

## **Conference on Regional Entrepreneurship and Innovation**

in the framework of EGOV\_INNO: E-government services and tools from regional governments and regional development bodies to support and coordinate the regional research and innovation capital

**Centre of Planning and Economic Research (KEPE)**

# **Post-recession economic policy challenges for Western Greece: fragmentation, production, well-being, development prospects**

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and  
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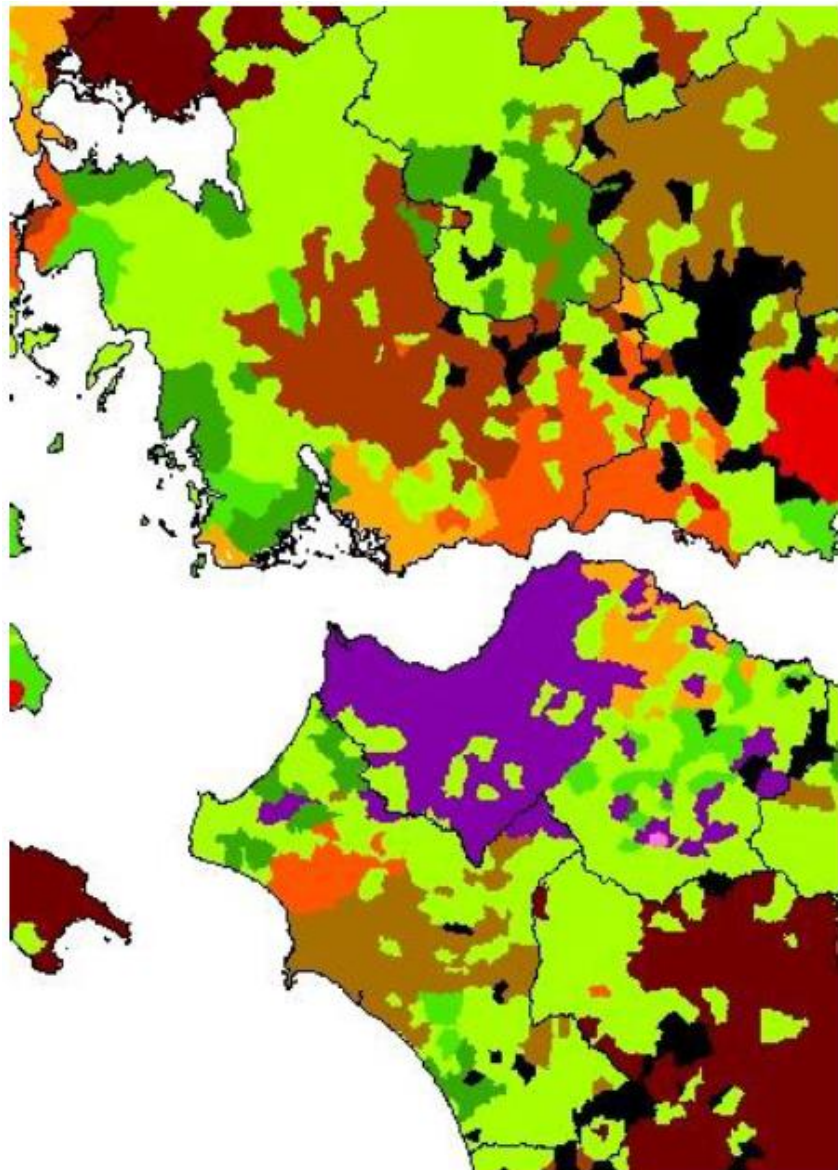
**Patras, 3/9/2020**

# Introduction (I)

- The paper studies the recent economic performance of Western Greece vis-à-vis the other 280 NUTS level II regions of the European Union (EU) via a common set of indices with the aim of contributing to the development of the region's economic policy.
- It is part of a growing literature on the study of subnational heterogeneity across the EU and the formulation of territorial policies.
  - Andreoni and Galmarini (2016), Herrero-Prieto et al. (2019), Pinar (2019) on regional well-being,
  - Rizzi et. al. (2018) on regional resilience and sustainability,
  - Parente (2019) on regional human development, etc.
- Western Greece is in need of such a perspective.
  - Classified as a less developed region of the EU.
  - It spans an area of 11.3 thousand km<sup>2</sup>, split into two by the gulf of Corinth, further fragmented and separated by the rest of Greece by mountain-ranges, rivers, lakes, a lagoon, other bodies of water, and a very jagged coastline, which prevent the formation of large markets, the achievement of economies of scale, and the diffusion of policy interventions.


