The COVID-19 Skills watcher

Covid-19 and skills in the labour market

Technical Report – July 2020

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The context

The Coronavirus (Covid-19) crisis is likely to have a severe impact on the European and global workforce. Recommended or forced closures and social distancing measures result in disruptive changes in the labour market, such as the decline of working hours, an increase in vulnerability for self-employed workers and a considerable loss in employment. These changes differ in their impact across sectors and regions, and this could potentially lead to a re-allocation of labour across sectors. In order to support the large number of workers impacted by the crisis and promote a faster recovery, the Commission is further investigating how the Coronavirus crisis will affect the labour market in order to provide targeted solutions.

In this context, a greater flexibility of the workforce is requested to potentially respond to the need of workers switching across occupations and sectors. A crucial role is now to be played by institutions and companies that support workers in their up-skilling and re-skilling process.

The European classification of Skills, Competences, Qualifications and Occupations (ESCO) offers a dataset to identify and analyse occupations and skills of the labour market. The combination of ESCO with real-time data offers a unique opportunity to gain data-based insights on what is happening and suggest possible pathways for a more efficient recovery.

In this context, a first exercise has already been conducted by linking real-time data from the International Labour Organization (ILO) to the ESCO dataset. The resulting information has been summarised in a visual tool (the "COVID-19 Skills watcher") that can be consulted free of charge in the ESCO portal. The tool gives an overview of skills that occur most frequently across occupations in every sector, where sectors are grouped by the level of impact of Covid-19 in their economic output. This tool is an instrument that provides labour market information and support for skills development, suggesting a focus on those skills that could potentially help workers in dealing with occupational changes.

Methodology

In order to build the COVID-19 Skills watcher, three datasets have been employed. Please see below an infographic (Table 1) that summarises all the steps undertaken during the analysis.

Table 1 - Methodology

01	02	03	04	05
ESCO	**ESCO - NACE**	**NACE - ILO**	**ESCO - ILO**	
Link skills and occupations	Group ESCO occupations in 21 economic sectors	Merge the 21 economic sectors by NACE into 14 economic sectors by ILO	Analyse the distribution of skills among sectors	Show data distinguishing by degree of impact of Covid-19

The **first dataset** is the ESCO dataset on occupations and skills. One of the main features of ESCO is that the occupations pillar and the skills pillar are interconnected, which results in a dataset where every occupation is linked with at least one skill. The ESCO dataset has been employed to link the ILO sectors to the skills linked to every occupation within the different sectors. Two groups of variables were used for this analysis:

1. *Preferred skill terms*, which are the names of skills related to every occupation. In this exercise, 12.571 skills and competences have been analysed. This dataset does not cover all the 13.485 skills and competences present in ESCO, and this is due to the fact that some skills have been included in the dataset after the time when the mapping exercise with NACE took place.

2. *Skills frequency rate*, which defines the frequency of one skill within one sector. It is based on the number of times one skill is linked to any occupation within the sector. As an additional feature, ESCO offers the opportunity to distinguish between skills that are essential for one occupation and skills that are optional. For this analysis, only essential links have been selected. A total of 114.403 links have been analysed.

   To define the frequency rate, the following formula has been used for each sector:

$$Skills\ frequency\ rate_i = \frac{no.\ links\ between\ skill\ i\ and\ occupations}{no.\ links\ between\ all\ skills\ and\ occupations}$$

The **second dataset** contains information on economic sectors as defined by NACE, the statistical classification of economic activities in the European Community. In the past the ESCO dataset of occupations had been mapped to NACE sectors. Since ESCO occupations were not mapped to the economic sectors as proposed by ILO in their report, this existing mapping between ESCO occupations and NACE sectors has been used to group ESCO occupations into the 14 ILO economic sectors. Please note that in the dataset NACE included 21 sectors, hence a second mapping was required for the purpose of this analysis to merge the 21 NACE sectors to the 14 ILO sectors. A table showing the results of the merging exercise is attached in the Annex (Table A1).

The **third dataset** contains information from the ILO report on COVID-19 and the world of work. The report is publicly available and can be consulted here. Two variables have been used from this dataset:

1. *Current impact of the crisis on economic output*, which divides the 14 economic sectors into 5 levels of impact, later merged into 4 levels for the purpose of this analysis. This variable uses real-time economic and financial data, including global and sector indices, performance analytics and other statistical datasets. This variable shows the extent of the decrease on firms' production,

investment, sales, expectations and their implications for layoffs and plans for short-term hiring.

