

Fostering Sustainable Transitions:  
The World Bank KDI Green Growth Seminar 2024

Session 2

# Just Transition in Korea: Regional Vulnerability

February 28, 2024 | Hyunseok Kim



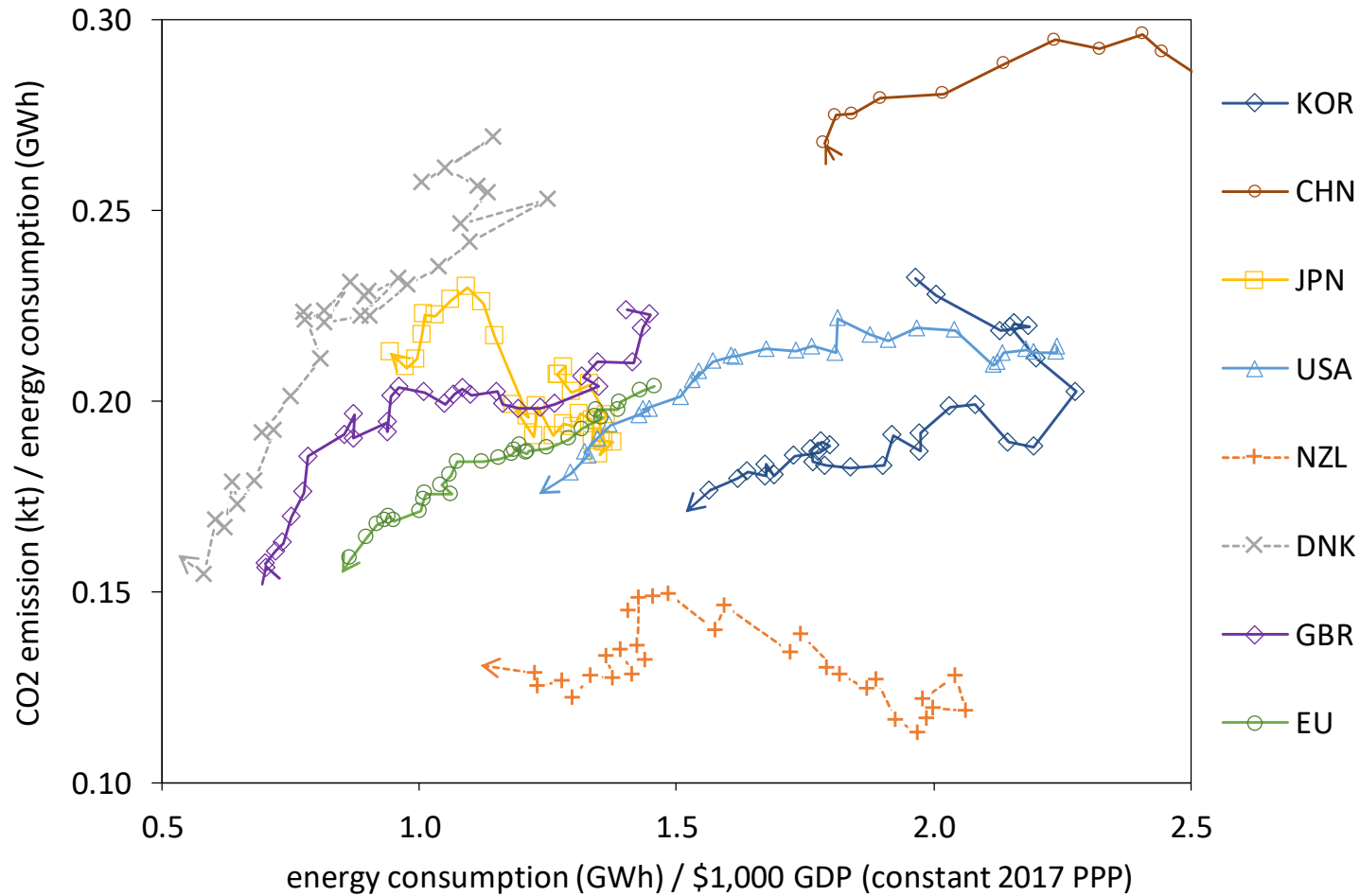


# **C O N T E N T S**

- 1. Progress on Climate Change Mitigation**
- 2. Emerging Issue: Just Transition**
- 3. Measuring Regional Net-Zero Vulnerability**
- 4. The Way Forward**

# Progress on Climate Change Mitigation

**Fig 1. Changes in Energy and Emissions Intensities in Major Countries (1990-2020)**



Notes: Symbols denote each year, and the last year (2020) of each country is displayed in an arrow.  
 Sources: WB, World Development Indicators; revised from Kim (2022, KDI Research Monograph).