## Introduction (II)



*The functional areas of Western Greece and of neighboring areas based on the 15% in- and out-commuting ratio at the time of the 2011 Census*



### Key for color classifications




Groups of localities and isolated localities with a working population of:

$\geq 100.0$  thousand (linked to Athens) 


50,0 – 99.999 thousand: Patras   
(linked to Ioannina) 


10,0 – 49.999 thous.   

Agrinion (dark brown in the north),  
Pirgos (light brown in the south)  
(Other formations in shades of brown:  
Arta, Karditsa, Lamia, Corinth,  
Tripolis, Zakynthos)

5,0 – 9.999 thousand   

Nafpaktos (orange in the center)  
Amalias (orange in the south)  
Messolongion (yellow in the center)  
Aegion (yellow, west of Patras)  
(Other formations in shades of orange,  
red, yellow: Preveza Lefkas, Amfissa)

1,0 – 4.999 thousand 

0,5 – 0.999 thousand 

< 500 

## Introduction (III)

- Identifying how the region is performing in key aspects compared to the other EU regions can be very instructive.
  - A new set of indices, regarding **Production, Well-being** and **Development prospects** (PWD), consisting of twenty-two individual indices (elements) is prepared focusing on sectoral employment and broader production features, well-being, and development prospects across EU regions.

## Data (I)

- EU regional data published by Eurostat:
  - collected and compiled regularly, measured in the same manner across all regions.
  - easy to compare and often used to guide policy decisions.
- Most of the data used in the construction of the PWD Index run up to 2019, and 2018 (in three cases) or 2017 (in two cases).
- All series are quite complete, except for the R&D spending figures which date to 2017 and are available for 84% of all EU regions.
- Additional aspects about labor productivity is each individual sector, and about the average business size in each sector, both of which are associated with crucial aspects about the structure and operation of businesses in every region, are considered on the basis of data dating to 2016 and 2017, respectively.
  - It comprises ten regional labor productivity indices (one for each sector) and twelve regional business size indices (one for each subsector of the secondary and tertiary sectors on which business statistics are usually collected).
  - Most are quite complete, except for the productivity figures in real estate, which are available for 64% of all EU regions, and for the business size figures in the energy sector and the water provision and related activities sector, which are available for 83-84% of all regions.

## Data (II)

### Index composition based on the most recent available data

	Variable (index)	Year	Observations	Description
WELL-BEING	1. Disposable income	2017	280 <sup>a</sup>	Net disposable income, purchasing power standard per inhabitant
	2. Jobs	2019	281	Employment
		2019	279 <sup>b</sup>	Unemployment
	3. People's education	2019	280 <sup>c</sup>	Population aged 25-64 years old with tertiary level education (%)
	4. Life expectancy	2018	278 <sup>d</sup>	Life expectancy of pop. < 1 year old
PRODUCTION	1. Distribution of employed people			Employment in each sector over the sum of all employed in each sector (%)
	a. Primary sector (agricult.-forestry-fishing)	2019	281	
	b. Secondary sector excluding construction	2019	281	
	c. Construction	2019	281	
	d. Trade, transport, accommodation etc.	2019	281	
	e. Information, communication	2019	281	
	f. Financial and insurance activities	2019	281	
	g. Real estate activities	2019	281	
	h. Professional-scientific-support serv. etc.	2019	281	
	i. Public admin., defense, educ., health etc.	2019	281	
	j. Arts-entertainment-recreation, other serv.	2019	281	
	2. Specialization of those employed	2019	281	Coef. of specialization on the basis of sectoral employment (Schooler, 1960)
	3. Labor productivity	2018	281	Gross value added at basic prices over the sum of employed people (all sectors)
	4. Workers education	2019	281	Persons employed with upper secondary educ. or higher out of all employed (%)
DEVELOPEMENT PROSPECTS	1. Market size	2019	280 <sup>e</sup>	Population
	2. Demographic composition	2019	280 <sup>e</sup>	Pop. aged 15-29 years, } among total Pop. aged 65 yrs. or over } population (%)
	3. R&D spending	2017	237 <sup>f</sup>	Intramural R&D expenditure in all sectors as % of GDP
	4. GDP per capita			Euro per inhabitant
	5. Rate of change in per capital GDP	2018	281	Euro per inhabitant (annual % change)

#### Notes:

<sup>a</sup> Missing: Malta.

<sup>b</sup> Missing two regions: one from Finland, one from the UK.

<sup>c</sup> Missing one overseas region of France.

<sup>d</sup> Missing three overseas regions of France.

<sup>e</sup> Missing one region of the UK.

<sup>f</sup> Missing 44 regions: the 27 of France, the ten of Belgium, the three of the Rep. of Ireland, two from Sweden, and the two autonomous cities of Spain.

