

# L'impatto della pandemia sulla vita ed il lavoro dei cittadini europei.

Massimiliano Mascherini, PhD  
Head of Social Policy Unit  
EUROFOUND  
Dublin, Ireland

# Introduction- Eurofound



to help improve the lives of citizens of Europe.

# 2021-2024: Research activities

Working conditions  
and sustainable  
work

Industrial relations  
and social dialogue

Employment and  
labour markets

Living conditions  
and quality of life

Anticipating and  
managing the  
impact of change

Promoting social  
cohesion and  
convergence

# Long history of fielding surveys

The European Working  
Conditions Survey



European Working  
Conditions Survey  
Since 1991

The European  
Quality of Life Survey



European Quality of  
Life Survey  
Since 2003

The European  
Company Survey



European Company  
Survey  
Since 2004



# Documenting the impact of the crisis.

- *Living, Working and COVID19*
- The Eurofound large-scale online survey across the European Union and beyond.
- Cross-sectional and longitudinal survey.



# It started like an experiment

- 24 March 2020
- April 9<sup>th</sup> 2020: launched in 22 languages across the EU and beyond.
- 6 waves has been fielded and more than 200,000 observations collected.
- Cross-sectional and longitudinal



# Topics

- Mental Health
- WorkLife Balance
- Housing
- Public Service and support
- Trust
- Political Participation
- Material Living conditions
- Vaccine acceptance
- Telework
- Skills
- Social Cohesion
- ...

# The COVID19 crisis: like a modern Kerberos





# The COVID19 crisis, a three-headed hound

- The COVID19 pandemic started in March 2020 and quickly became a **health, economic and social crisis**.
- Like a **modern Kerberos**, the gigantic three-headed hound and guardian of Hades, these three faces of the crisis are affecting the various demographic groups in our societies very differently.
- Age-specific trends in **Coronavirus deaths** have been clear since the beginning of the pandemic.
- Conversely, **younger generations and women** are much more exposed than the older population to the wider consequences of **restrictive measures** implemented by governments to control the virus.

# This talk

- Mental Health
- WorkLife Balance
- Vaccine hesitancy

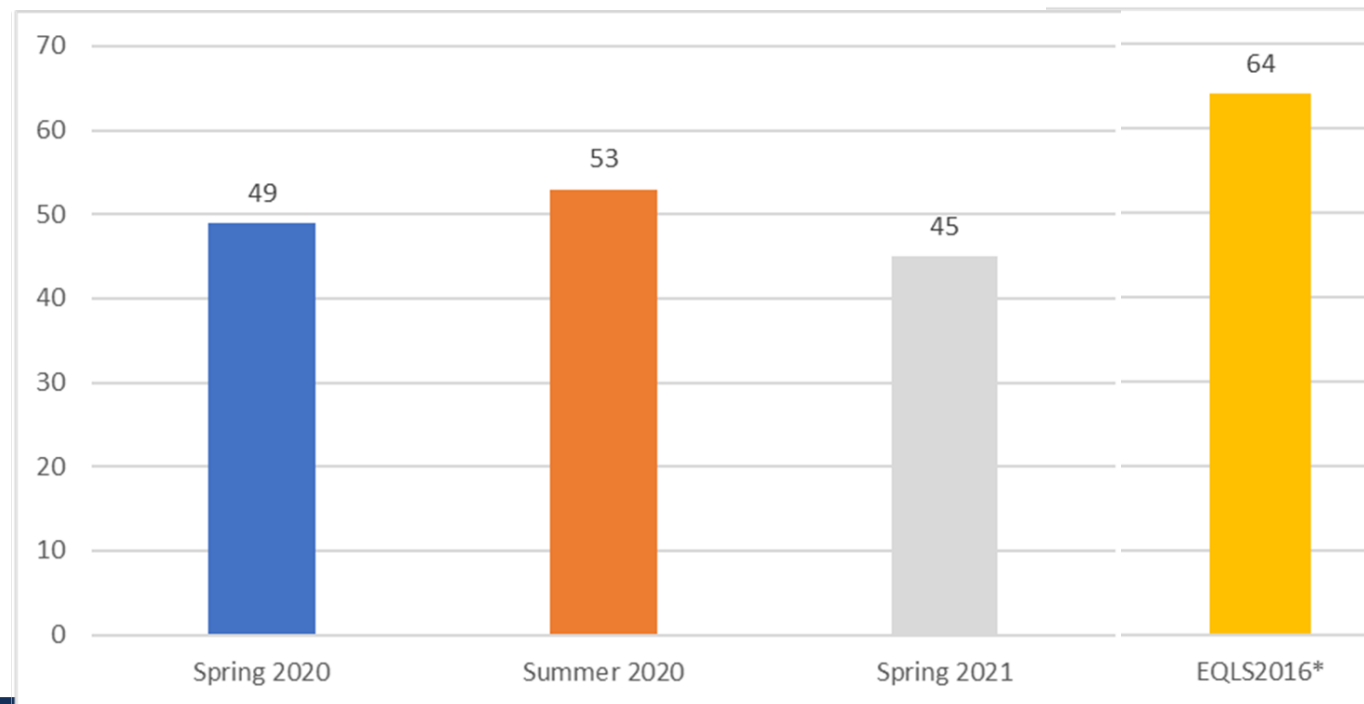


**Mental Health**



# The impact on Mental Wellbeing.

- There is increasing evidence for a surge in mental health problems, greater vulnerability and alarming implications for emotional and social functioning.
- WHO-5 mental well-being scale (0–100), based on the frequency of positive feelings over the previous two weeks