- ◆ While the global *decarbonization* has been strengthened since the 2015 Paris Agreement, the *just transition* has been also emphasized
  - The Ministerial Declaration “Solidarity and Just Transition Silesia Declaration” is adopted at COP24 in 2018
    - When establishing and implementing climate change policies in the future, the impact on the labor market and local communities should be actively considered in national policies for a just transition
  - As the main background, 1) the transition takes place over a long period of time, 2) various changes in social, economic, and technology are required in the process, and 3) the costs and benefits from the transition is not equally distributed among regions and people

- ◆ *Multi-level governance* has been emphasized as a way to promote decarbonization and just transition
  - Large-scale investment and legislation are handled by top government agencies
  - Policies that directly or indirectly affect greenhouse gas emissions, such as various transportation and construction regulations, space planning, and economic policies, are promoted at the regional level
  - Under the European Green Deal (2020), EU plans to provide 100 billion euros for 10 years to regions and sectors that are severely damaged by the transition, and *member states need to submit their 'Territorial Just Transition Plan' (TJTP) where TJTPs are specified at the sub-regional level (NUTS 3 regions, population of 150,000 to 800,000 inhabitants)*

- ◆ The need to establish *indicators* to monitor the status of the regional units is also emerging
  - Ex: “The 8th EAP promotes a “deal” between all three EU institutions to support the implementation of the EGD[European Green Deal]’s objectives by all actors at different governance levels, including through a new monitoring framework” (EC 2021)

**Table 1. Potential social impacts of environmental transitions and Policies**

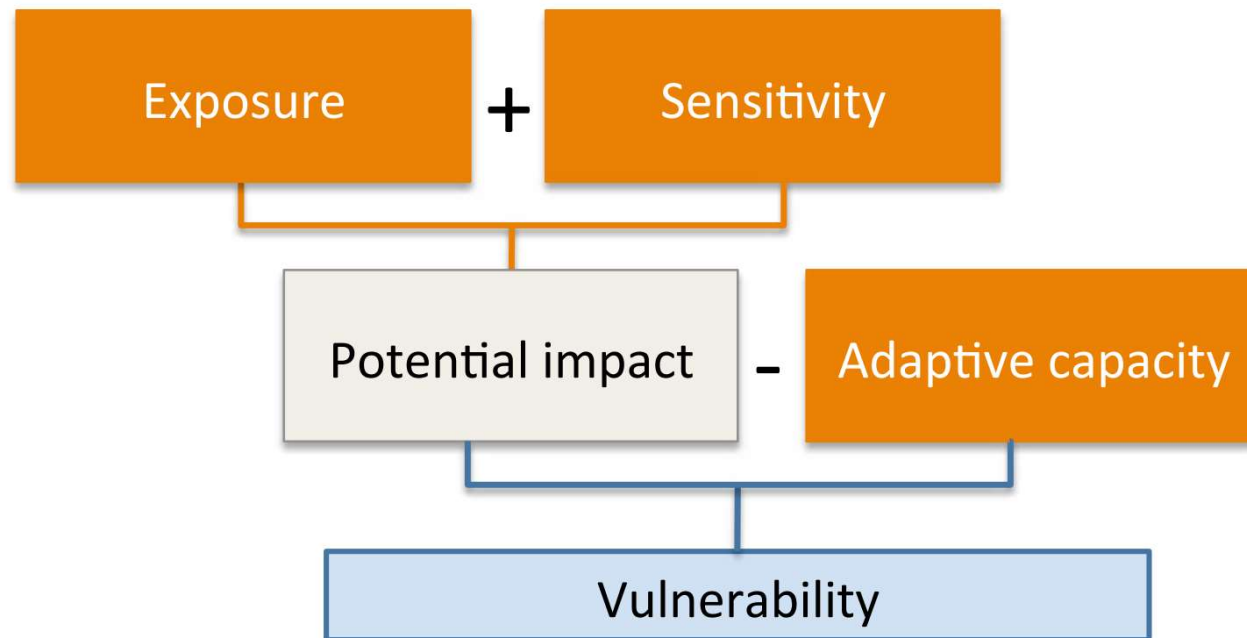
	Potential impacts on jobs (workers & regions)	Potential impacts on households (consumers)
Positive impacts	<ul style="list-style-type: none"> <li>• Healthier working conditions</li> <li>• Long-term economic prosperity</li> <li>• Avoiding high costs of inaction</li> </ul>	<ul style="list-style-type: none"> <li>• Well-being</li> <li>• Equality</li> <li>• Inclusion</li> </ul>
Positive impacts with limitation	<ul style="list-style-type: none"> <li>• Cost savings</li> <li>• New jobs <b>with social &amp; regional bias and poor labor conditions</b></li> </ul>	<ul style="list-style-type: none"> <li>• Cost savings <b>with social bias</b></li> <li>• New income opportunities <b>with social bias and side effects</b></li> </ul>
Potential negative impacts	<ul style="list-style-type: none"> <li>• Sectoral job losses</li> <li>• Lower regional value creation</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced purchasing power</li> <li>• Obstacles to inclusion</li> </ul>