Source: Eurostat (May 2020), own calculations.



# Methodology

- The Eurostat statistics shaped into indices based on an OECD (2018) approach that is also used by several analysts (e.g., Economou, 2018; Herrero-Prieto, 2019; Parente, 2019; Pinar, 2019).
  - Since the Index's components are expressed in different units (euro, percentages, years etc.), the are rendered comparable via a Min-Max normalization procedure on the zero-to-ten scale.
- Regions,  $i$ , with extreme values (outliers) below the 4<sup>th</sup> percentile and above the 96<sup>th</sup> percentile are assigned scores of zero and ten, respectively; and all other regions are assigned a score  $\hat{x}_i$  or  $\check{x}_i$ , when higher and lower values, respectively, relate increased production, welfare or development prospects.

$$\hat{x}_i = \frac{x_i - \min(x)}{\max(x) - \min(x)} \times 10$$

$$\check{x}_i = \frac{\max(x) - x_i}{\max(x) - \min(x)} \times 10$$

- Specialization: regional coefficient of specialization (Schooler, 1960), i.e., the sum of positive sectoral  $S_{k,i}$ :

$$S_{k,i} = \frac{\text{Number of employed people in sector } k, \text{ country } i}{\text{Number of empl. people in sector } k \text{ across the EU}} - \frac{\text{Number of empl. people in country } i}{\text{Number of empl. people in the EU}}$$

- If a component (index) is based on two measures the score is computed from the arithmetic mean of the normalized values of the two measures.

# Western Greece compared to the median Greek and median EU region

*based on the most recent available PWD scores, and the top EU region in each case*

<u>Elements (indices)</u>	<u>Western Greece</u>	<u>Median GR</u>	<u>Median EU</u>	<u>The top EU region</u>
<i>Well-being</i>				
1. Disposable income (2017)	0.44 (264 <sup>th</sup> )	1.17	5.47	Innert London-West (UK)
2. Access to jobs (2019)	0.00 (274 <sup>th</sup> )	2.07	7.82	[ Åland Islands (FI), Praha encircled by Stredni Cechy (CZ)
3. People's education (2019)	1.03 (250 <sup>th</sup> )	2.63	4.15	
4. Life expectancy (2019)	7.29 (127 <sup>th</sup> -133 <sup>rd</sup> )	8.00	7.12	Inner London – West (UK) Madrid (ES)
<i>Production</i>				
1. Distribution of employed people (2019)				
a. Primary sector	10.00 (3 <sup>rd</sup> )	8.50	1.37	Nord-Est (RO)
b. Secondary sector excluding construction	1.26 (250 <sup>th</sup> )	1.43	4.08	Vest (RO)
c. Construction	2.09 (243 <sup>rd</sup> )	0.00	5.04	Severoiztochen (BG)
d. Trade, transport, accommodation etc.	6.96 (36 <sup>th</sup> )	9.09	3.55	South Aegean Islands (GR)
e. Information, communication	1.86 (221 <sup>st</sup> )	0.00	3.11	Stockholm (SE)
f. Financial and insurance activities	1.68 (255 <sup>th</sup> )	1.68	3.92	Inner London – West (UK)
g. Real estate activities	0.00 (180 <sup>th</sup> -281 <sup>st</sup> )	0.00	3.47	Algarve (PT)
h. Profession.-scient.-tech., admin.-support.	0.00 (276 <sup>th</sup> )	1.37	4.71	Inner London – West (UK)
i. Public adm.-defense, educ.-health etc.	2.46 (214 <sup>th</sup> )	2.51	4.54	Mayotte (FR)
j. Arts-entertainment-recreation, etc.	0.52 (258 <sup>th</sup> )	1.05	3.74	Brussels (BE)
2. Specialization of those employed (2019)	2.23 (95 <sup>th</sup> )	1.58	1.18	Île de France (FR)
3. Labor productivity (2018)	1.80 (223 <sup>rd</sup> )	1.96	4.91	Inner London – West (UK)
4. Workers education (2019)	0.28 (268 <sup>th</sup> )	3.24	7.18	Praha (CZ)
<i>Development prospects</i>				
1. Market size (2019)	0.79 (230 <sup>th</sup> )	0.61	2.50	Île de France (FR)
2. Demographic composition (2019)	3.77 (188 <sup>th</sup> )	3.13	4.73	[ Inner London – East (UK) Mayotte (FR)
3. R&D spending (2017)	2.68 (110 <sup>th</sup> )	1.02	2.45	
4. GDP per capita (2018)	0.79 (244 <sup>th</sup> )	1.12	4.05	Braunschweig (DE)
5. Rate of change in per capita GDP (2018)	5.06 (81 <sup>st</sup> )	4.05	3.84	Inner London – West (UK) Severozapaden (BG)



