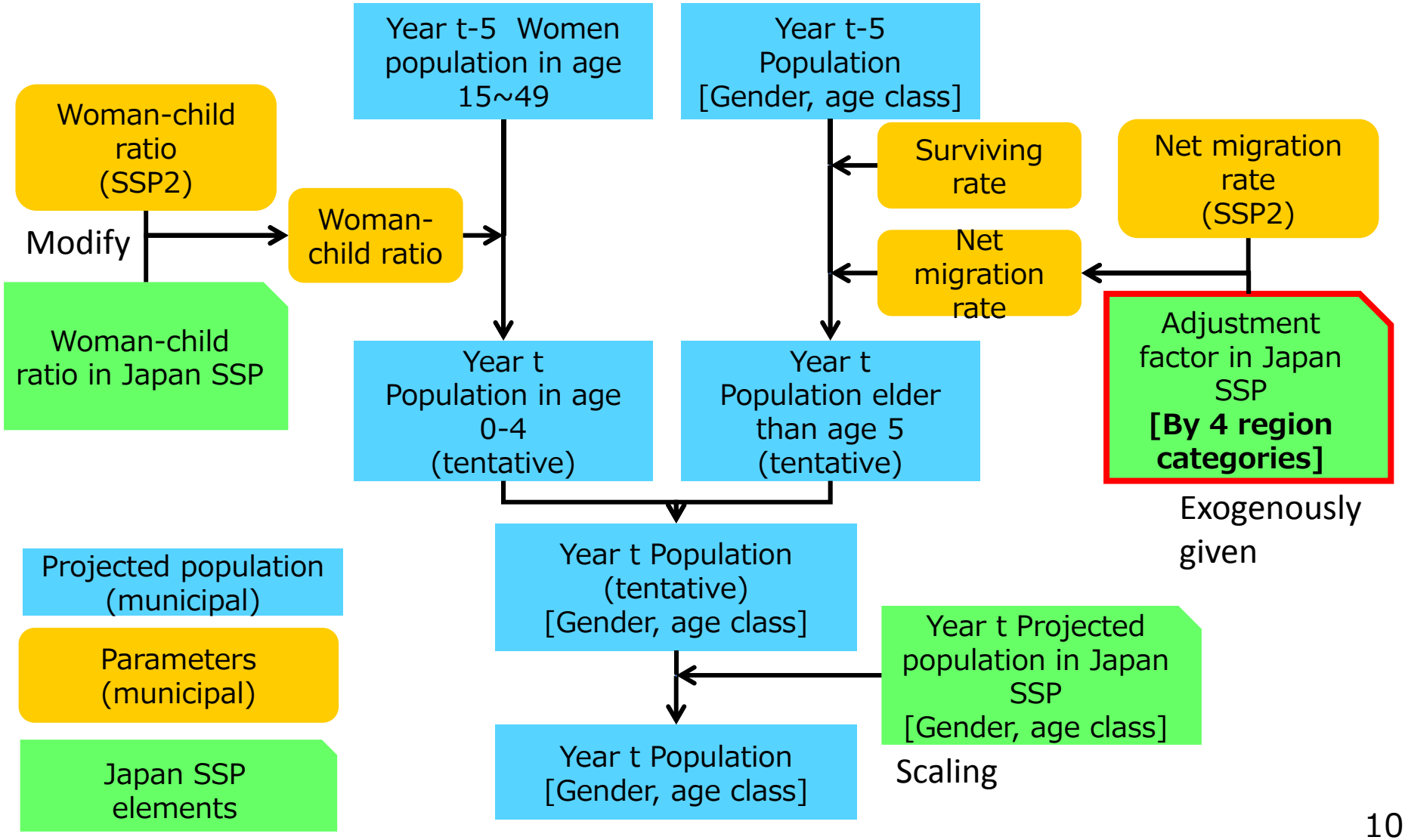
| | Unit | MP | Other |
|---|---|---|---|
| Population | – | 300,000 | 30,000 |
| Density in habitable area | /km2 | 4000 | 1500 |
| DID population ratio | - | 0.9 | 0.6 |
| Net migration rate | /5yrs | 1.0% | 0.0% |

# Total population by categories in 2015



# Flow of projection

- Year 2015 to 2100, every 5 years
- NMR which gives the result consistent to Japan SSP was found by try-and-error