Sources: Revised from Heyen et al. (2020).

# Measuring Regional Net-Zero Vulnerability

- ◆ Regional Net-Zero Vulnerability (NZV) index can be calculated with raw data for 161 regions in South Korea based on global practices

Fig 2. IPCC-derived conceptual model of vulnerability



Sources: Adopted by many studies in which measure climate-related vulnerability including Carley et al. (2018, Nature Energy)

# Measuring Regional Net-Zero Vulnerability

**Table 2. Raw data for regional NZV index: 23 primitive indicators**

Factor	Category	Primitive indicators	Level	Year
Exposure	Firm	Percentage of carbon-intensive firms in mining, manufacturing, and electric gas supply industries	County	2017-2019
		Percentage of carbon-intensive firms in the manufacturing industry	County	2018-2020
	Worker	Percentage of carbon-intensive workers in the manufacturing industry	County	2018-2020
Sensitivity	Energy supply	Energy use per production in the manufacturing industry	Province	2018-2020
	Energy demand	Energy consumption per capita	County	2019-2020
		Percentage of oil energy in energy usage		
	Population	Percentage of households receiving energy vouchers	Province	2019-2021
		Percentage of elderly households living alone	County	2019-2021
		Number of foreigners per 1,000 people	County	2019-2021
		Percentage of multicultural marriages	County	2018-2020
	Safety	Percentage of old housings	County	2019-2021
		Number of fires per 10,000 people	County	2018-2020
		Number of crimes per 1,000 people	Province	2019-2021
	Socioeconomic factor	Income per capita	Province	2019-2021
Percentage of education under high school		County	2020	
Adaptive Capacity	Service	Percentage of service industry within GRDP	Province	2019-2021
	Tourism	Number of tourist attractions	County	2017-2019
		Number of visitors to tourist attractions per capita		
		Number of registered tourism businesses per 100,000 people		
	Energy	Percentage of solar and wind power generation	County	2019-2020
		Percentage of regional supply in the national EV supply	County	2019-2021
	Recycling	Waste recycling rate(%)	County	2018-2020
Local fiscal	Fiscal independence	County	2018-2020	

Sources: Kim (2022, KDI Research Monograph).