# Production, Well-being and Development prospects

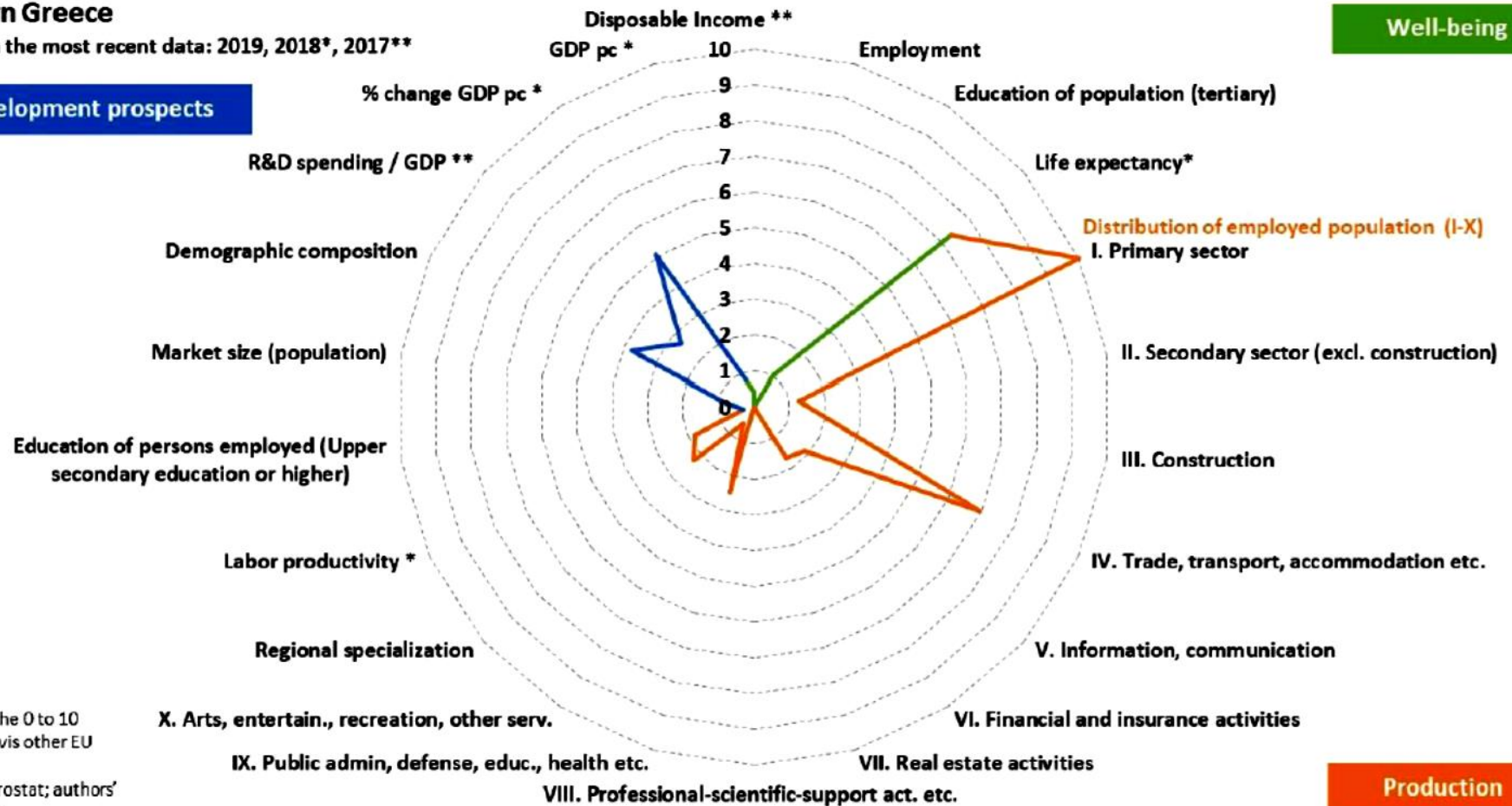
## Western Greece

### Western Greece

based on the most recent data: 2019, 2018\*, 2017\*\*

#### Development prospects

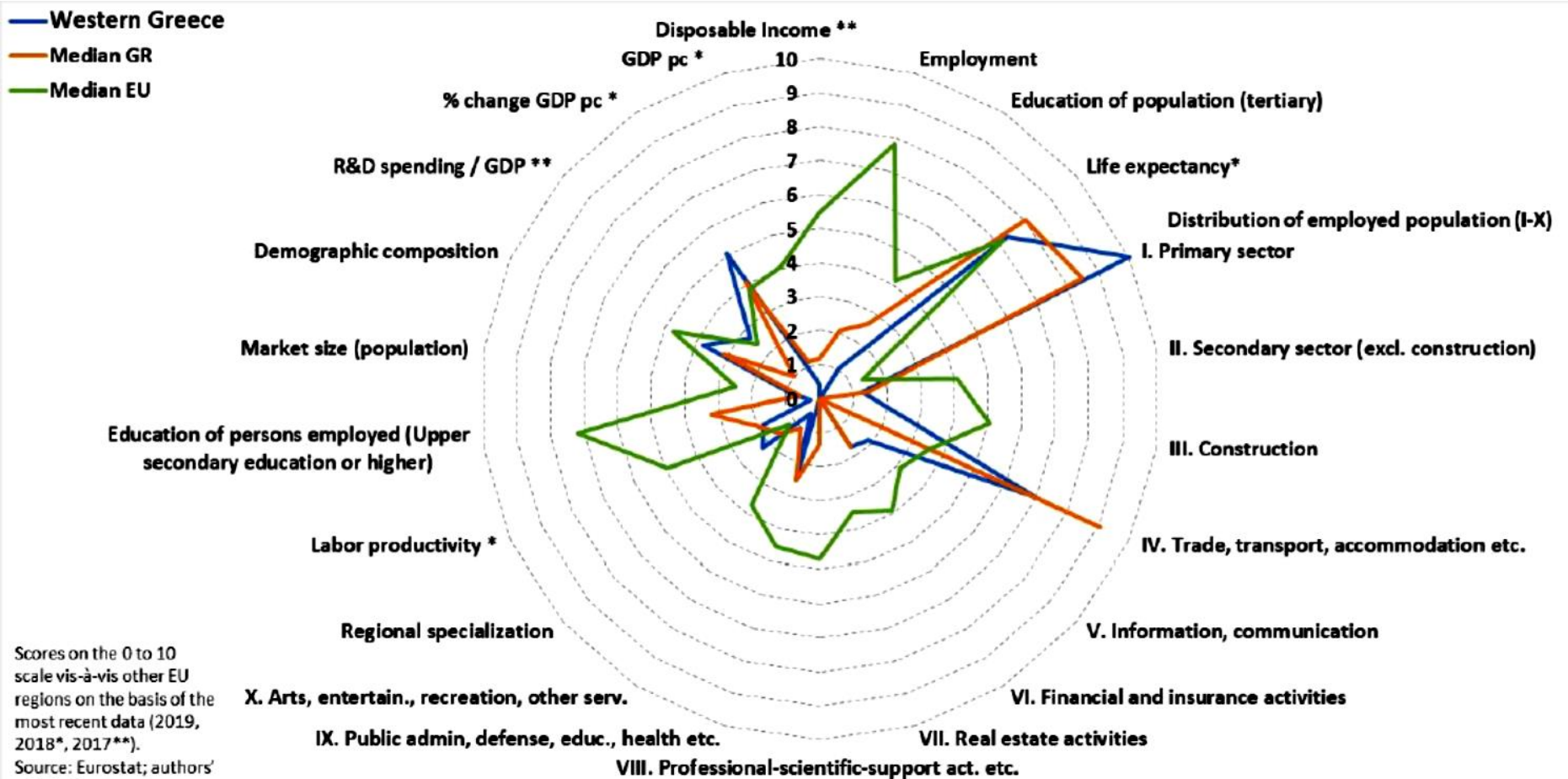
#### Well-being



Scores on the 0 to 10 scale vis-à-vis other EU regions.  
Source: Eurostat; authors' calculations.

# Production, Well-being and Development prospects

## Western Greece, Median Greek and EU region



# Western Greece's similarity to other EU regions in terms of the PWD elements

The sum of the absolute differences in the scores of the production elements, i.e., the so-called *Manhattan distance* (OECD, 2018), reveals a number of regions with production profiles similar to that of Western Greece.

