

Covid-19: Matrix for assessment of economic vulnerability and healthcare capacity



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While there are still too many uncertainties to precisely assess Covid-19's economic impact on individual countries and the globe, we can try to detect which countries are more vulnerable to the immediate developments from a healthcare and economic point of view. Specifically, we score 31 countries (EU-27, UK, US, Japan, China) according to five economic and three healthcare capacity variables to assess relative exposures to the immediate impact of the Covid-19 shock and enacted containment measures.

Figure 1: Scorecard for assessing economic and healthcare vulnerabilities

Vulnerability		Variable	Weight
Economic	External	Global value chain participation rate, % of total exports	20.0%
		Manufacturing, % of gross value added	20.0%
		Travel and tourism, % of GDP	20.0%
	Internal	Temporary employment, % total employment	20.0%
		Employees of micro enterprises, % total employment	20.0%
Health care capacity	Health system	Hospital beds per 1,000 inhabitants	33.3%
		Medical staff per 1,000 inhabitants	33.3%
	Demographics	Share of the population aged 65 years and more	33.3%

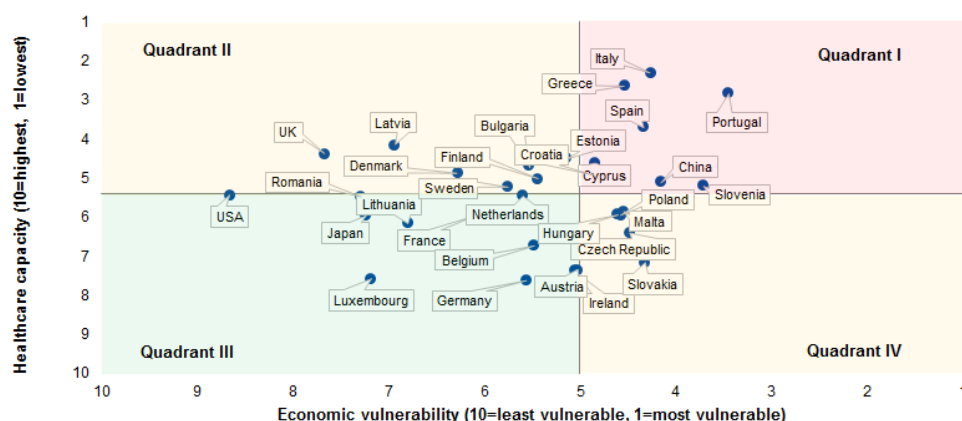
Source: Scope Ratings

Countries most exposed to the synchronised healthcare capacity and economic shocks include Italy (BBB+/Stable), Greece (BB/Positive), Portugal (BBB+/Stable) and Spain (A-/Stable), while Luxembourg (AAA/Stable) and Germany (AAA/Stable) appear least exposed among the EU-27. The US (AA/Stable) and UK (AA/Negative) are more exposed via lower health care system capacities than via economic metrics while the opposite appears to be the case for Ireland (A+/Positive), the Czech Republic (AA/Stable) and Slovakia (A+/Stable).

We acknowledge the limitations of this analysis given the ongoing developments and responses from private actors (which may find alternative suppliers in some cases) and governments (which are increasing hospital capacities and fiscal support to those most affected). The ultimate impact on economies will thus depend, among other factors, on i) the total number of infected people (which can vary significantly by country), health care systems' abilities to treat them, and the speed of developing and distributing a vaccine, ii) the duration and intensity of the containment measures and their impact on value chains and domestic consumption, and iii) the credibility and effectiveness of the fiscal and monetary response.

Figure 2: Covid-19: economic vulnerability and healthcare capacity grid

10=least vulnerable, 1=most vulnerable



Source: Scope Ratings GmbH. We apply a min-max approach to assign scores between 1 (most vulnerable) and 10 (least vulnerable). The dividing lines between quadrants reflect the median country scores on each axis. Individual country scores are in [Annex I](#), underlying data in [Annex II](#), and the definition and rationale for the variables in [Annex III](#).