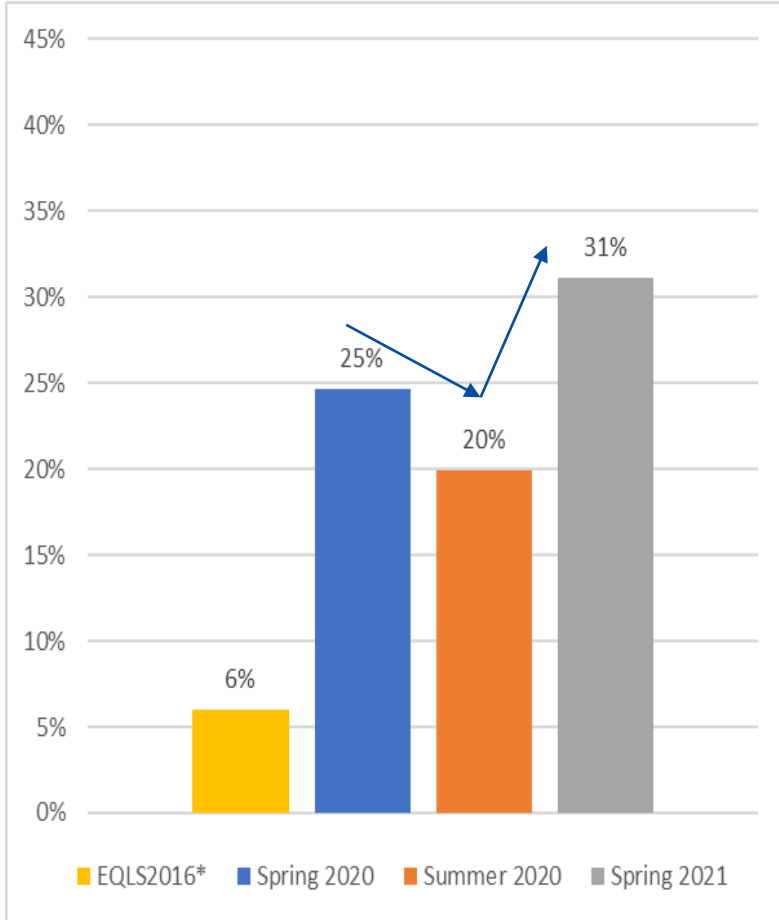


Source: Eurofound Living, Working and COVID19 survey

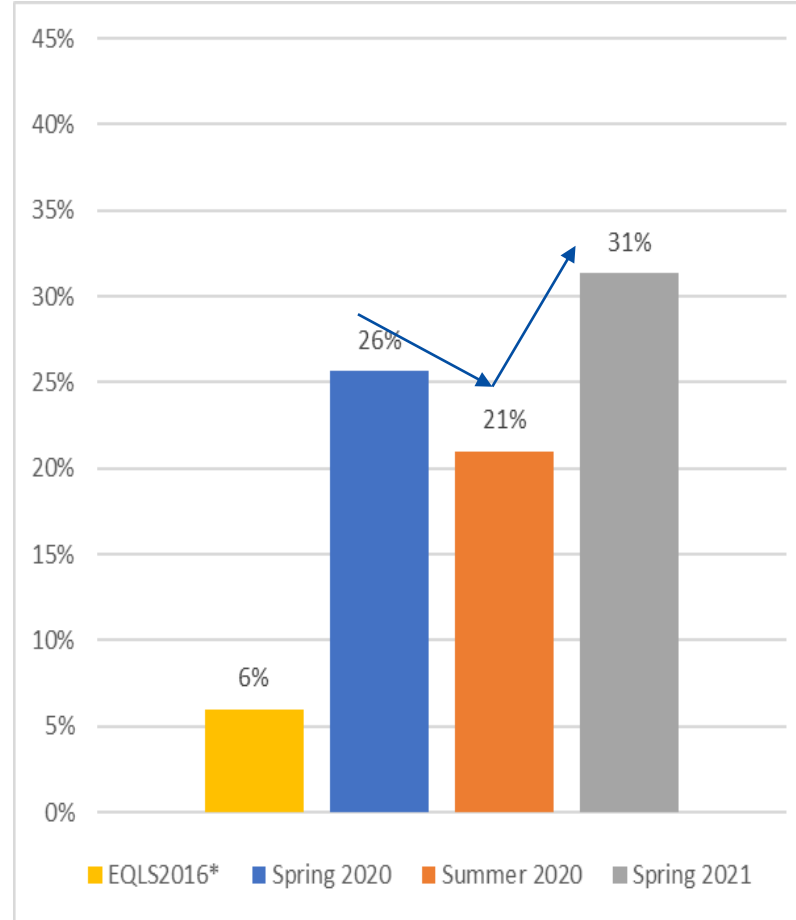


# The impact on Mental Wellbeing.

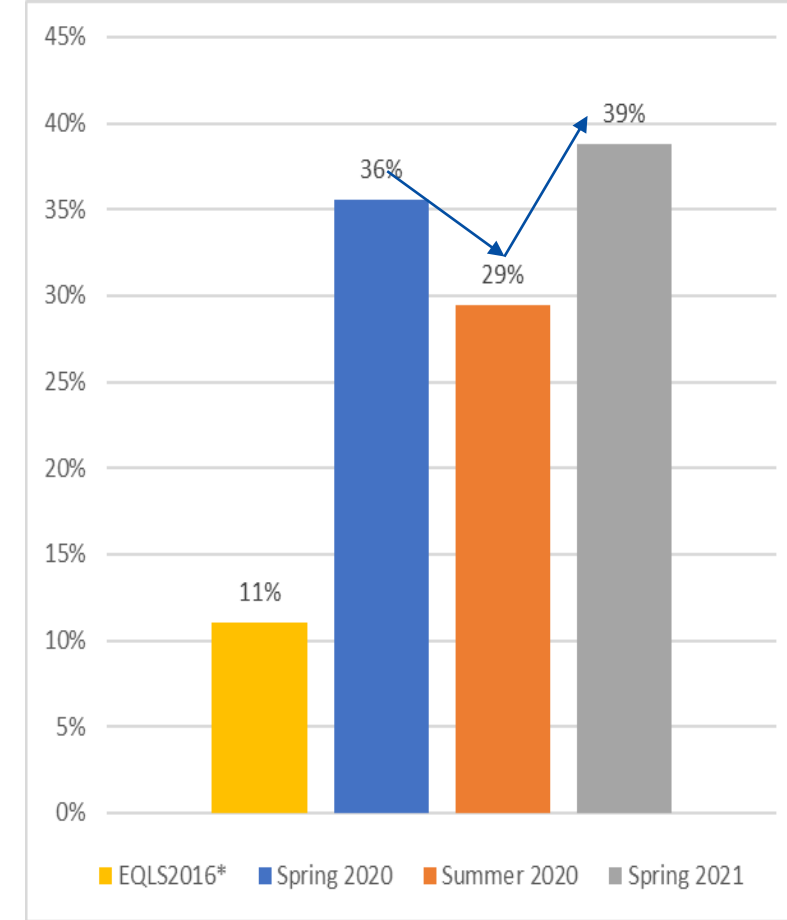
## Feeling downhearted and depressed



## Feeling lonely

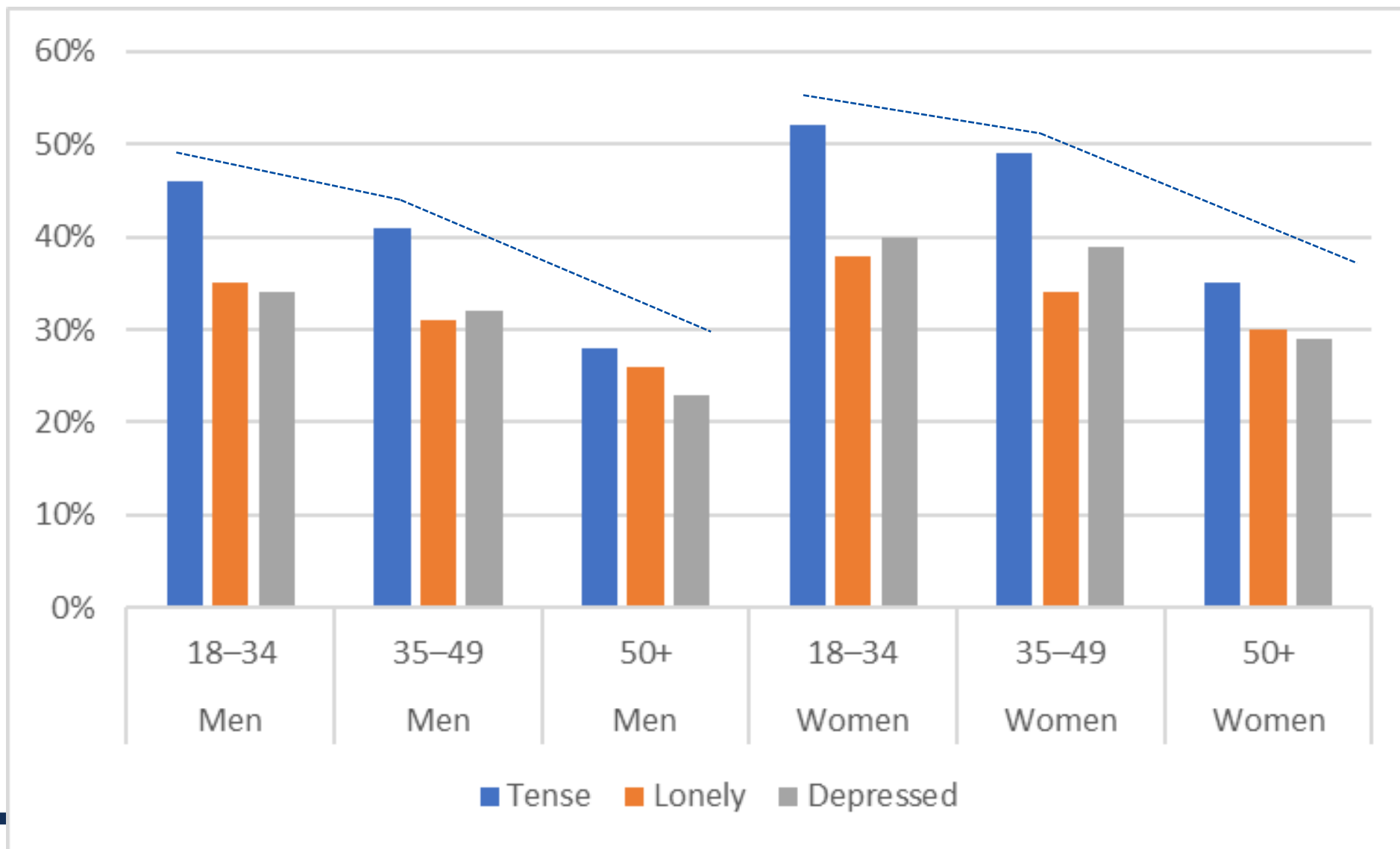


## Feeling tense



Source: Eurofound Living, Working and COVID19 survey

# Not everyone is affected the same way



Source: Eurofound Living, Working and COVID19 survey

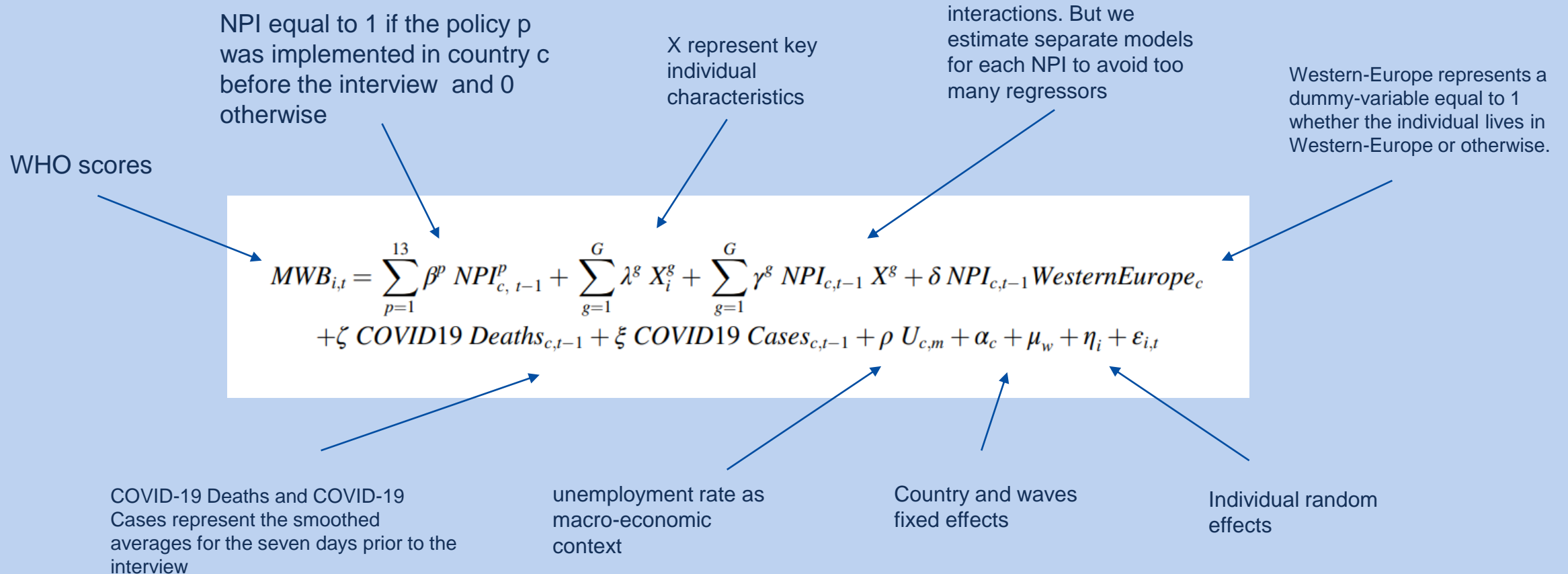
- Pandemic-related distress stems from the **fear of the illness**, **economic hardship**, and **uncertainty** about the real impact of the crisis.
- It is also a result of **social isolation** and **tensions** (within families) in lockdown together as a **result of restrictions** (NPI) that most governments have deployed to contain the pandemic.
- **Had NPIs a role in worsening mental health?**

# Data and Methods

- Dependent variable:  
**WHO5** Mental Wellbeing Index
- Covariates:  
Usual **key individual** variables (age, gender, education, place of living...)
- Explanatory variables:  
**13 NPIs**, measured with Oxford COVID-19 Government Response Tracker (OxCGRT).
- Dataset:  
Eurofound Living, Working and COvid19, wave 1-3 longitudinal.
  
- The dataset is further complemented by numbers of daily COVID-19 cases and deaths at country level.
- Unemployment rate is included to control for the impact of macro-economic shock.