2. *Share in global employment*, which offers a percent value for every economic sector.

A table showing the full dataset is included in the Annex (Table A2).

The visual tool

The COVID-19 Skills watcher consists of an interactive 3-levels pie chart. The first level describes 4 different degrees of impact of the Coronavirus crisis in the output of global economic sectors. The assessment of the impact on sectors has been conducted by ILO using a set of indices to reveal the effects of the shock on firm dynamics and jobs[1]. The second level lists 14 economic sectors, each of them included in one of the four impact levels. The size of the sector within the chart reflects the share of global employment of that sector, based on ILO data. The third and last level lists 70 skills, which represent the 5 skills defined as essential for the higher number of occupations within every sector. The size of every skill in the chart is based on the rate of frequency of the skills, please see the following section ("Methodology") for a more detailed explanation.

The tool is interactive in the sense that the user can select one option in every of the three levels and the tool will show information only concerning that option. This selection can be done for the first two levels of the chart. Moreover, when pointing the cursor on one option, the reader receives additional information such as the share of global employment of one sector or the frequency rate of one skill.

The tool will be available in the ESCO portal.

The COVID-19 Skills watcher has been designed using the Plotly Python Open Source Graphing Library, which is free and open source, more information is available here.

Use cases

The COVID-19 Skills watcher is available free of charge in the ESCO portal and it responds to various needs. Among them, four use cases have been selected and described below.

Table 2 – Use cases

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[1] For more information, please consult the following section "Methodology" or refer to the ILO paper.

Public Employment Services	E-learning platforms	International Institutions	Research bodies
Have an overview of current skill trends in the LM and foresee future paterns	Respond to basic needs of workers and education and training institutions	Learn about a successful attempt of collaboration between international institutions	Provide information useful for further investigations on the role of skills in the LM
Receive support to understand intersectoral labour mobility opportunities	Define investment strategies towards the creation of targeted content	Look at the combination of a real-time dataset with ESCO to investigate the LM	Demonstrate the flexibility and richness of the ESCO dataset to respond to research needs

Public Employment Services (PES)
In order to respond to the consequences of the coronavirus crisis in the labour market, there is the need for some institutions to be in the frontline supporting workers and promoting the recovery. Public (and private) employment services are expected to play a crucial role in preventing the labour market from seizing up, by giving support to workers to potentially reallocate across occupations and sectors (OECD, 2020). The COVID-19 Skills watcher offers an original overview of the skills owned by workers among different sectors and it can help PES in two ways:

1. PES can consult the COVID-19 Skills watcher to see the range of skills that are available in the labour market and foresee those that will potentially be over-supplied due to the crisis. Thanks to the visual representation of the data, PES agents are equipped with an instrument that can help to better understand the current labour market context and find possible solutions to re-integrate the labour force.
2. By comparing the set of skills that are most frequent in every sector with the skills owned by job seekers, the COVID-19 Skills watcher can support PES in looking for opportunities for workers across different sectors. Hence, the tool can provide PES with good labour market information and support for intersectoral labour mobility to foster the recovery.

E-learning platforms
Due to changes in the labour marked caused by the crisis, there is an increasingly urgent need to retrain workers who are forced to redeploy. Cedefop (2020) underlines the need to identify sectors, occupations and population groups faced with higher risk of disruption for designing appropriate reskilling programs. A step towards the achievement of this goal has been done with the COVID-19 Skills watcher. E-learning platforms can consult the COVID-19 Skills watcher for the following purposes:

1. Focus on creating education content on those skills that are most frequent in every sector, to support e-learning platforms in responding to the needs of workers and education and training institutions.
2. Plan a content strategy that gives relevance to those sectors less hit by the crisis. In the low- and medium-impact sectors, the decrease in employment and investments is expected to be smaller compared to other sectors. As a consequence, more content for skills related to occupations in those sectors might be demanded for learners.

International institutions
The coronavirus crisis has reached global dimensions. International institutions are expected to play a central role in the response to the crisis, but to achieve a better recovery it is necessary to ensure collaboration among different bodies. The COVID-19 Skills watcher demonstrates a step towards reaching this goal.