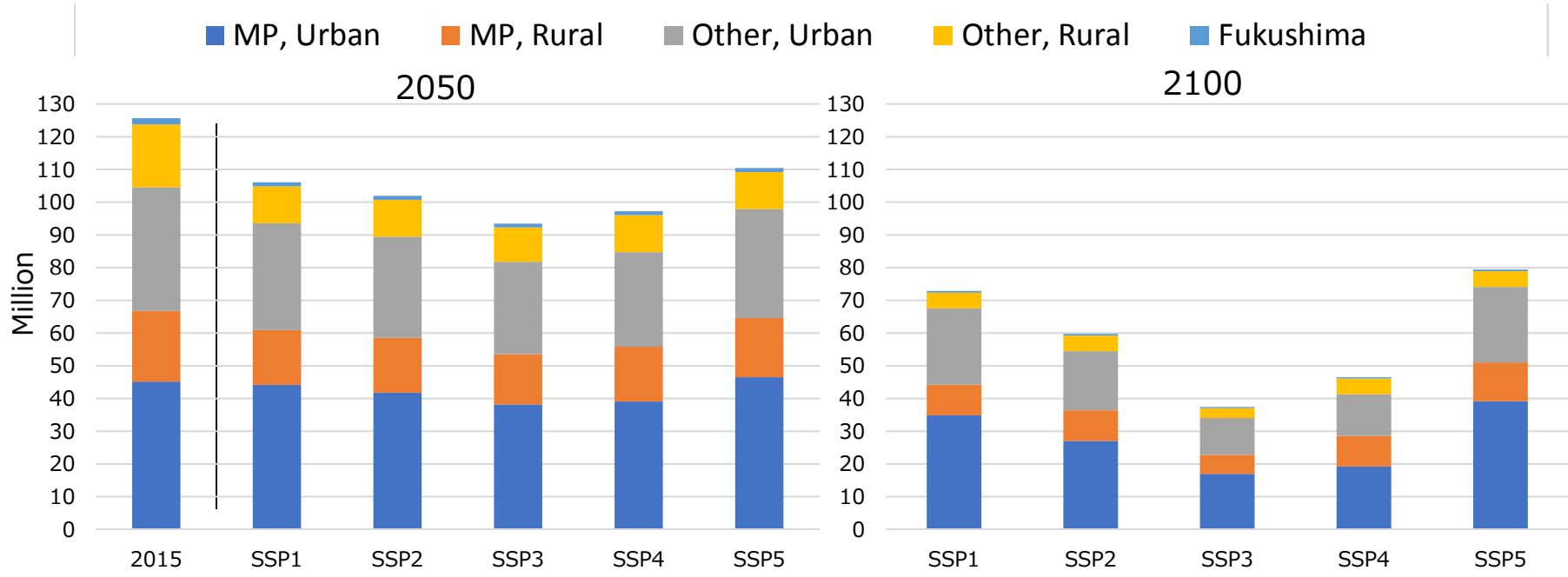


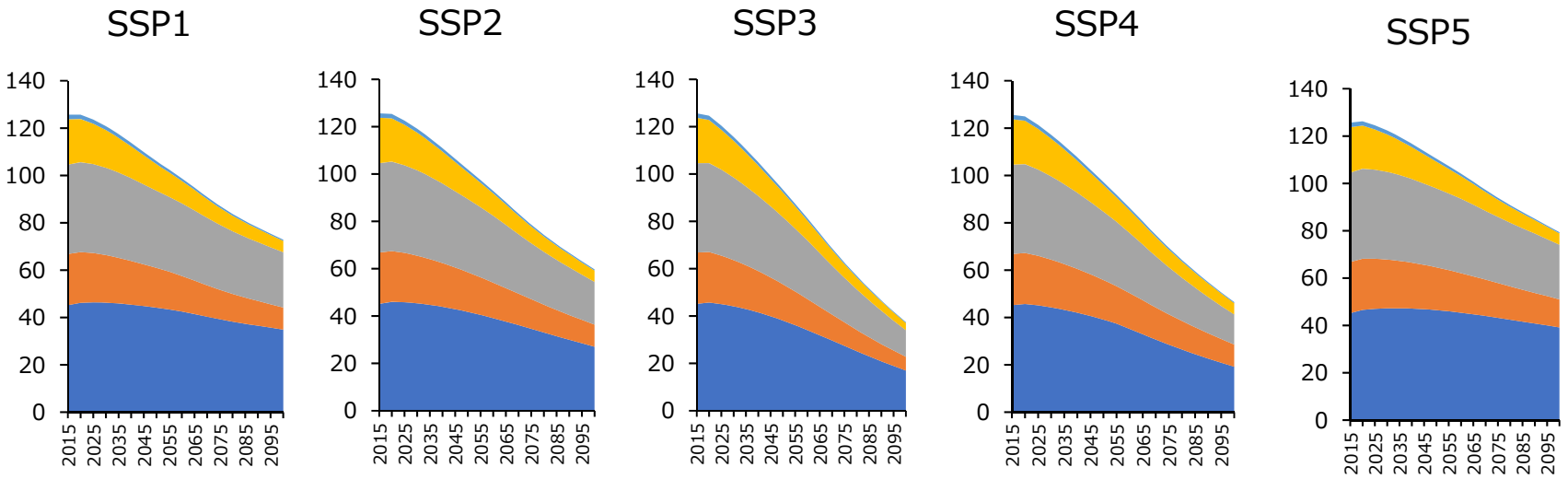
# Parameters

| | | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|---|
| Birth rate | | High | High | → 1 | → 1.2 | Middle |
| Surviving rate | | Middle | Middle | Middle | Middle | Middle |
| Foreign immigrants | | - | - | - | - | + |
| Net migration rate (vs SSP2) 2015-2050 | MP & Urban | +0.8% | - | - | -1.0% | +1.2% |
| | MP & Rural | ±0% | - | - | ±0% | +0.8% |