# Measuring Regional Net-Zero Vulnerability

**Table 2. Factor loading according to factor analysis (20 primitive indicators used eventually)**

Factor	Primitive indicators	Factor 1	Factor 2	Factor 3
Exposure	Percentage of carbon-intensive firms in mining, manufacturing, and electric gas supply industries	0.2093	0.9071	0.0643
	Percentage of carbon-intensive firms in the manufacturing industry	0.2938	0.9187	-0.0064
	Percentage of carbon-intensive workers in the manufacturing industry	-0.0300	0.7710	0.0039
Sensitivity	Energy use per production in the manufacturing industry	0.4240	0.1253	0.0050
	Percentage of oil energy in energy usage	0.5000	0.0192	-0.1051
	Percentage of households receiving energy vouchers	0.6498	0.0198	-0.2621
	Percentage of elderly households living alone	0.9262	0.1522	0.0602
	Percentage of old housings	0.8610	0.1698	0.0428
	Percentage of multicultural marriages	0.6043	0.0787	0.1883
	Number of fires per 10,000 people	0.7278	0.1958	0.0019
	Income per capita	0.6201	0.1793	0.2069
	Percentage of education under high school	0.8848	0.2213	0.1571
Adaptive Capacity	Percentage of service industry within GRDP	0.1314	0.1316	0.6560
	Number of tourist attractions	0.1032	-0.1881	0.3366
	Number of visitors to tourist attractions per capita	-0.3499	-0.2776	0.2379
	Number of registered tourism businesses per 100,000 people	-0.3583	-0.1920	0.4467
	Percentage of solar and wind power generation	0.1481	0.0601	0.3797
	Percentage of regional supply in the national EV supply	0.3169	0.1350	0.6045
	Waste recycling rate(%)	0.2647	0.1515	0.2012
	Fiscal independence	0.2131	-0.1853	0.3971
Percentage of explained variance		54.0%	28.3%	17.8%
Categorization of factors		Sensitivity	Exposure	Adaptive Capacity

Sources: Kim (2022, KDI Research Monograph).

# Measuring Regional Net-Zero Vulnerability

Fig 3. Exposure index

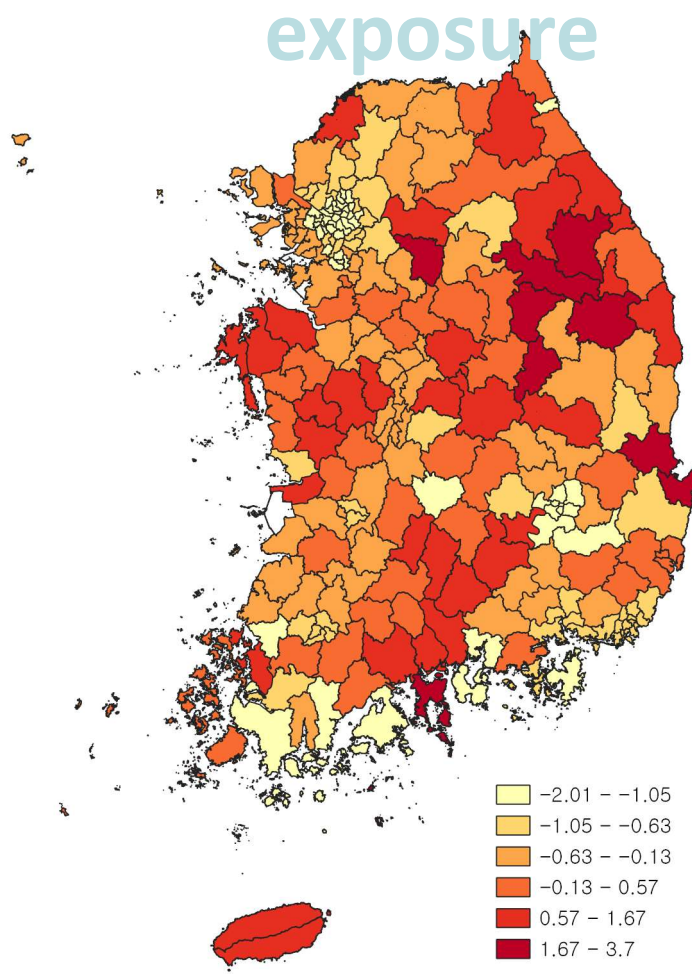
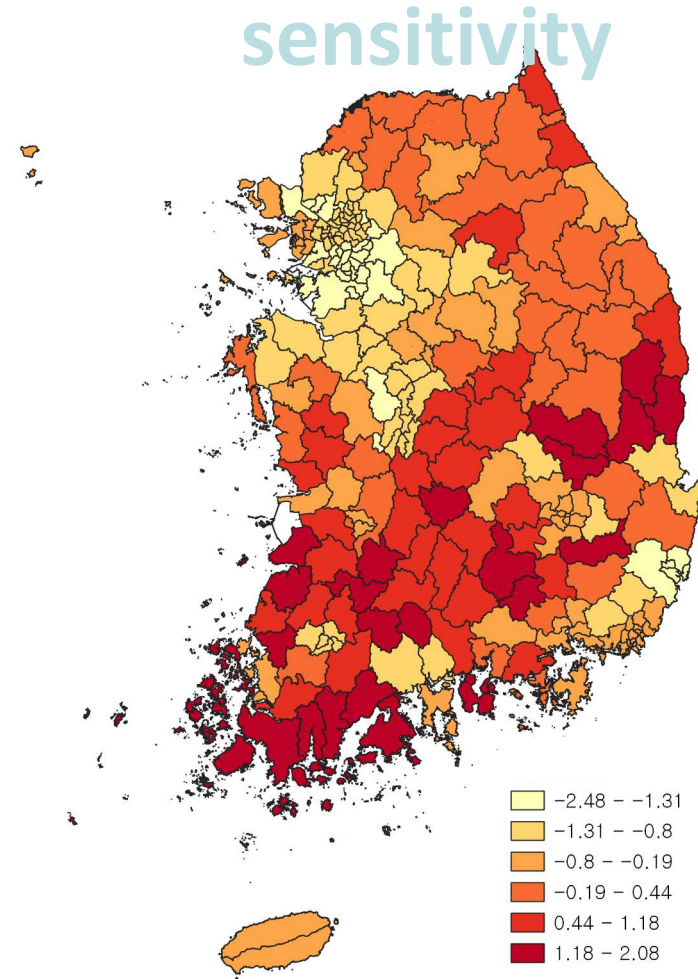