1. The COVID-19 Skills watcher demonstrates an example of collaboration between international institutions. By combining information from three different international bodies, the tool is able to enable conclusions and data-based suggestions. This exercise is possible only thanks to the open availability of data. In addition, since the COVID-19 Skills watcher is online and free-of-charge, it opens to further collaborations and analysis.
2. The tool shows that ESCO is a flexible and rich dataset, which can be used for various investigations on the labour market. ESCO gives an overview of the European labour market but can also be employed for international analysis, as in this case.

Research bodies
Research institutes are already using qualitative and quantitative analysis to investigate the impact of the Coronavirus crisis in the labour market. Their efforts to understand the characteristics of this crisis are extremely valuable for policy makers in order to design the most effective policies towards economic and social recovery.

1. The COVID-19 Skills watcher provides research institutes with information concerning the distribution of skills among sectors, suggesting possible analysis based on data such as the frequency rate of skills and opportunities for intersectoral labour mobility. Such information can be a starting point for further investigations towards the analysis of the role of skills in the labour market.
2. The COVID-19 Skills watcher demonstrates that the ESCO dataset can be managed, combined with additional datasets and employed in various contexts to respond to research needs.

Annex

Table A1 - Merging NACE sectors with ILO sectors

NACE top level labels (21)	ILO top level labels (14)
ACCOMMODATION AND FOOD SERVICE ACTIVITIES	Accommodation and food services
ACTIVITIES OF EXTRATERRITORIAL ORGANISATIONS AND BODIES	*Only 2 occupations are in this group. They are: "humanitarian advisor" and "hunter". Those will not considered in the analysis.*
ACTIVITIES OF HOUSEHOLDS AS EMPLOYERS; UNDIFFERENTIATED GOODS- AND SERVICES-PRODUCING ACTIVITIES OF HOUSEHOLDS FOR OWN USE	*Only 2 occupations are in this group. They are: "humanitarian advisor" and "hunter". Those will not considered in the analysis.*
ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	Real estate; business and administrative activities
AGRICULTURE, FORESTRY AND FISHING	Agriculture; forestry and fishing
ARTS, ENTERTAINMENT AND RECREATION	Arts, entertainment and recreation and other services
CONSTRUCTION	Construction
EDUCATION	Education
ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	Utilities
FINANCIAL AND INSURANCE ACTIVITIES	Financial and insurance activities
HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	Human health and social work activities

INFORMATION AND COMMUNICATION	Transport; storage and communication
MANUFACTURING	Manufacturing
MINING AND QUARRYING	Mining and quarrying
OTHER SERVICE ACTIVITIES	Arts, entertainment and recreation and other services
PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	Education
PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	Public administration and defence; compulsory social security
REAL ESTATE ACTIVITIES	Real estate; business and administrative activities
TRANSPORTATION AND STORAGE	Transport; storage and communication
WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	Utilities
WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	Wholesale and retail trade; repair of motor vehicles and motorcycles

Table A2 – The final dataset

Number	Impact	Sector	Skill	Freq.	Freq_share
1	High	Accommodation and food services	comply with food safety and hygiene	0.026	0.001
2	High	Accommodation and food services	maintain customer service	0.023	0.001
3	High	Accommodation and food services	manage staff	0.018	0.001
4	High	Accommodation and food services	handle customer complaints	0.014	0.001
5	High	Accommodation and food services	greet guests	0.011	0.000
1	High	Real estate, business and administrative activities	identify customer's needs	0.016	0.002
2	High	Real estate, business and administrative activities	communicate with customers	0.011	0.002
3	High	Real estate, business and administrative activities	guarantee customer satisfaction	0.011	0.002
4	High	Real estate, business and administrative activities	handle financial transactions	0.011	0.001
5	High	Real estate, business and administrative activities	have computer literacy	0.011	0.001
1	High	Manufacturing	troubleshoot	0.034	0.005
2	High	Manufacturing	wear appropriate protective gear	0.021	0.003
3	High	Manufacturing	adhere to organisational guidelines	0.020	0.003
4	High	Manufacturing	perform test run	0.020	0.003
5	High	Manufacturing	read standard blueprints	0.019	0.003