| | Other & Urban | +0.8% | - | - | -1.0% | +0.8% |
| | Other & Rural | ±0% | - | - | +0.8% | -0.1% |
| Net migration rate (vs SSP2) 2015-2050 | MP & Urban | +0.17% | -* | -* | -3.6% | +1.2% |
| | MP & Rural | -0.45% | -* | -* | +0.36% | +0.8% |
| | Other & Urban | +0.18% | -* | -* | -3.0% | +0.8% |
| | Other & Rural | 0.65% | -* | -* | +1.1% | -0.1% |

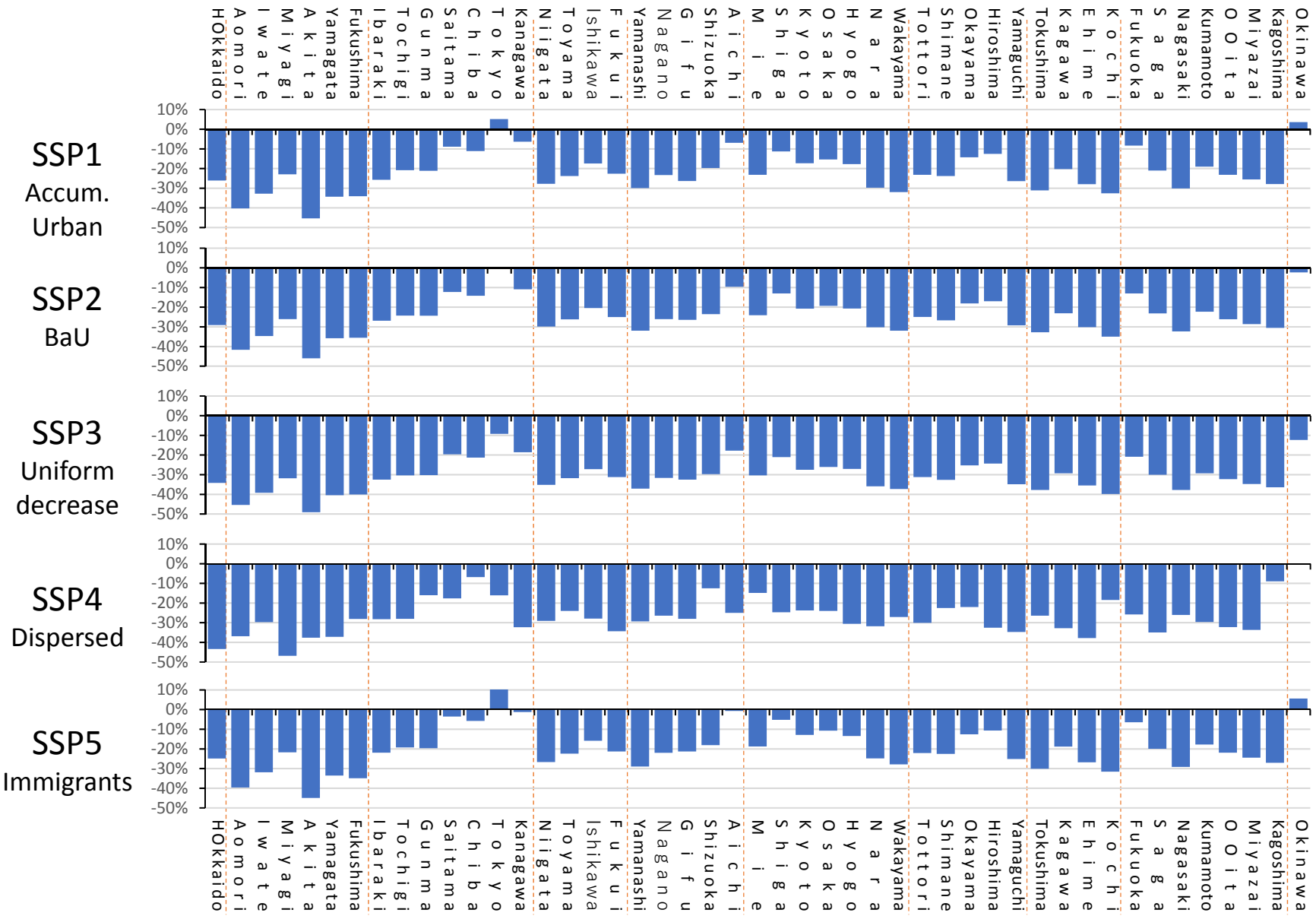
* Converge to 0 in year 2100. Decrease absolute value linearly since 2050.