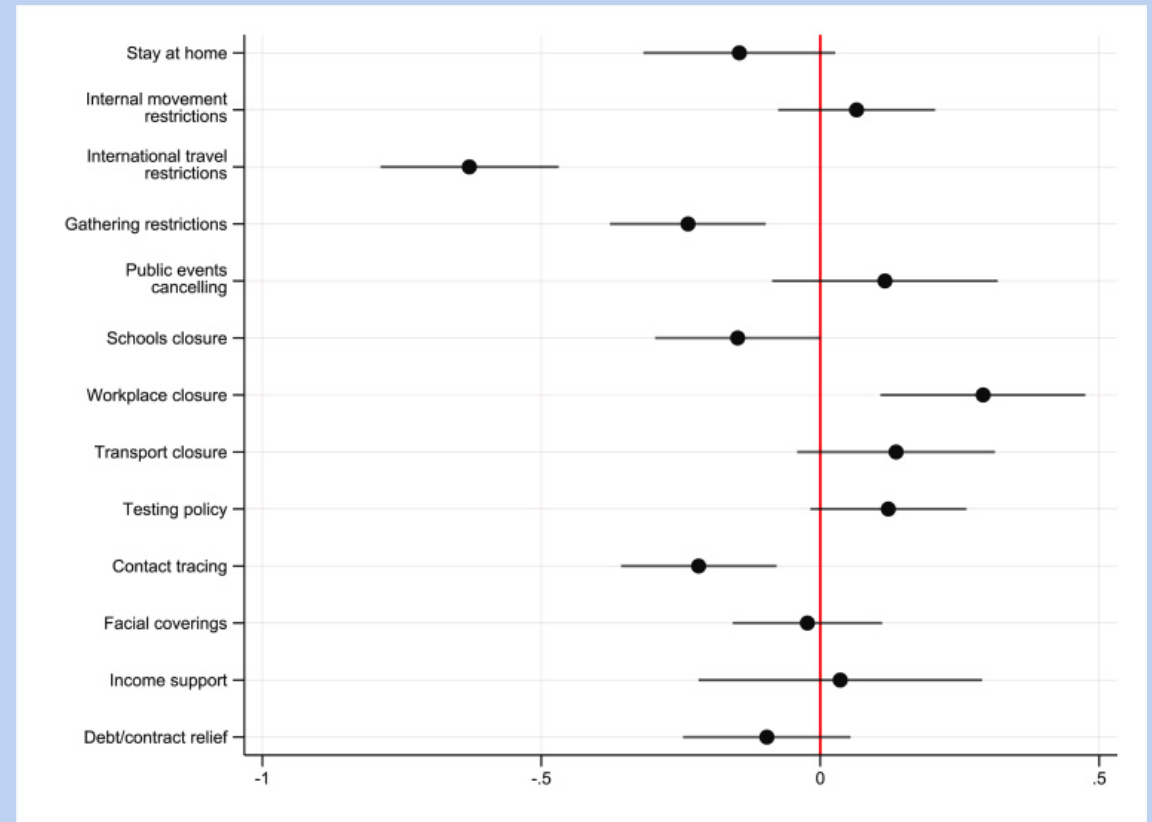


# The model



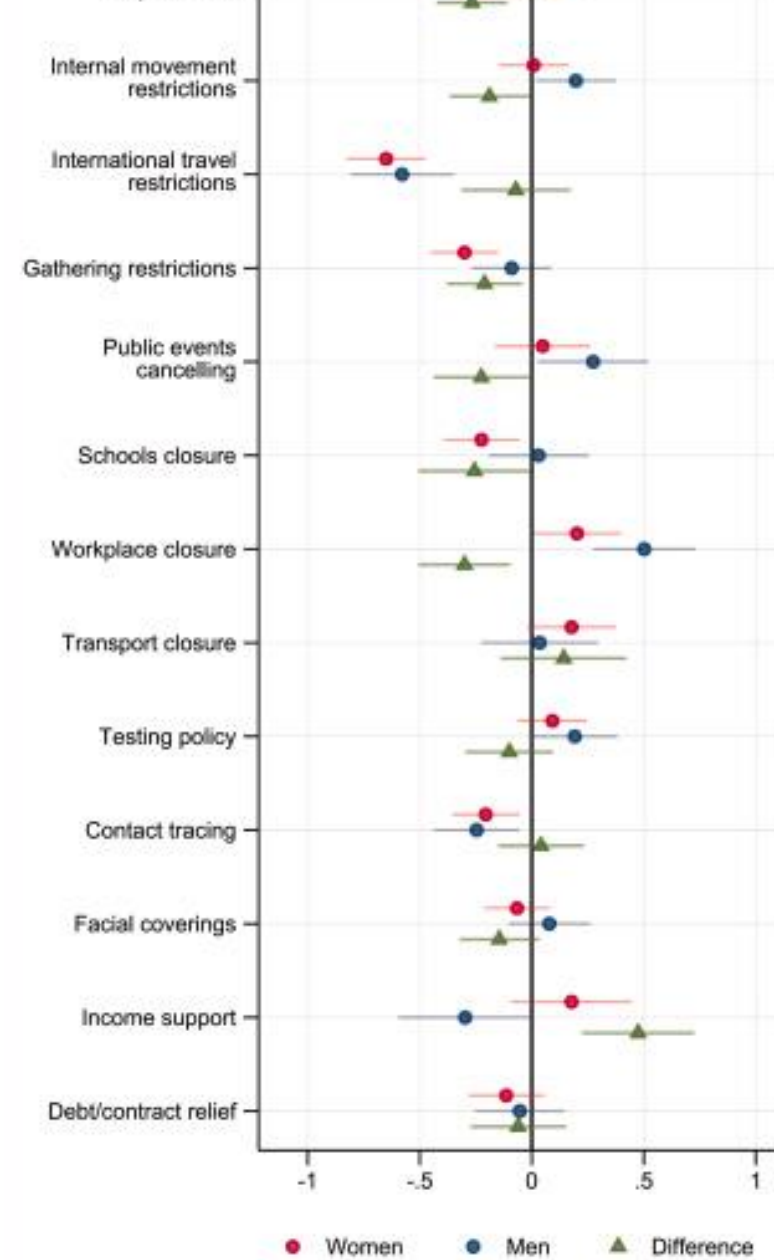
# Results

- Average marginal effects and 95% CIs for the association between each NPI and MWB, estimated with mixed-effects OLS models on longitudinal data from the 28 European countries.
- Our evidence shows that the enactment of NPIs in terms of restriction on **international travel**, **restrictions on private gatherings**, and **contact tracing policies** were negatively associated with individuals' MWB

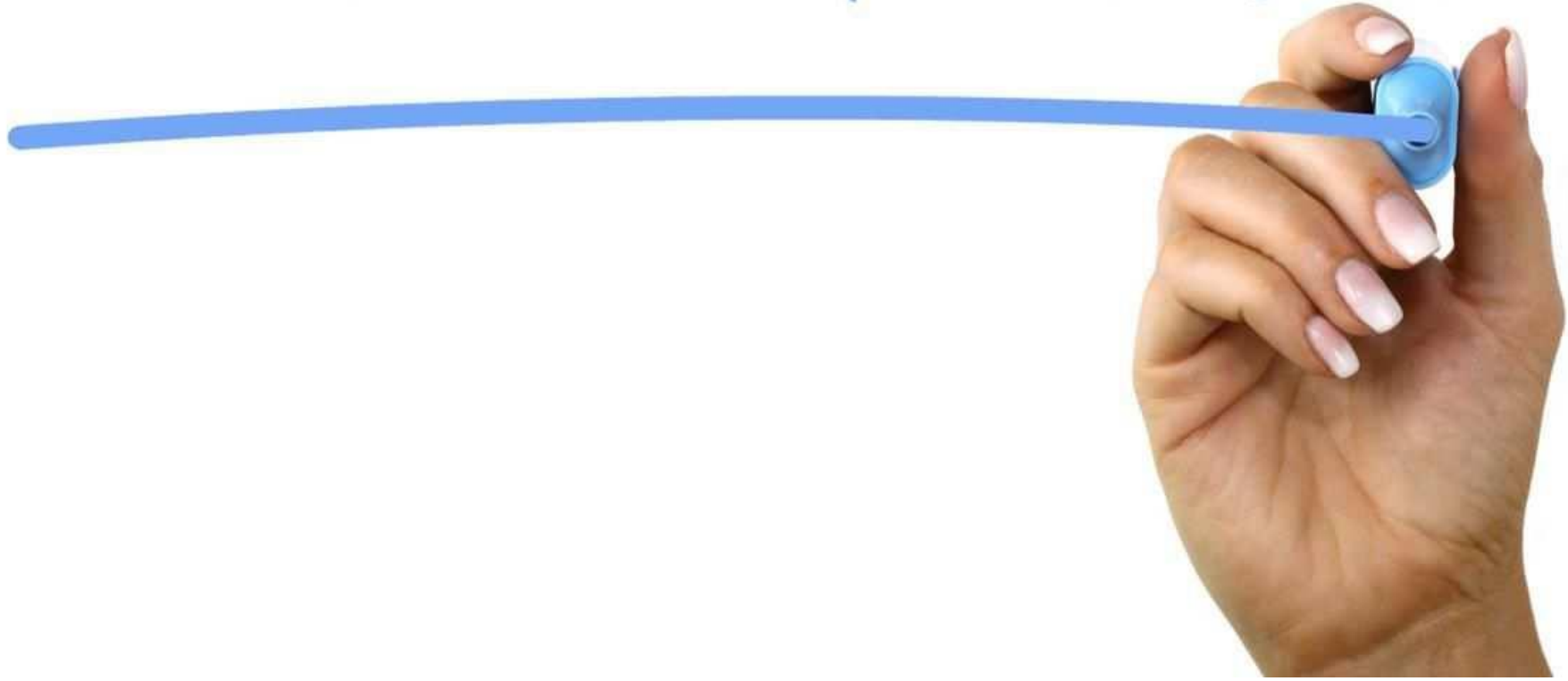


# Results – gender differences

- Gender differences:
  - **stay-at-home requirements, restrictions on private gatherings, and school closures** were negatively associated with women's MWB
  - As for men, **restrictions on internal movement, cancellations of public events** were positively associated with their MWB
  - **Workplace closures** were positively related to both men and women's MWB.
  - for both women and men, **contact tracing policies** and **international travel restrictions** were negatively associated with their MWB