1	High	Wholesale and retail trade	have computer literacy	0.034	0.005
2	High	Wholesale and retail trade	create solutions to problems	0.021	0.003
3	High	Wholesale and retail trade	maintain financial records	0.020	0.003
4	High	Wholesale and retail trade	meet deadlines	0.020	0.003
5	High	Wholesale and retail trade	comprehend financial business terminology	0.019	0.003
1	Medium-High	Arts, entertainment and recreation and other services	maintain customer service	0.009	0.001
2	Medium-High	Arts, entertainment and recreation and other services	work ergonomically	0.009	0.000
3	Medium-High	Arts, entertainment and recreation and other services	manage staff	0.007	0.000
4	Medium-High	Arts, entertainment and recreation and other services	identify customer's needs	0.005	0.000
5	Medium-High	Arts, entertainment and recreation and other services	adapt to artists' creative demands	0.005	0.000
1	Medium-High	Transport; storage and communication	use different communication channels	0.009	0.001
2	Medium-High	Transport; storage and communication	manage budgets	0.006	0.000
3	Medium-High	Transport; storage and communication	manage staff	0.005	0.000
4	Medium-High	Transport; storage and communication	develop professional network	0.005	0.000
5	Medium-High	Transport; storage and communication	communicate with customers	0.004	0.000
1	Medium	Agriculture; forestry and fishing	write work-related reports	0.009	0.002
2	Medium	Agriculture; forestry and fishing	ensure aquaculture personnel health and safety	0.008	0.002
3	Medium	Agriculture; forestry and fishing	control aquatic production environment	0.007	0.002
4	Medium	Agriculture; forestry and fishing	monitor water quality	0.007	0.002
5	Medium	Agriculture; forestry and fishing	supervise hygiene procedures in agricultural settings	0.007	0.002
1	Medium	Construction	follow health and safety procedures in construction	0.030	0.002
2	Medium	Construction	inspect construction supplies	0.026	0.002
3	Medium	Construction	use safety equipment in construction	0.025	0.002
4	Medium	Construction	work ergonomically	0.018	0.001

5	Medium	Construction	work in a construction team	0.016	0.001
1	Medium	Financial and insurance activities	analyse market financial trends	0.028	0.000
2	Medium	Financial and insurance activities	advise on financial matters	0.024	0.000
3	Medium	Financial and insurance activities	analyse financial risk	0.019	0.000
4	Medium	Financial and insurance activities	create a financial plan	0.019	0.000
5	Medium	Financial and insurance activities	obtain financial information	0.019	0.000
1	Medium	Mining and quarrying	troubleshoot	0.030	0.000
2	Medium	Mining and quarrying	address problems critically	0.016	0.000
3	Medium	Mining and quarrying	prepare technical reports	0.013	0.000
4	Medium	Mining and quarrying	use a computer	0.013	0.000
5	Medium	Mining and quarrying	work ergonomically	0.013	0.000
1	Low	Education	guarantee students' safety	0.012	0.001
2	Low	Education	give constructive feedback	0.012	0.001
3	Low	Education	apply teaching strategies	0.011	0.001
4	Low	Education	assess students	0.010	0.001
5	Low	Education	prepare lesson content	0.010	0.001
1	Low	Human health and social work activities	listen actively	0.014	0.001
2	Low	Human health and social work activities	adhere to organisational guidelines	0.013	0.001
3	Low	Human health and social work activities	accept own accountability	0.013	0.001
4	Low	Human health and social work activities	apply organisational techniques	0.011	0.000
5	Low	Human health and social work activities	promote inclusion	0.011	0.000
1	Low	Public administration and defence; compulsory social security	use different communication channels	0.005	0.000
2	Low	Public administration and defence; compulsory social security	adhere to organisational guidelines	0.004	0.000
3	Low	Public administration and defence; compulsory social security	manage staff	0.004	0.000
4	Low	Public administration and defence; compulsory social security	delegate activities	0.003	0.000
5	Low	Public administration and defence; compulsory social security	handle conflicts	0.003	0.000
1	Low	Utilities	ensure compliance with environmental legislation	0.009	0.000

2	Low	Utilities	perform scientific research	0.009	0.000
3	Low	Utilities	troubleshoot	0.008	0.000
4	Low	Utilities	use technical drawing software	0.008	0.000
5	Low	Utilities	adjust engineering designs	0.008	0.000