# Projected Population in 4 regions

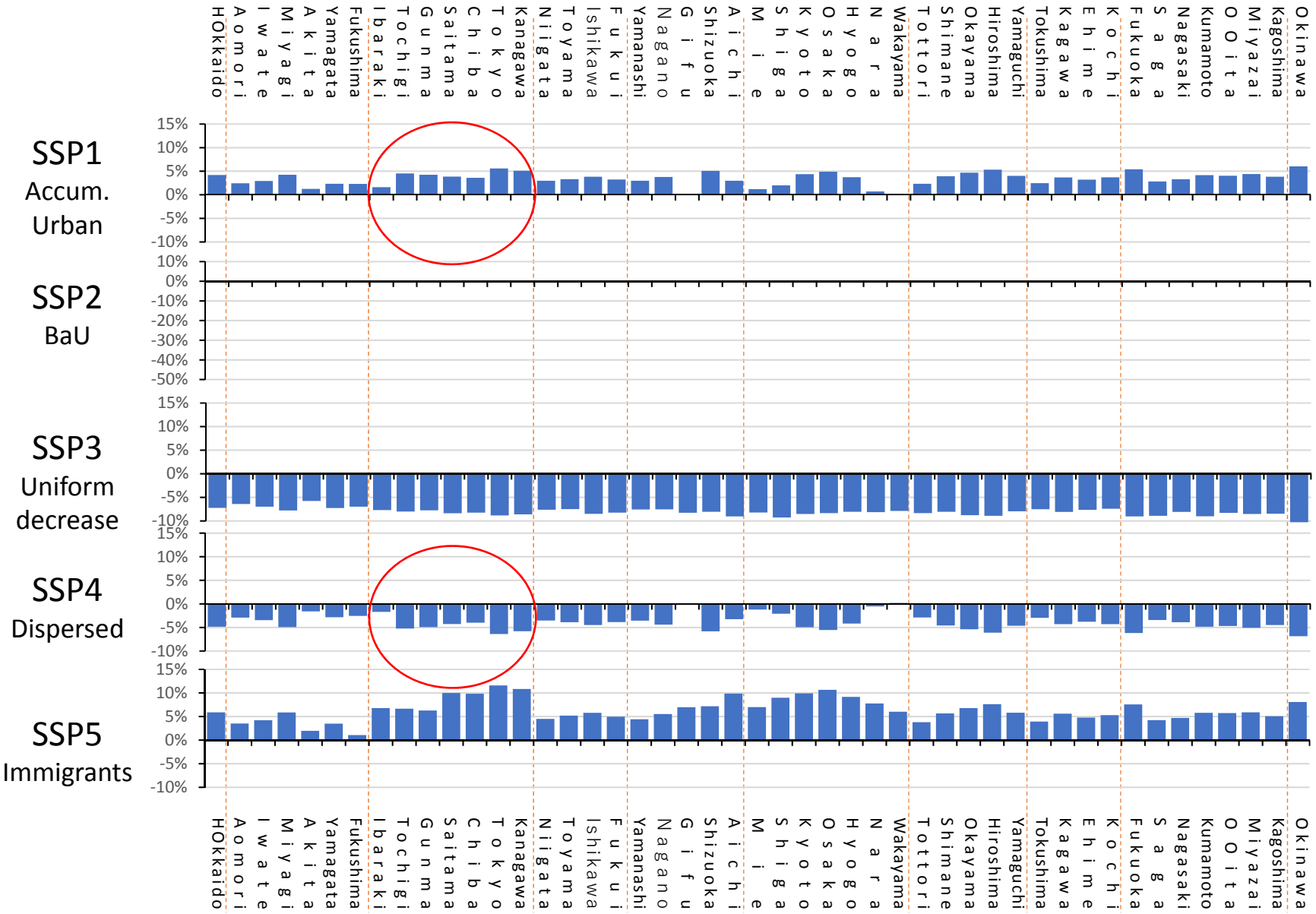


# Prefectural population in 2050 (vs 2015)



# Prefectural population in 2050 (vs SSP2)



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| Other & Rural | 0 | 0 | － | 0 | 0 |