# EMPLOYMENT

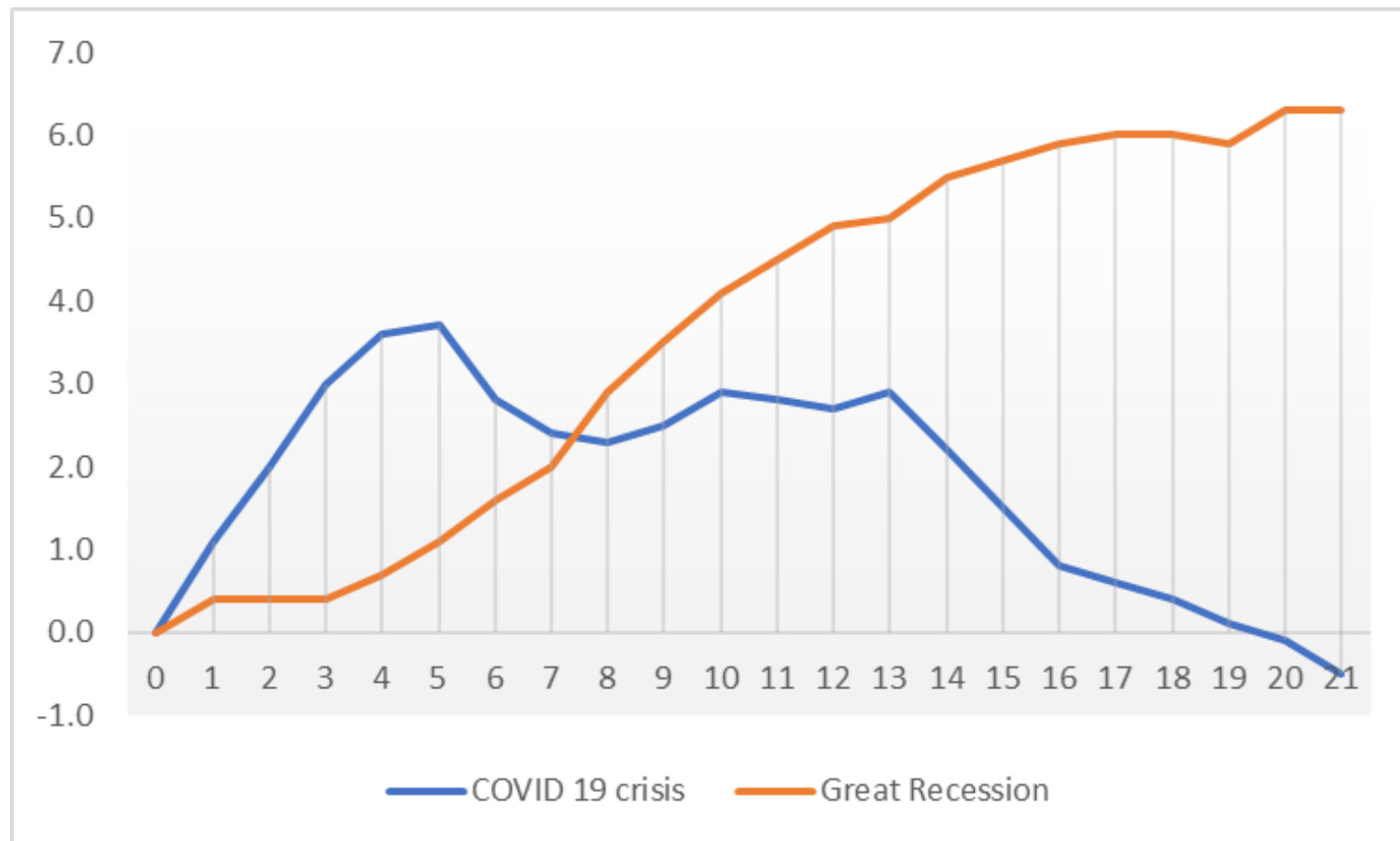




# Unemployment, comparison with 2008

In 2008, the surge in unemployment started mild and then grew regularly over the months before the crisis.

In 2020, unemployment surged dramatically but it was fully re-absorbed during 2021



# The surge of telework

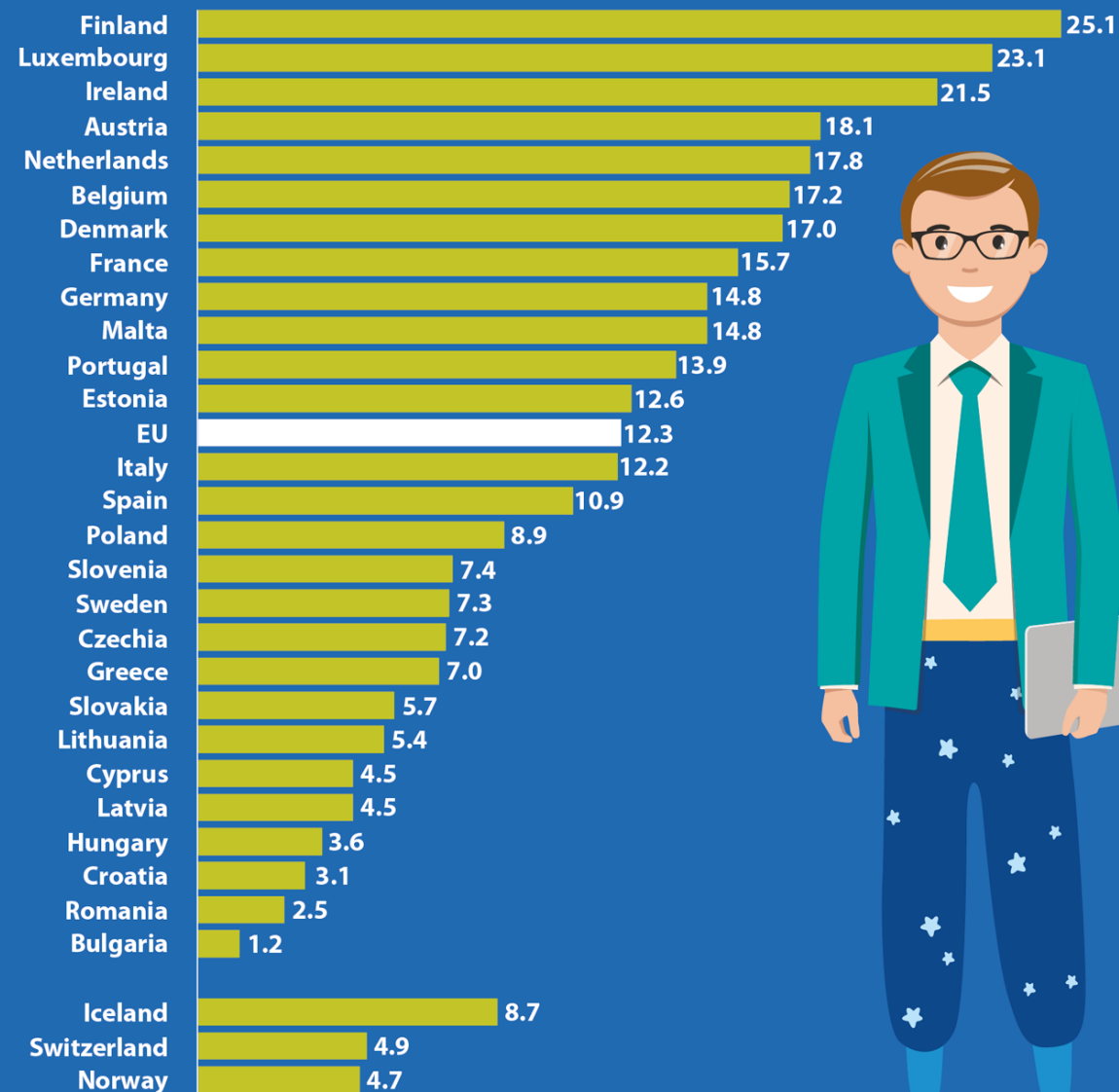
The social distancing measures that were introduced as a response to the COVID-19 pandemic forced many people to work from home.

In 2020, 12.3% of employed people aged 15-64 in the EU usually worked from home, although this share had remained constant at around 5% over the past decade.

Compared with other age groups, younger people were less likely to work from home in 2020: only 6.3% of those aged 15-24 reported that they usually worked from home, compared with 13.0% of those aged between 25-49 and 12.4% of those aged 50-64.