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Our analysis highlights the following key takeaways:

- **Euro area periphery countries**, including Italy, Greece, Portugal and Spain display the highest vulnerabilities in our sample, due to relatively high shares of temporary contracts as well as micro-businesses and self-employment in total employment. In general, these entities have lower liquidity buffers than larger corporates and are thus more exposed in times of distress. These economies also depend on a relatively high contribution from tourism and travel services, at around 17% of GDP on average (indirect impact included), which are now the sectors most strongly affected via simultaneous supply and demand shocks. Finally, the relative capacity of health care systems, as captured by number of medical staff and hospital beds per 1,000 people, is lower than the EU average, which may also be more at risk of being strained given their relatively older population.
- In western Europe, **Germany, Luxembourg, Austria (AAA/Stable)** and **France (AA/Stable)**, display the lowest vulnerabilities. Germany has among the highest health care system capacities in the EU, and a relatively lower reliance on small businesses and self-employed people. However, it has among the largest manufacturing sectors relative to the size of the economy in the EU (21.6%), which is expected to be adversely affected by the current environment. This contrasts somewhat with France, where the manufacturing sector accounts for only 11% of gross value added. In addition, Luxembourg, France and Austria benefit from relatively high health care system capacities.
- The **US and Japan (A+/Stable)** show low economic vulnerabilities, as both economies have relatively low exposures to international value chains. In addition, the self-employed, micro-businesses and temporary contracts have relatively small shares in total employment. Still, the comparatively lower contractual protection of US employees could result in high unemployment with an adverse impact on domestic consumption. The US health care system has significantly fewer hospital beds per inhabitants compared to that of most other countries in our sample.
- Conversely, **China (A+/Negative)** shows high economic vulnerability given a very high share of self-employed in total employment, and a manufacturing sector which accounts for nearly 30% of the economy and experienced a sharp deterioration in January and February. Until China resumes full production, this indicates a vulnerability for countries that have a high goods trade turnover with China in % of GDP, including Japan, Germany and most of Central and Eastern European economies (CEE).
- **The UK, Denmark (AAA/Stable), Sweden (AAA/Stable) and Finland (AA+/Stable)** have relatively low economic vulnerabilities, given the moderate total contribution of travel and tourism services in GDP, at around 9% on average, as well as lower-than-EU average shares of employment by micro enterprises. However, the number of total hospital beds and acute care beds per 1,000 inhabitants in these countries is significantly lower than the EU-average.
- Among **CEEs**, the Czech Republic, Slovakia, Slovenia (A/Stable) and Hungary (BBB+/Stable) display elevated economic vulnerabilities given their large manufacturing sectors which are closely linked to western European value chains. Croatia's (BBB-/Stable) economic growth will also be heavily affected, as the total contribution of travel and tourism in GDP was estimated at 25% in 2018. For Poland (A+/Stable), the high share of temporary employment and employment by micro businesses constitutes an economic vulnerability in times of a prolonged consumption shock. Finally, while medical staff per capita in many of the CEEs is lower than the EU average, hospital beds and acute care beds per capita is higher than the EU's average.

Annex I. Covid-19: economic vulnerability (10=lowest, 1=highest) and healthcare capacity matrix (10=highest, 1=lowest)