Fig 4. Sensitivity index



Sources: Kim (2022, KDI Research Monograph).

Sources: Kim (2022, KDI Research Monograph). 10

# Measuring Regional Net-Zero Vulnerability

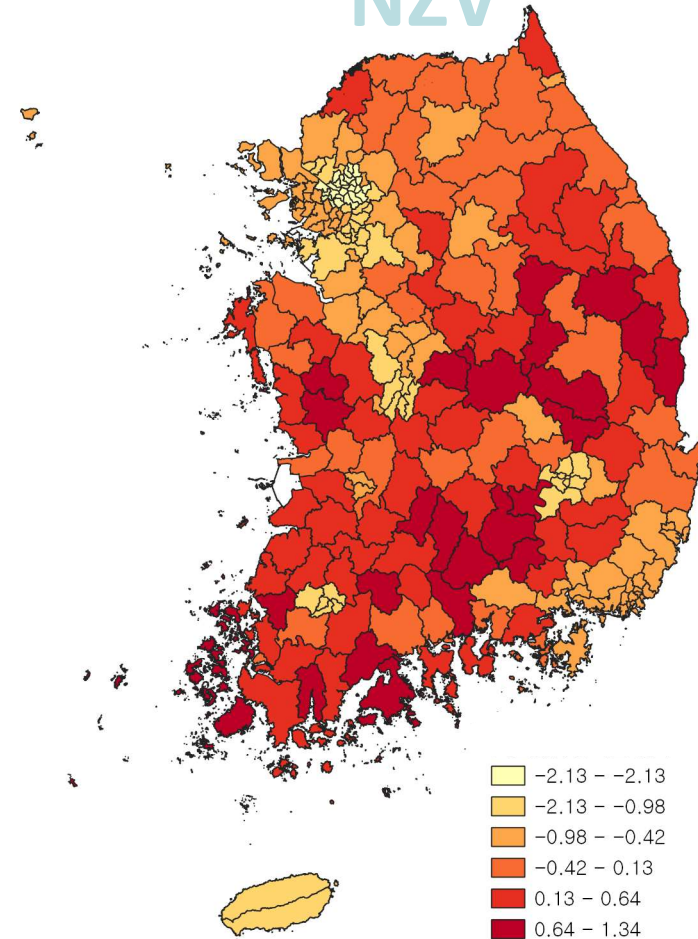
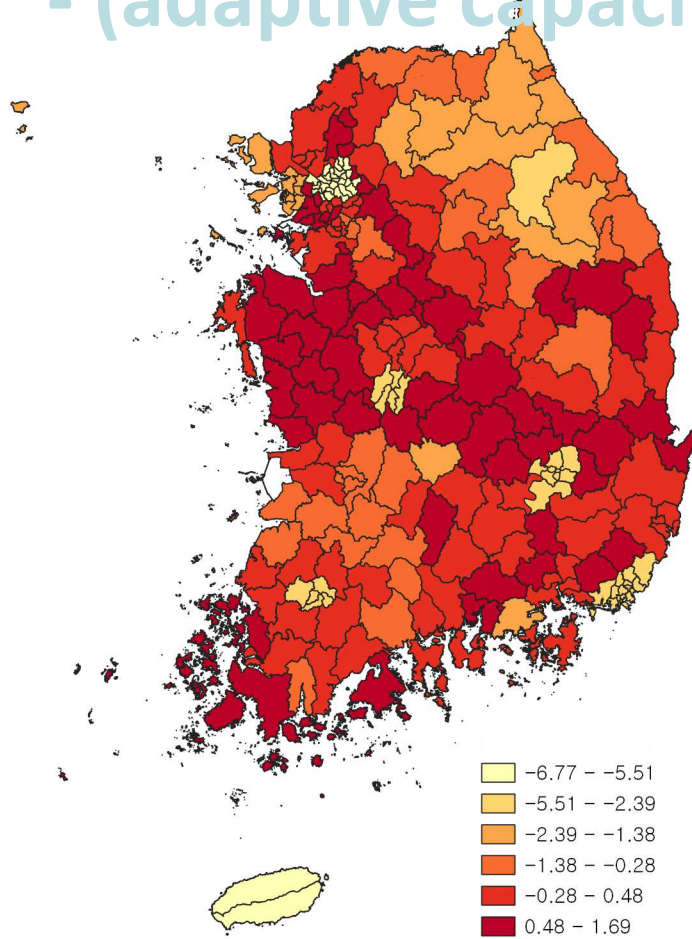
Fig 5. Adaptive capacity index