## People usually working from home, 2020

(% of employed people aged 15-64)



Germany: provisional data with low reliability.





# Work-life balance and NPIs

- The difference in mental health among men and women rings an alarm bell and open questions on how Europeans coped with life and work during the pandemic.
- Teleworking in a time of social distancing and lockdown might be burdensome for many working mothers as they juggle work, home-schooling and care, all in the same pocket of space and time.
- Concentration of activity in the home also meant that work and home life are in conflict and the work–life balance among European workers deteriorate.
- In particular, this seems more acute in times of closure of schools.
- **What was the impact of NPIs on work life balance?**



# Aim of the EF-ECDC study

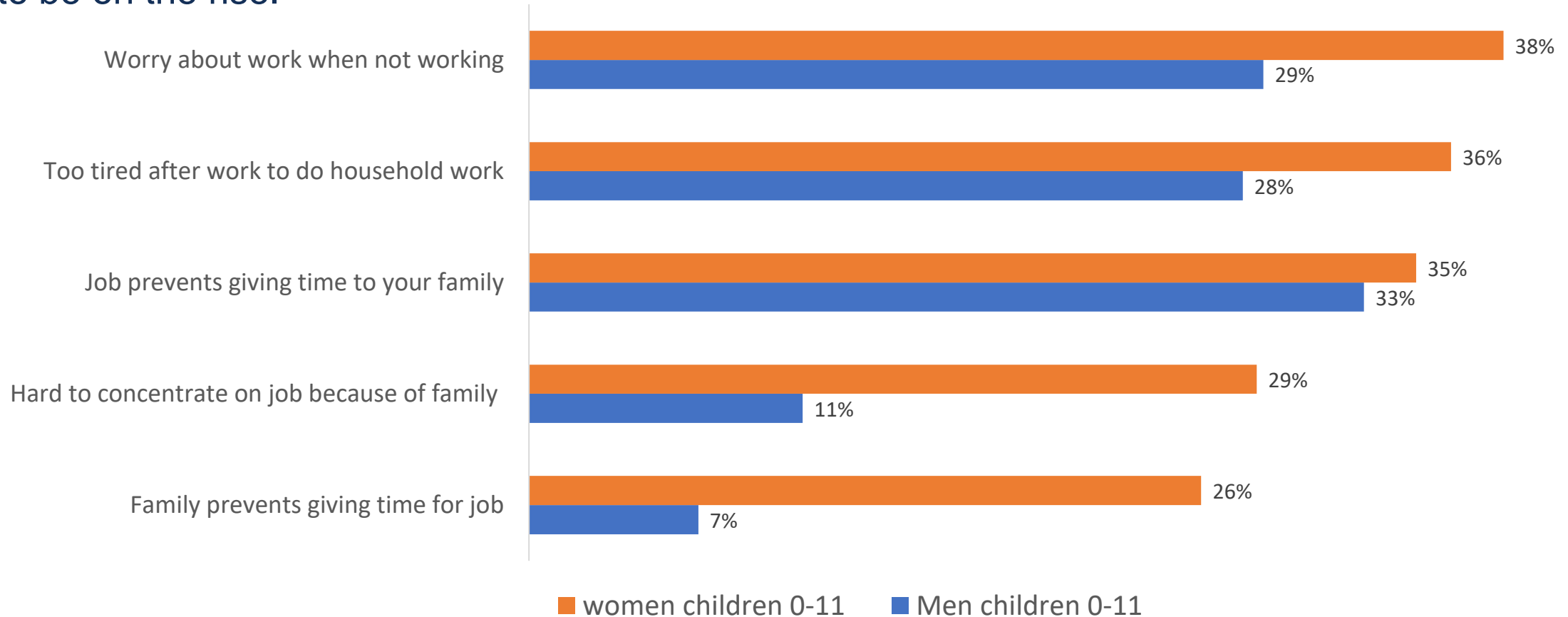
To join **Eurofound** and **ECDC** expertise in this field and to assess the **impact of different NPIs** in response to COVID-19 implemented from **January 2020 to May 2022** on the **work life balance** of the respondents of the Eurofound survey “Living, Working and COVID-19”

# Measuring work-life balance

- The Living, Working and COVID19 survey adopt the work-life balance scale of the European Working Conditions Survey
- This scale has been introduced in Eurofound in the 90s.
- It is composed by 5 items:
  - 1. kept worrying about work when you were not working
  - 2. felt too tired after work to do some of the household jobs which need to be done
  - 3. found that your job prevented you from giving the time you wanted to your family
  - 4. found it difficult to concentrate on your job because of your family responsibilities
  - 5. found that your family responsibilities prevented you from giving the time you should to your job

# Work-life balance of men and women with young children

Concentration of activity in the home also means that conflicts between work and home life are sure to be on the rise.



Source: Eurofound Living, Working and COVID19 – round 2

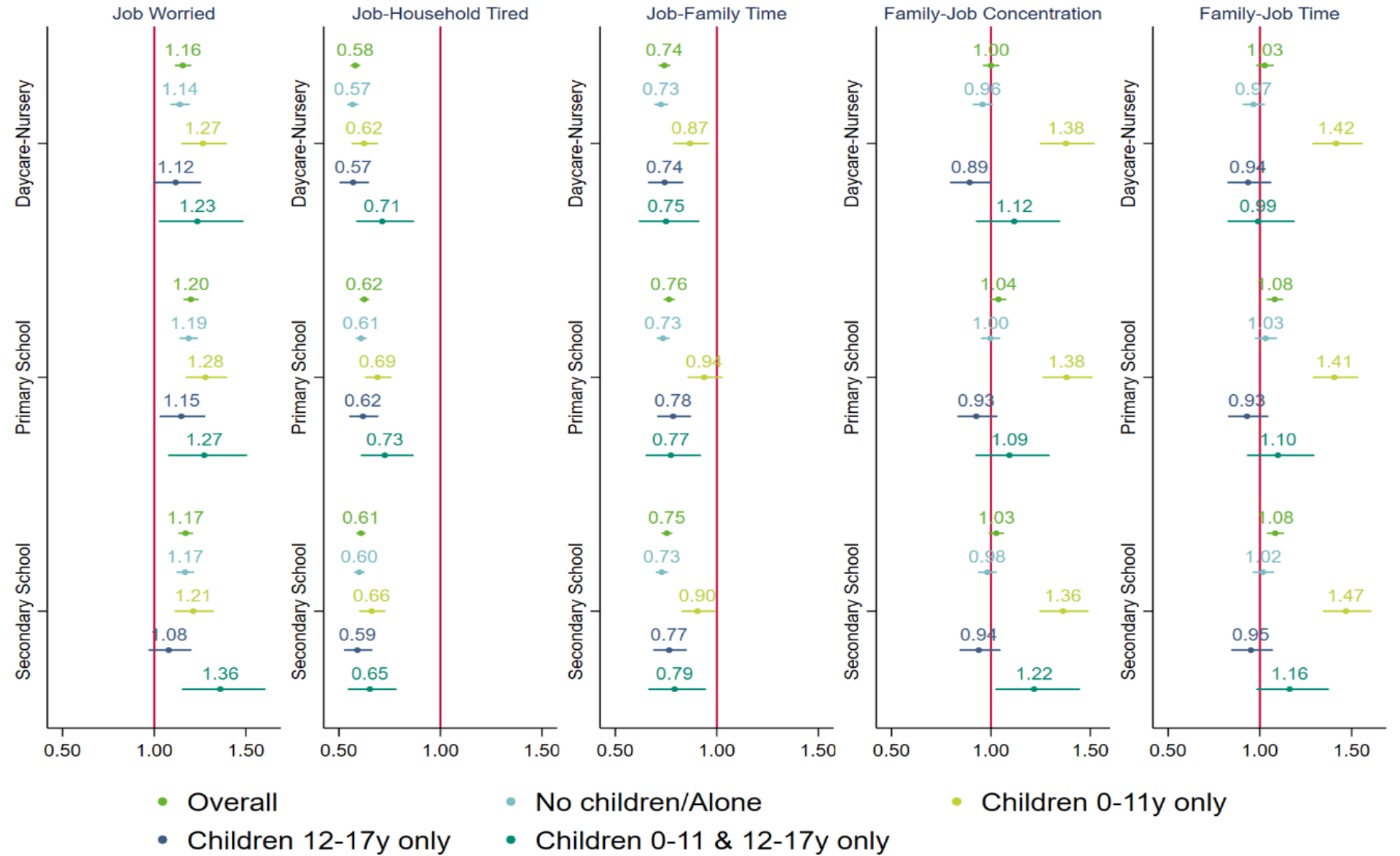
# Methods: data on NPIs (ECDC)