	Countries	External			Internal		Economic vulnerability	Health care system		Demographics	Healthcare capacity
		20%	20%	20%	20%	20%		33%	33%	33%	
		Global value chain participation rate, % of total gross exports	Manufacturing, % of gross value added	Travel and tourism total contribution to	Temporary employment, % total employment	Persons employed by micro enterprises, % of total employment		Hospital beds per 1000 inhabitants	Medical staff (physicians, nurses and midwives) per 1000	Share of population 65+, % of total	
Euro area	Germany	6.5	2.6	5.7	4.7	8.4	5.6	10.0	10.0	2.8	7.6
	France	6.6	7.5	6.8	2.8	6.7	6.1	6.9	6.3	4.8	6.0
	Italy	7.2	4.9	4.1	3.2	1.9	4.3	2.5	3.4	1.0	2.3
	Netherlands	4.4	6.9	9.3	1.4	5.9	5.6	2.7	7.5	6.1	5.4
	Belgium	2.6	5.9	9.1	5.4	4.3	5.5	6.3	7.4	6.5	6.7
	Spain	7.3	6.9	2.9	1.0	3.4	4.3	2.2	3.1	5.8	3.7
	Portugal	6.1	6.3	1.0	1.0	2.8	3.4	2.8	3.2	2.4	2.8
	Ireland	3.3	1.0	8.8	6.1	6.1	5.0	2.2	10.0	10.0	7.4
	Austria	4.8	3.9	3.1	6.4	6.8	5.0	9.0	6.4	6.6	7.4
	Finland	5.0	4.7	7.2	3.2	7.1	5.4	2.7	10.0	2.4	5.0
	Greece	7.3	7.5	1.0	5.8	1.0	4.5	4.1	1.7	2.1	2.6
	Slovakia	1.0	2.7	8.5	7.1	2.3	4.3	6.6	4.9	10.0	7.2
	Slovenia	3.3	1.8	4.7	4.6	4.2	3.7	4.6	5.8	5.2	5.2
	Estonia	3.6	5.7	2.5	8.9	4.9	5.1	4.8	3.4	5.2	4.5
	Latvia	7.0	7.2	6.6	9.2	4.7	6.9	6.2	1.7	4.5	4.2
	Lithuania	4.6	4.2	9.5	9.8	5.8	6.8	7.8	5.5	5.2	6.1
Luxembourg	1.0	10.0	10.0	6.1	8.8	7.2	4.6	8.2	10.0	7.6	
Cyprus	5.9	10.0	1.0	4.1	3.3	4.8	2.8	1.0	10.0	4.6	
Malta	1.0	8.9	1.0	6.4	5.5	4.5	4.9	5.9	6.8	5.9	
Non-Euro area EU	United Kingdom	7.9	8.2	5.8	8.3	8.3	7.7	1.5	4.4	7.2	4.4
	Denmark	5.0	5.6	7.7	5.0	8.2	6.3	1.4	7.7	5.5	4.9
	Sweden	6.7	5.6	6.5	2.8	7.1	5.8	1.0	9.6	5.1	5.2
	Czech Republic	1.2	1.0	7.7	7.1	5.4	4.5	7.9	5.9	5.5	6.4
	Hungary	1.0	2.5	7.5	7.3	4.7	4.6	8.5	3.4	5.9	5.9
	Poland	4.7	3.7	9.8	1.2	3.4	4.6	7.9	1.8	8.2	6.0
	Romania	6.0	3.8	9.2	10.0	7.4	7.3	7.4	2.0	7.1	5.5
	Bulgaria	3.4	5.0	5.3	8.5	5.5	5.5	8.1	2.8	3.1	4.7
	Croatia	10.0	5.8	1.0	1.9	5.6	4.9	6.3	4.4	4.1	4.9
Other countries	USA	10.0	7.2	7.6	8.4	10.0	8.7	1.9	4.5	10.0	5.4
	Japan	8.3	2.9	8.2	6.8	10.0	7.2	10.0	6.9	1.0	6.0
	China	9.2	1.0	5.5	N/A	1.0	4.2	4.3	1.0	10.0	5.1

Source: Scope Ratings GmbH; *China's score for "Economic vulnerability" is computed without "Temporary employment".

Annex II. Covid-19: economic vulnerability and healthcare capacity matrix (underlying data)

	Countries	Economic vulnerability				Healthcare capacity			
		External			Internal		Health care system		Demographics
		Global value chain participation rate, % of total gross exports, 2015	Manufacturing, % of gross value added, 2019 or latest available	Travel and tourism total contribution to GDP, % of GDP, 2018	Temporary employment, % total employment (15-64 years)	Persons employed by micro enterprises, % of total employment	Hospital beds per 1000 inhabitants, 2018 or latest available	Medical staff (physicians, nurses and midwives) per 1000 inhabitants, 2017 or latest	Share of population 65+, % of total, 2019
Euro area	Germany	42.9	21.6	10.7	10.8	19.1	8.0	17.4	21.5
	France	42.5	10.9	9.0	14.1	25.5	6.0	13.2	20.1
	Italy	40.8	16.6	13.1	13.4	43.6	3.2	10.0	22.8
	Netherlands	49.2	12.3	5.2	16.6	28.4	3.3	14.6	19.2
	Belgium	54.3	14.4	5.6	9.4	34.5	5.6	14.4	18.9
	Spain	40.3	12.2	14.9	22.2	37.7	3.0	9.6	19.4
	Portugal	43.9	13.5	17.8	17.4	40.3	3.4	9.7	21.8
	Ireland	52.4	33.3	6.0	8.3	27.8	3.0	17.4	14.1
	Austria	47.8	18.7	14.6	7.6	25.1	7.4	13.3	18.8
	Finland	47.2	17.1	8.4	13.5	23.9	3.3	18.5	21.8
	Greece	40.3	10.9	20.2	8.8	48.5	4.2	8.0	22.0
	Slovakia	63.6	21.2	6.4	6.5	42.0	5.8	11.6	16.0
	Slovenia	52.4	23.2	12.3	10.9	34.9	4.5	12.7	19.8
	Estonia	51.6	14.9	15.5	3.1	32.1	4.7	9.9	19.8
	Latvia	41.3	11.7	9.4	2.6	33.0	5.6	8.0	20.3
	Lithuania	48.4	18.0	4.9	1.5	28.9	6.6	12.3	19.8
	Luxembourg	79.4	5.7	4.2	8.2	17.6	4.5	15.4	14.4
Cyprus	44.6	5.7	23.1	11.9	38.3	3.4	7.2	16.1	
Malta	66.1	8.1	26.9	7.7	30.1	4.7	12.8	18.7	
Non-Euro area EU	United Kingdom	38.8	9.6	10.6	4.3	19.5	2.5	11.1	18.4
	Denmark	47.4	15.1	7.7	10.2	20.0	2.5	14.8	19.6
	Sweden	42.2	15.0	9.5	14.1	24.0	2.2	16.9	19.9
	Czech Republic	58.6	24.9	7.6	6.4	30.5	6.6	12.7	19.6
	Hungary	59.2	21.7	8.0	6.0	33.0	7.0	9.9	19.3
	Poland	48.1	19.1	4.5	17.1	37.7	6.6	8.1	17.7
	Romania	44.2	18.9	5.4	1.2	22.9	6.3	8.4	18.5
	Bulgaria	52.2	16.5	11.3	3.9	30.0	6.8	9.3	21.3
	Croatia	32.4	14.7	25.1	15.7	29.7	5.6	11.1	20.6
Other	USA	31.7	11.6	7.8	4.0	10.1	2.8	11.1	16.4
	Japan	37.6	20.8	6.8	7.0	13.1	13.1	13.9	28.4
	China	34.9	29.0	11.1	NA	46.9	4.3	4.1	12.6