Similar regions in terms of the production indices (Manhattan distance in descending order)		The well-being scores of the four indices are (Higher (+) or lower (–))				The development prospect scores of the five indices are than or equal (=) to W. Greece)				
		1	2	3	4	1	2	3	4	5
1	East Macedonia & West Thrace (GR)	+	+	+	–	–	–	–	–	–
2	Thessaly (GR)	+	+	+	+	+	–	–	+	–
3	Crete (GR)	+	+	+	+	–	+	+	+	–
4	East & South Peloponnese (GR)	+	+	+	+	–	–	–	+	–
5	Central Greece (GR)	+	+	+	+	–	–	–	+	–
6	West Macedonia (GR)	+	=	+	+	–	–	–	+	–
7	Central Macedonia (GR)	+	+	+	+	+	–	–	+	–
8	Extremadura (ES)	+	+	–	+	+	+	–	+	–
9	Alentejo (PT)	+	+	–	–	+	–	–	+	–
10	Epiros (GR)	+	+	+	+	–	–	+	–	–
11	North Aegean Islands (GR)	+	+	+	+	–	+	–	–	–
12	Calabria (IT)	+	=	+	+	+	+	–	+	–
14	Murcia (ES)	+	+	–	+	+	+	–	+	–
15	Centro (PT)	+	+	–	+	+	–	=	+	+
16	Severozapaden (BG)	=	+	+	–	+	–	–	–	+
17	Ionian Islands (GR)	+	+	+	–	–	–	–	+	–
18	Podlaskie (PL)	+	+	+	–	+	+	–	–	+
19	South Aegean Islands (GR)	+	+	+	+	–	+	–	+	–
20	Madeira (PT)	+	+	–	–	–	+	–	+	–
21	Açores (PT)	+	+	–	–	–	+	–	+	+
22	Dél-Alföld (HU)	+	+	+	–	+	+	–	–	+
23	Yuzhen tsentralen (BG)	=	+	+	–	+	–	–	–	+
24	Sicilia (IT)	+	=	+	+	+	+	–	+	–
25	Swietokrzyskie (PL)	+	+	+	–	+	+	–	–	+
26	Sud-Vest Oltenia (RO)	–	+	+	–	+	+	–	–	+
27	Molise (IT)	+	+	+	+	–	–	–	+	–
28	Puglia (IT)	+	+	+	+	+	–	–	+	–
29	Nord-Est (RO)	–	+	+	–	+	+	–	–	+
30	Vest (RO)	+	+	+	–	+	+	–	–	+
31	Sardegna (IT)	+	+	+	+	+	–	–	+	–

Source: Eurostat (May 2020), own calculations.

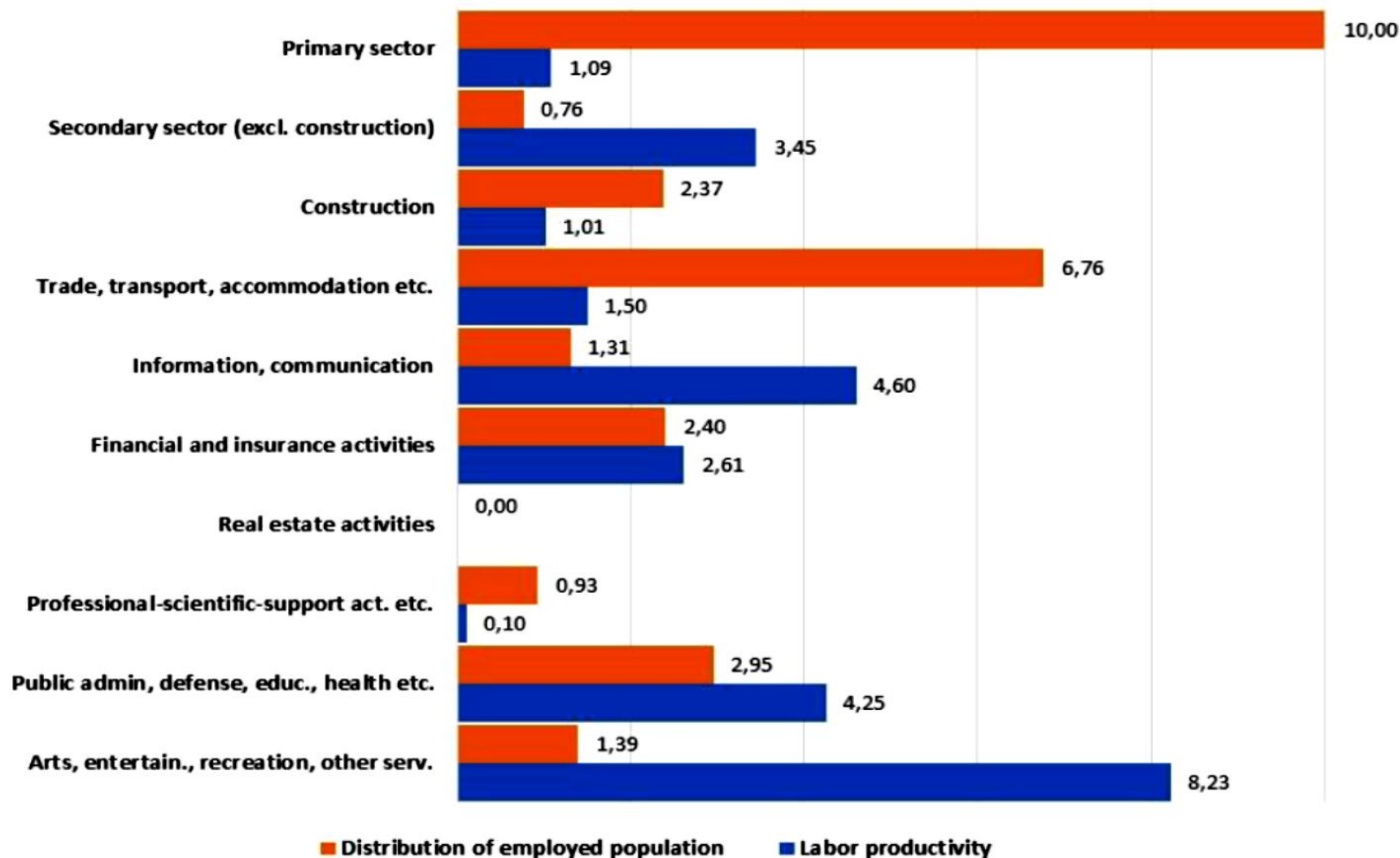
## Western Greece compared to the median Greek and median EU region based on the scores regarding the additional aspects of production