- **Data on NPIs** were retrieved from the European Centre for Disease Prevention and Control (**ECDC**) and the European Commission's Joint Research Centre (**JRC**) Response Measures Database (ECDC-JRC RMD).
- **NPIs:**
  - organised in a **hierarchical structure** with a three-level system;
  - implemented from **1<sup>st</sup> Jan 2020 to 22<sup>nd</sup> June 2022**;
  - aiming at the **general community** (not specific target groups);
  - **mandatory and voluntary status**;
  - **full implementation** (partial implementation excluded).

# Methods: design, participants and analyses

- **Design:** repeated cross-sectional study
- **Study participant:**
  - All EF survey respondents (in any survey round) stating to be workers
- **Statistical analyses:**
  - Descriptive analysis
  - Mixed logistic regression models fitted with random intercepts for participants ID variables and adjusting by individual-level covariates

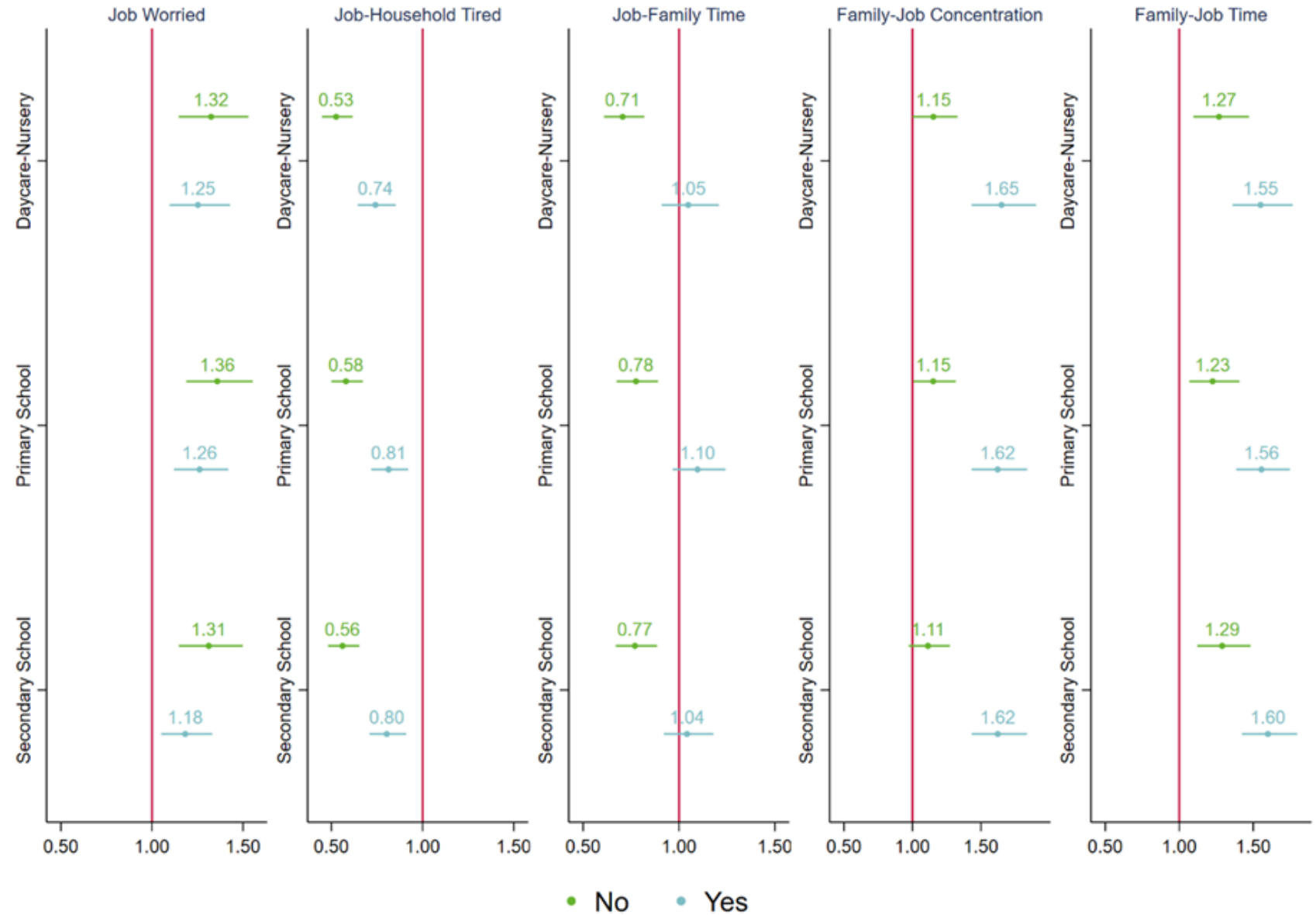
# Results





# Results

- Role of telework and having young kids.