Parameters for population projection

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- Surviving rate
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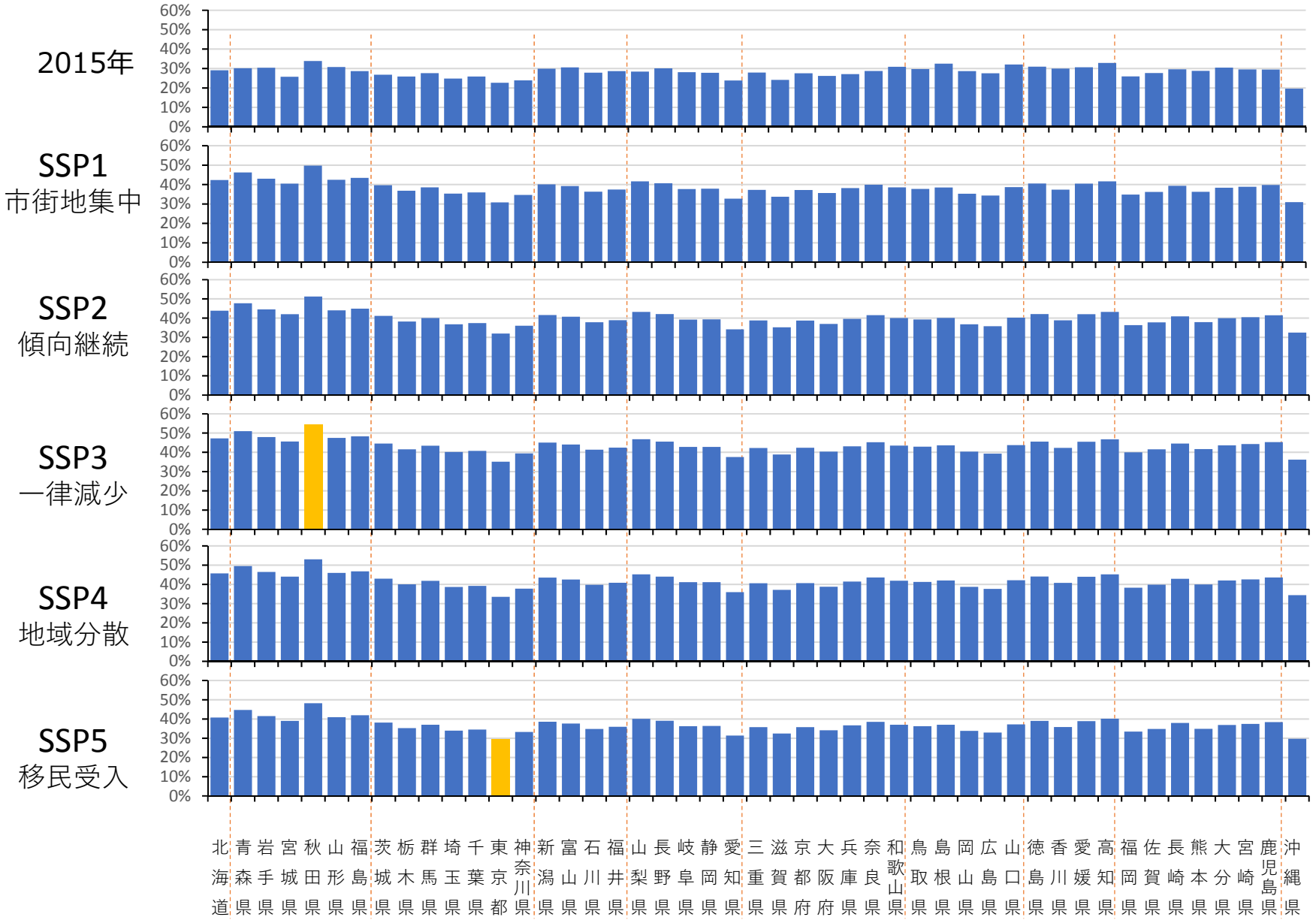
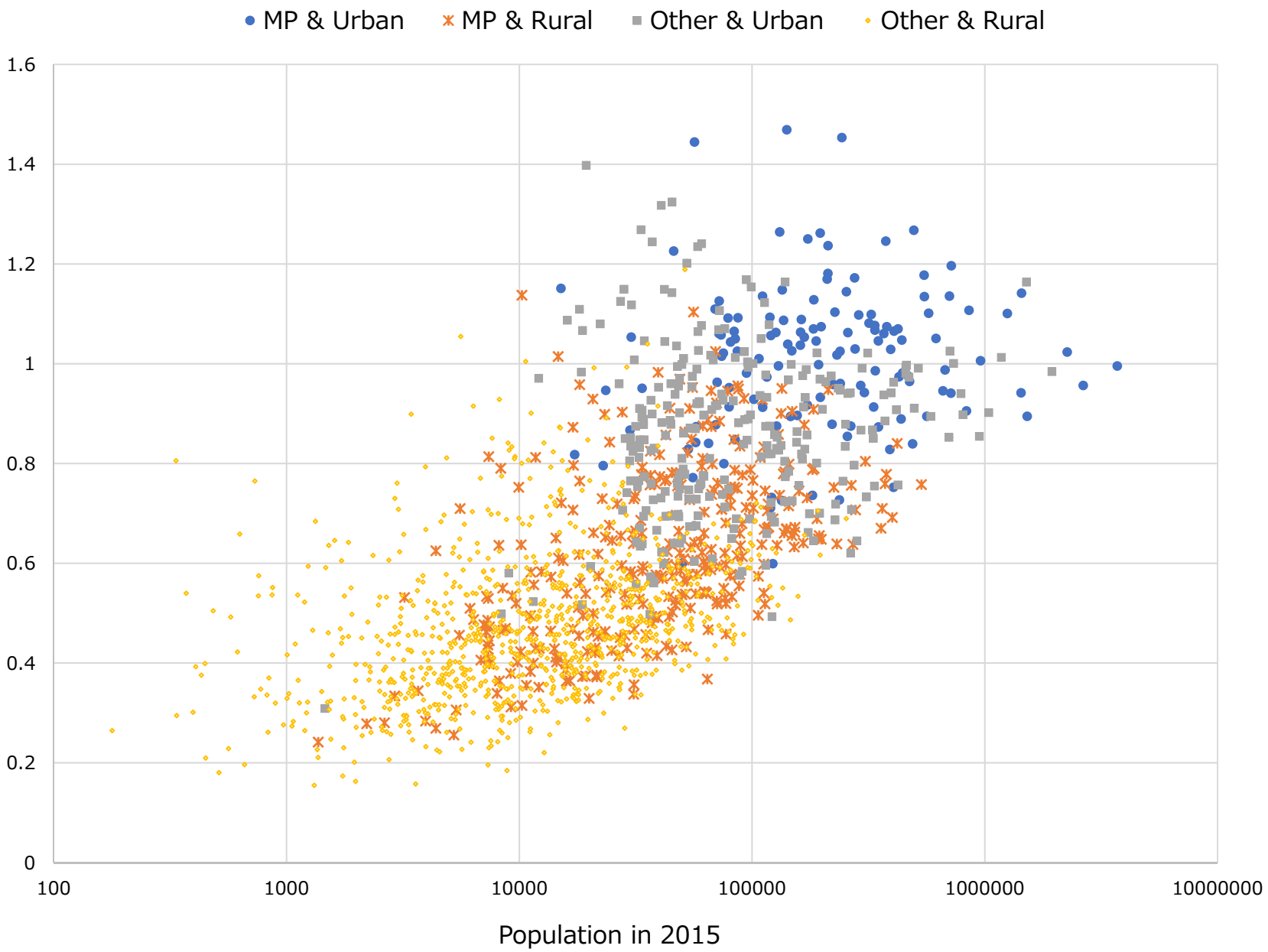
→ Control population distribution by modifying net migration rate.