<u>Elements</u> (indices)	<u>Western Greece</u>	<u>Median GR</u>	<u>Median EU</u>
<i>Labor productivity (2016)</i>			
Primary sector	1.09 (211 <sup>th</sup> )	0.98	3.24
Secondary sector excluding construction	3.45 (166 <sup>th</sup> )	2.44	4.05
Construction	1.01 (245 <sup>th</sup> )	1.59	4.92
Trade, transportation, accommodation etc.	1.50 (229 <sup>th</sup> )	1.50	4.13
Information, communication	4.60 (75 <sup>th</sup> )	3.31	3.21
Financial and insurance activities	2.61 (165 <sup>th</sup> )	2.61	3.24
Real estate activities	NA	NA	2.85
Professional-scientific-support activities. etc.	0.10 (263 <sup>rd</sup> )	0.40	3.79
Public administration, defense, education, health etc.	4.25 (203 <sup>rd</sup> )	4.25	6.28
Arts-entertainment-recreation, other services	8.23 (34 <sup>th</sup> )	5.67	5.10
<i>Business size in terms of employed people (2017)</i>			
Mining, quarrying	NA	0.01	1.11
Manufacturing	0.00 (217 <sup>th</sup> )	0.07	2.79
Electricity, gas, steam, air conditioning supply	0.25 (207 <sup>th</sup> )	0.29	1.79
Water supply, sewerage, waste management, remediation	0.37 (219 <sup>th</sup> )	0.61	1.83
Construction	0.00 (272 <sup>nd</sup> )	0.00	2.88
Trade (wholesale and retail), repair of motor vehicles etc.	0.00 (273 <sup>rd</sup> )	0.00	2.64
Transportation, storage	0.00 (275 <sup>th</sup> )	0.00	2.85
Accommodation, food service activities	0.55 (242 <sup>nd</sup> )	0.68	2.60
Information, communication	0.56 (243 <sup>rd</sup> )	0.60	2.97
Real estate activities	0.66 (232 <sup>nd</sup> )	1.27	2.14
Professional, scientific, technical activities	0.55 (242 <sup>nd</sup> )	0.55	1.94
Administrative and support service activities	0.05 (263 <sup>rd</sup> )	0.09	3.41