- (adaptive capacity)

=

NZV

Fig 6. Net-zero vulnerability index

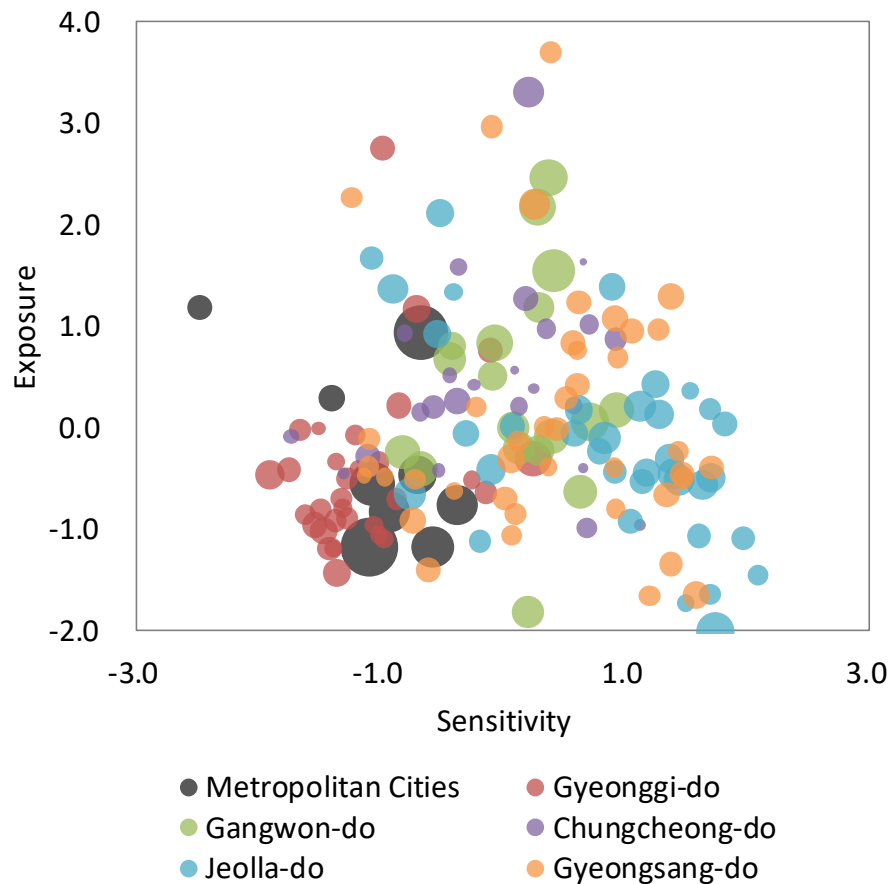


Sources: Kim (2022, KDI Research Monograph).