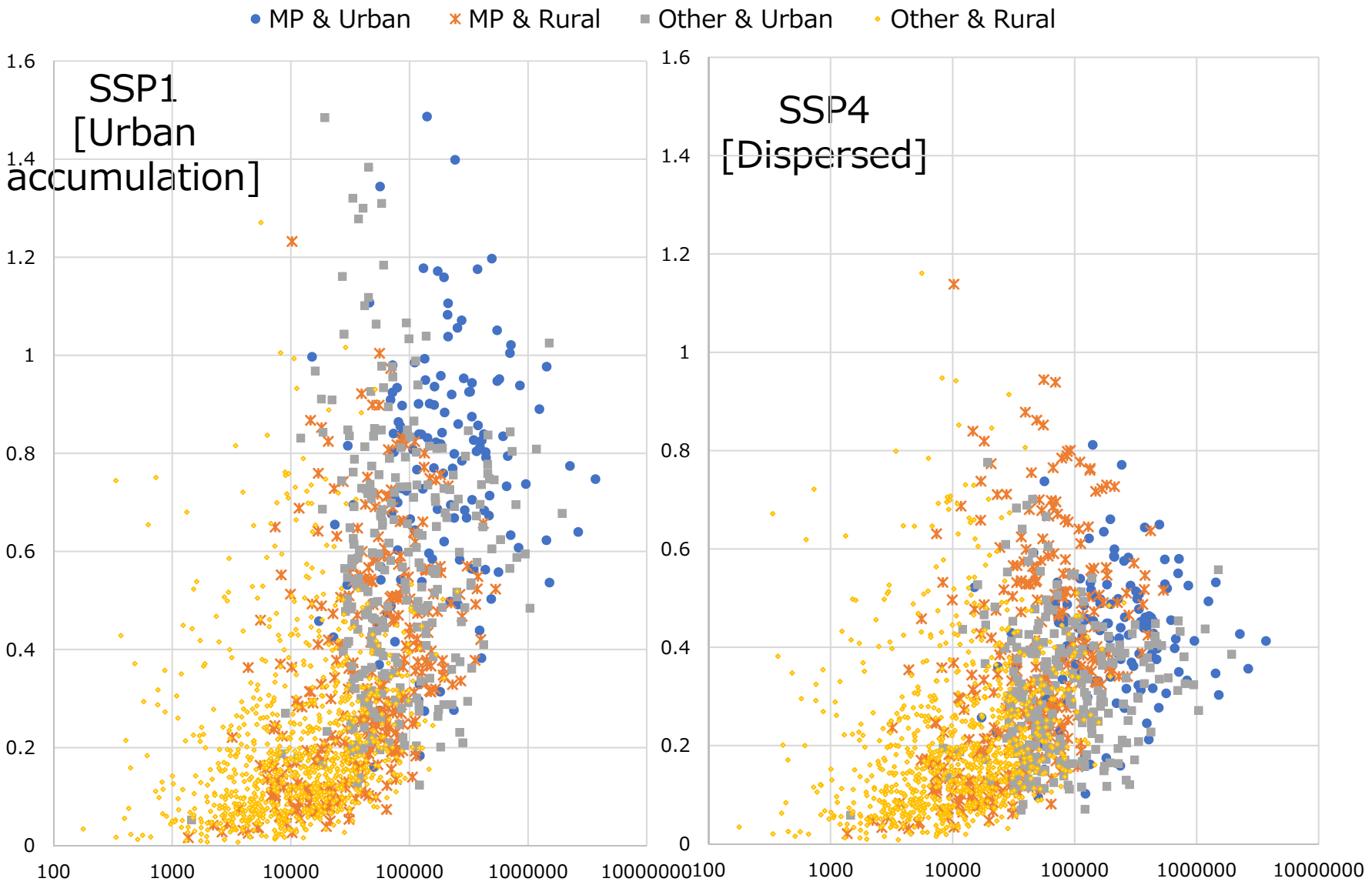
# Elder Population ratio (age 65 and elder)