Source: Eurostat (May 2020), own calculations

# Distribution of employed people and labor productivity scores (2016)

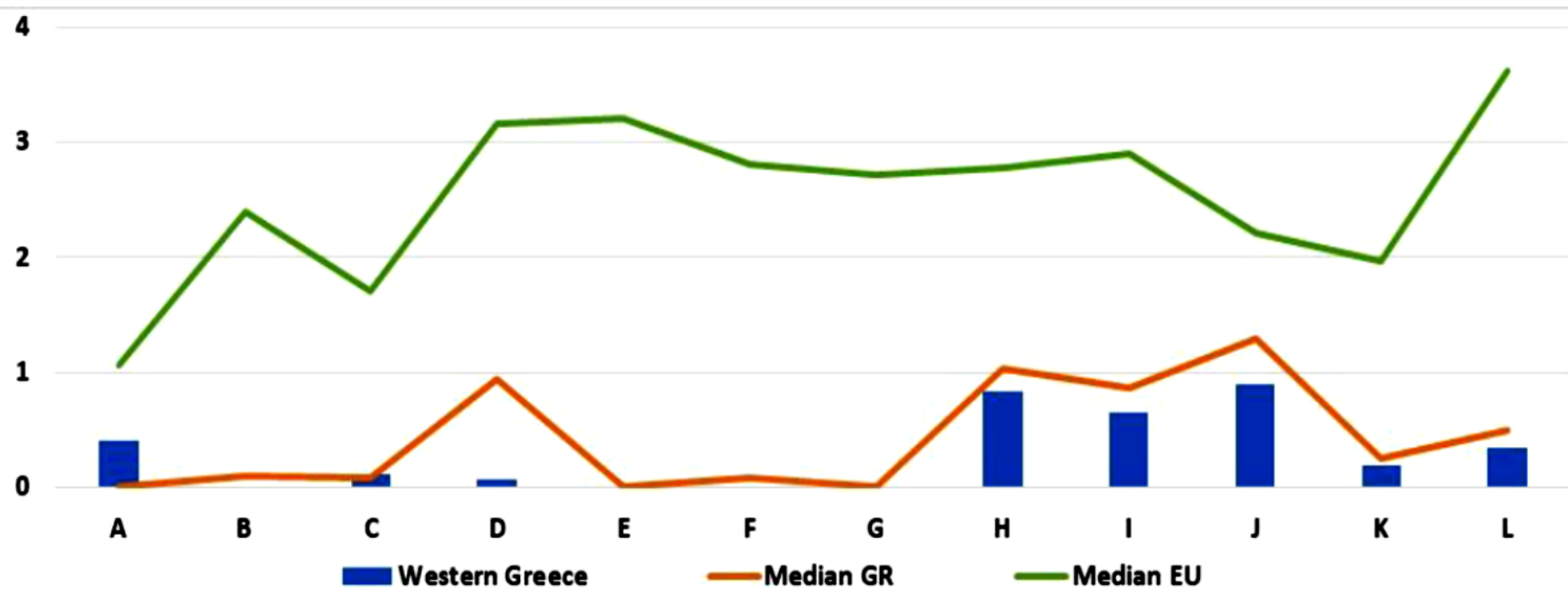
## 2016 scores for Western Greece





# Average business size in terms of employed people

2017 scores for Western Greece



A. Mining, quarrying	D. Water supply, sewerage-waste	G. Transportation, storage	J. Real estate activities
B. Manufacturing	E. Construction	H. Accommodation, food services	K. Professional-scientific-technical act.
C. Electricity, gas etc. Excluding public admin, defense, educ., health, financial-insurance, arts-entertain.-recreation, other service activities	F. Trade, repair of vehicles	I. Information, communication	L. Admin., support service activities

Source: Eurostat; authors' calculations.

## Conclusions (I)

- As a geographically and functionally divided land, it ought to benefit from attempts (e.g., road-, rail-, bridge-, toll-, pro e-commerce- and telework- projects) likely to reduce fragmentation so that production and transportation may be facilitated, costs may be reduced, and public spending and other interventions may reach more people and places.
- The region's production model ought to be reviewed.
  - Labor productivity in the primary sector, where a considerable number of people are involved, ought to improve (whether by introducing new capital, technology and techniques and/or by moving up the value chain) so that output and wealth in the region may increase.
  - And in the other end of the economy (the highly productive arts-entertainment-recreation and information-communication sectors) the number of workers ought to increase, so that more people may produce more output and generate wealth. This may be achieved by attracting people working elsewhere and/or by attracting non-participants. Perhaps the same ought to take place in the relatively understaffed sectors (e.g., the real estate and professional-scientific-technical-administrative-support services) so that the regional economy may turn to their expertise and function better.

## Conclusions (II)

- Simplifying the process of commencing and conducting a business, improving the entrepreneurial ecosystem, facilitating the creation and use of digital and other job-matching services, in all likelihood will accommodate this agenda.
- The educational level of both workers and of the broader public ought to be brought up, towards the EU average, to ensure the region's competitiveness.
  - The exposure of workers to business-related training, whether in person or long distance, may be easy to carry out and serve as a substitute to some extent.
- The analysis shows that Western Greece has to cover considerable distance in several areas.
- It also identifies a number of EU regions with similar production features that generally outperform Western Greece in well-being and development prospects. These regions may provide useful models that policy makers and entrepreneurs in Western Greece may want to think about and emulate.
- To the extent the relative position of Western Greece in a good number of areas with respect to the other EU regions has been mapped, it is easy and useful to monitor the progress, and evaluate the performance on an annual basis.

**Post-recession economic policy challenges for Western Greece:  
fragmentation, production, well-being, development prospects**

**Thank you for your attention!**