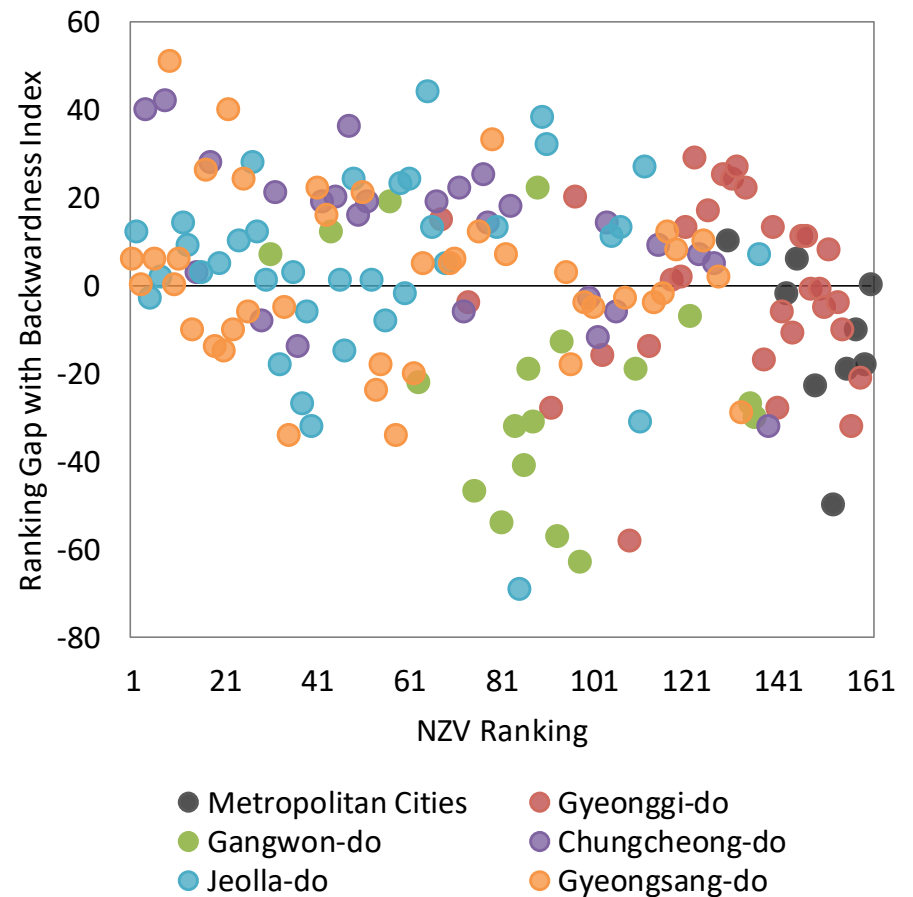
Sources: Kim (2022, KDI Research Monograph).

# Measuring Regional Net-Zero Vulnerability

**Fig 7. Distribution of Adaptive Capacity**



**Fig 8. Distribution of “Ranking of Regional Backwardness – Ranking of NZV”**



Sources: Kim (2022, KDI Research Monograph).

Sources: Kim (2022, KDI Research Monograph). 12

- ◆ The level of NZV differs not only by province but also by the lower-level region (county) in the same province
  - Metropolitan area and counties in Gyeonggi-do are generally found to have low exposure and sensitivity
  - Among the 161 regions to be analyzed, 10 regions with high NZV are mixed with 5 Gyeongsang-do, 3 Jeolla-do, and 2 Chungcheong-do
- ◆ The ranking of NZV shows a big difference (from -69 to 51) from *the ranking of regional backwardness used in the gov project appraisal*
  - Counties in Chungcheong-do were generally found to have higher NZV rankings and lower in Gangwon-do
  - Even if the region is developed, NZV is higher if carbon-intensive industries have located, and on the contrary, even if underdeveloped, NZV can be lower if the exit industry (e.g., tourism, etc.) has well established

- ◆ Better to facilitate the understanding of regional situations and induce the **development of response strategies at the local gov level**
  - Need to establish and publicly disclose key baseline indicators at the current insufficient sub-regional level, such as carbon emissions and jobs-in-transition → enhance the quality of composite indices
- ◆ Need to provide **a more effective higher-level gov support** for the regional transition process **by referring to key indicators**
  - The Korea's central government financial support related to carbon neutrality, including the Climate Response Fund (newly established in 2022), is expected to expand in the future
  - Necessary to provide support according to the conditions of each region by utilizing indicator information when allocating (existing & new) budgets



**Thank You :)**