# Municipal Population SSP2[BaU] 2050 (vs 2015)

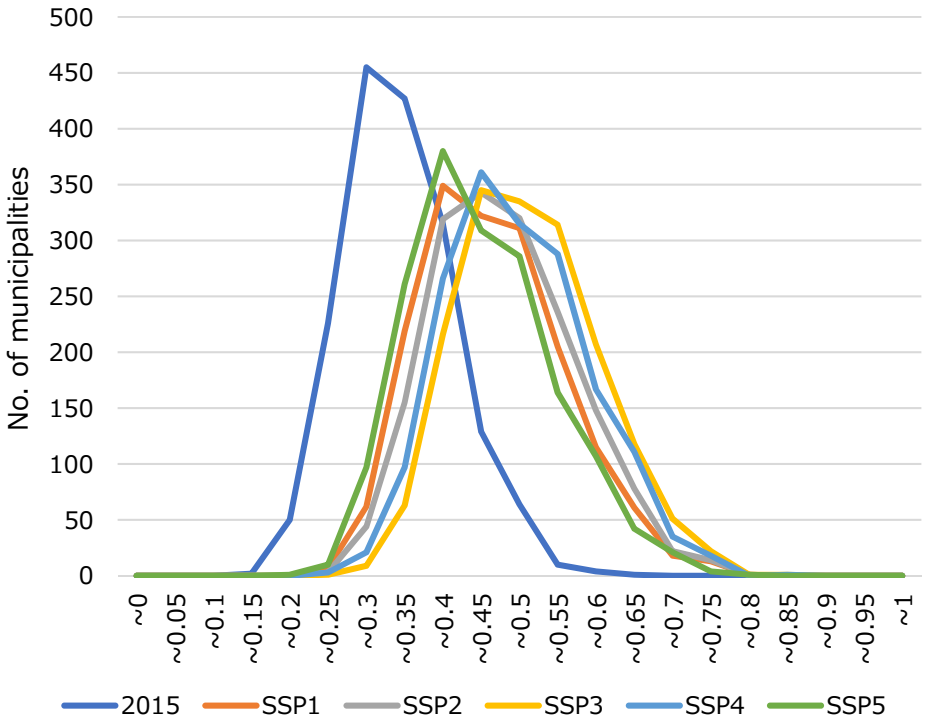


# Municipal Population 2100 (vs 2015)

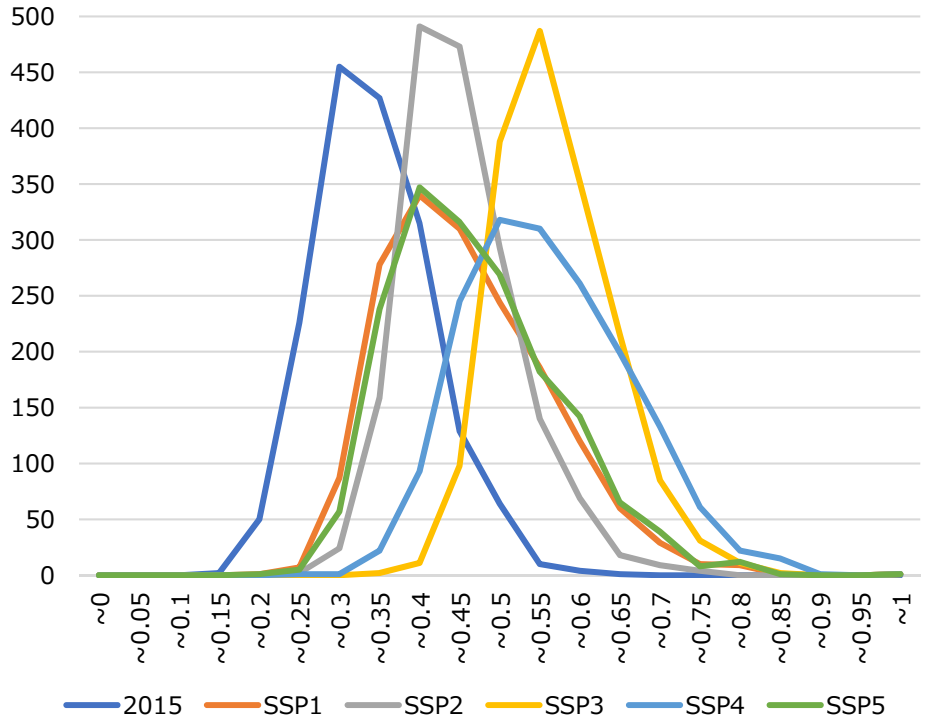


# Distribution of Elder ratio (≧65)

2050




2100




| | 2015 | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|---|
| Median | 31.3% | 43.1% | 44.6% | 48.1% | 46.5% | 41.6% |
| Municipalities over 60% | 1 | 93 | 115 | 193 | 165 | 68 |
| Municipalities under 30%. | 733 | 69 | 47 | 10 | 24 | 108 |

| | 2015 | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|---|
| Median | 31.3% | 41.9% | 41.6% | 53.4% | 52.6% | 42.9% |
| Municipalities over 60% | 1 | 110 | 32 | 345 | 432 | 126 |
| Municipalities under 30%. | 733 | 95 | 26 | 0 | 2 | 63 |

# Next step

- Projection
  - Economy, Labor, Commuting
  - Household (single)
  - Land use

- Distribution
  - Documentation
  - Use in several regions