Source: Eurostat, OECD, WB, WTO, IMF, World Travel & Tourism Council, CNBS, MIC, Bureau of Census, Scope Ratings GmbH; China's data for "Persons employed by micro enterprises" equals to "Self-employment"

Annex III. Indicator definitions and rationale

Indicator	Definition	Rationale	Source
Global value chain participation rate, % of total gross exports, 2015	Foreign inputs and domestically produced inputs used in third countries' exports, % of total exports (goods and services).	The supply and demand shocks due to the COVID-19 outbreak is likely to have a larger negative impact on countries with a higher exposure to international value chains.	WTO
Manufacturing, % of gross value added, 2019 or latest available	Contribution of the manufacturing sector to the total gross value added. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.	Many manufacturing enterprises suspend or reduce production due to the COVID-19 outbreak, adversely affecting output and employees' incomes.	Eurostat, OECD
Travel and tourism total contribution to GDP, % of GDP, 2018 (indirect impact included)	Travel & tourism sector includes airlines, hotels, cruises, car rental, travel agencies, tour operators, GDS, and technology.	Travel and tourism services will be heavily affected as people cancel their trips and social activities.	World Bank, World Trade & Tourism Council
Temporary employment, % total employment (15-64 years)	Temporary employment includes work under a fixed-term contract compared to permanent contracts (no end-date).	Employees with temporary contracts face a higher risk of lost income as their contract may not be renewed.	Eurostat, OECD
Persons employed by micro enterprises (0-9 persons), % of total employment	Micro enterprises are defined as those having less than 10 persons employed.	Micro businesses and self-employed usually have a limited cash buffers to offset the impact of consumption shocks due to the COVID-19 outbreak.	Eurostat, OECD
Hospital beds per 1,000 inhabitants, 2018 or latest available	Hospital beds include inpatient beds available in public, private, general, and specialized hospitals and rehabilitation centers. In most cases beds for both acute and chronic care are included.	Health systems - the combined arrangement of institutions, medical staff and policy actions are key to combat the COVID-19 outbreak and maintain the health of populations.	OECD, World Bank
Medical staff (physicians, nurses and midwives) per 1,000 inhabitants, 2017 or latest	Physicians include generalist and specialist medical practitioners. Nurses and midwives include professional nurses, professional midwives, auxiliary nurses, auxiliary midwives, enrolled nurses, enrolled midwives and other associated personnel, such as dental nurses and primary care nurses.	Health systems - the combined arrangement of institutions, medical staff and policy actions are key to combat the COVID-19 outbreak and maintain the health of populations.	World Bank
Share of population 65+, % of total, 2019	Population aged 65 and above as a percentage of the total population.	Considerably higher mortality rates from COVID-19 among the elderly population.	Eurostat, CNBS, MIC, US Bureau of the Census



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