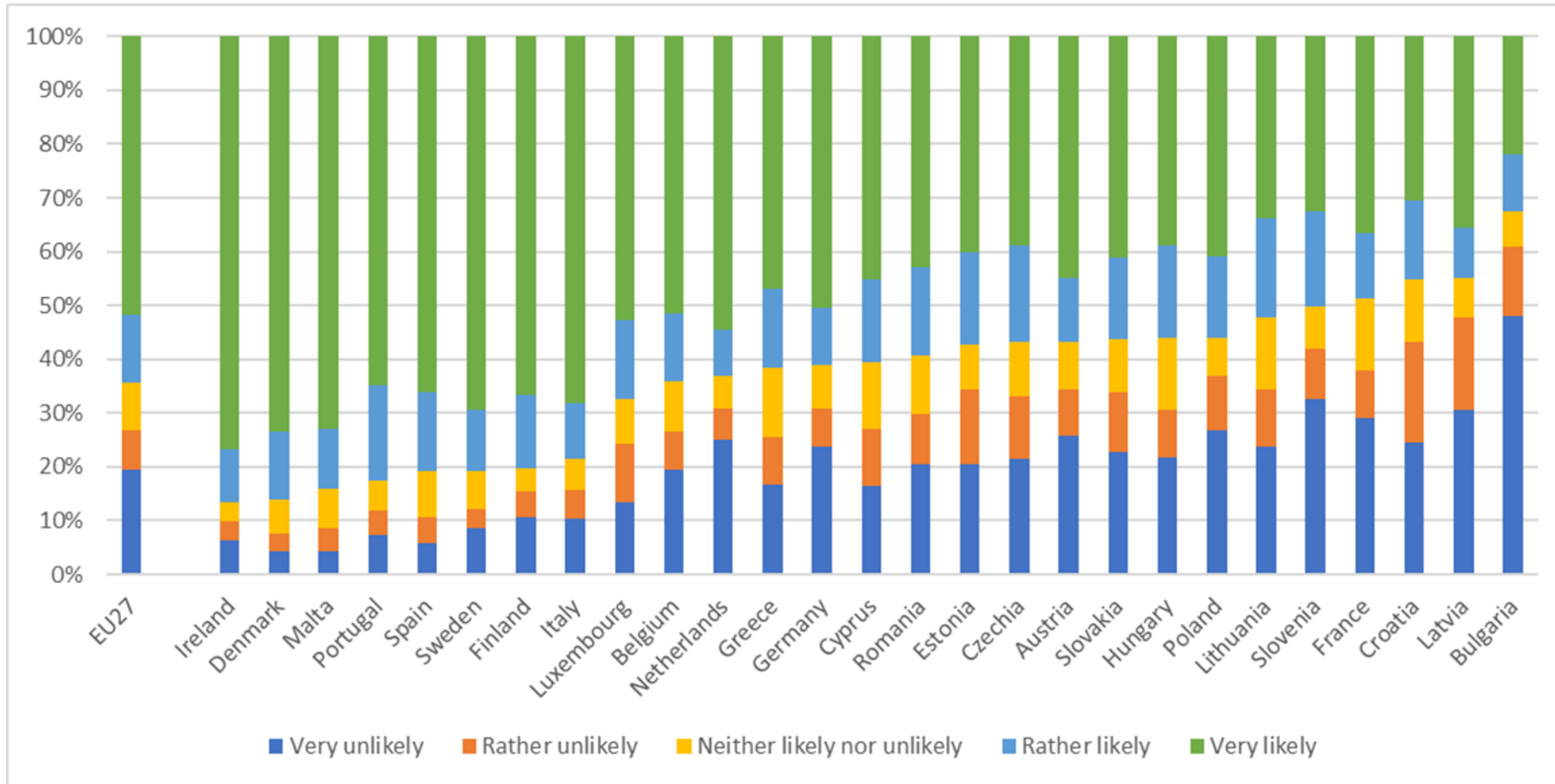


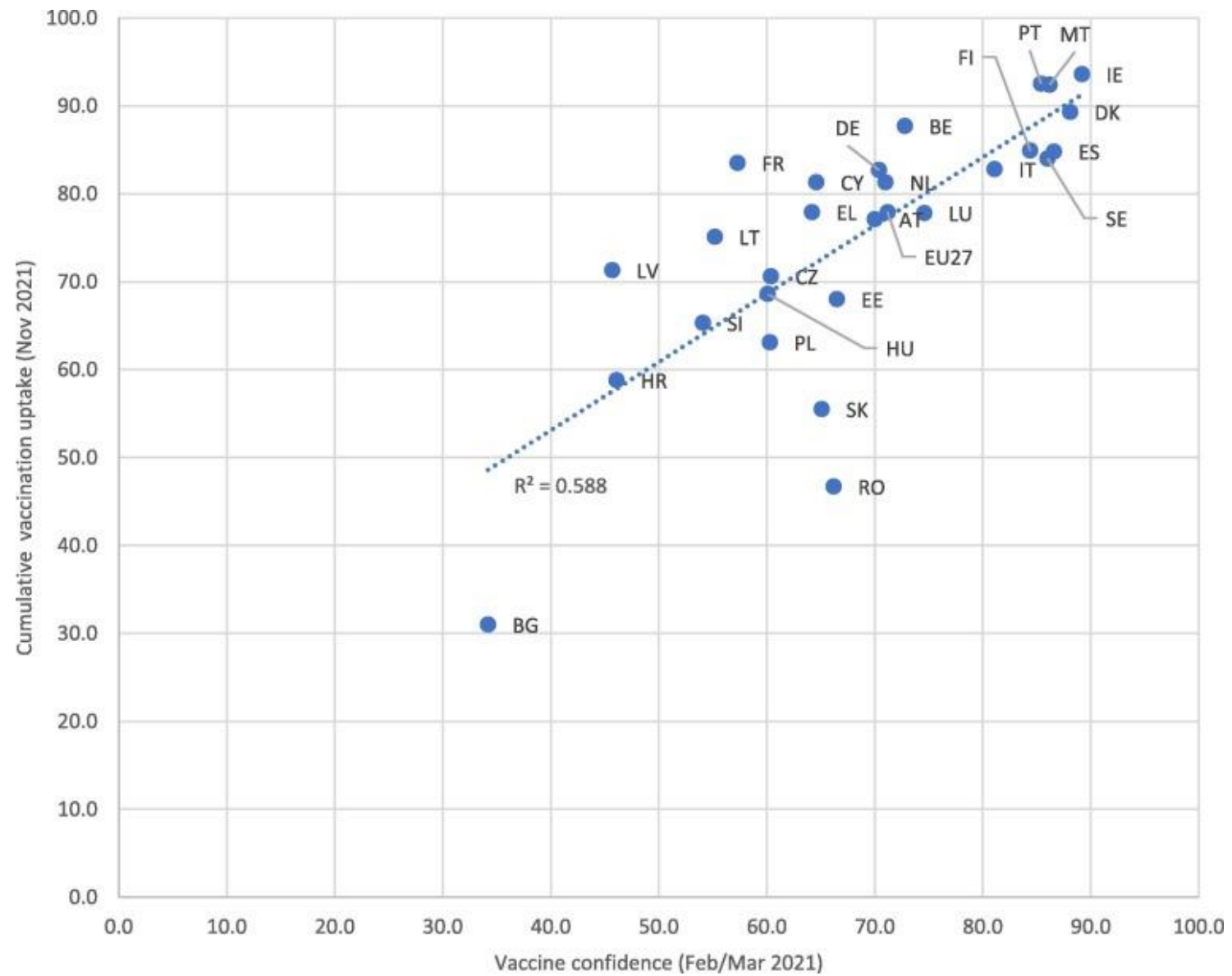
# Vaccine hesitancy

# The issue of vaccine hesitancy

- A flexible tool like an e-survey allows to address timely questions as the vaccine hesitancy.
- It was open from March to April 2021
- What are the main drivers of intention to vaccination?
- Did the AstraZeneca suspension increased vaccine hesitancy in Europe?

# Vaccine hesitancy in Europe





	(1)	(2)	(3)	(4)	(5)					
Female	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Male	0.02*	(0.01)	0.02*	(0.01)	0.02*	(0.01)	0.02*	(0.01)	0.01	(0.01)
18-29 years	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
30-39 years	0.04	(0.03)	0.04	(0.03)	0.03	(0.03)	0.04	(0.03)	0.04	(0.03)
40-49 years	0.02	(0.03)	0.02	(0.03)	0.01	(0.03)	0.02	(0.03)	0.03	(0.03)
50-59 years	0.02	(0.03)	0.02	(0.03)	0.02	(0.03)	0.03	(0.03)	0.04	(0.03)
60-69 years	-0.02	(0.03)	-0.02	(0.03)	-0.02	(0.03)	-0.01	(0.03)	0.00	(0.03)
70+ years	-0.05*	(0.03)	-0.05	(0.03)	-0.05	(0.03)	-0.04	(0.03)	-0.02	(0.03)
The open countryside	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
A village/small town	-0.06**	(0.02)	-0.06**	(0.02)	-0.06**	(0.02)	-0.06***	(0.02)	-0.06**	(0.02)
A medium to large town	-0.07***	(0.02)	-0.07***	(0.02)	-0.07***	(0.02)	-0.07***	(0.02)	-0.08***	(0.03)
A city or city suburb	-0.13***	(0.02)	-0.13***	(0.02)	-0.12***	(0.02)	-0.13***	(0.02)	-0.13***	(0.02)
Employed	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Self-employed	0.06**	(0.03)	0.06**	(0.03)	0.06**	(0.03)	0.06**	(0.03)	0.05**	(0.03)
Unemployed	0.10***	(0.03)	0.10***	(0.03)	0.09***	(0.03)	0.09***	(0.03)	0.08***	(0.03)
Ill/disabled	0.13***	(0.04)	0.13***	(0.05)	0.13***	(0.05)	0.12**	(0.05)	0.10*	(0.05)
Retired	0.03	(0.02)	0.03	(0.02)	0.02	(0.02)	0.02	(0.02)	0.01	(0.02)
Homemaker	0.04	(0.04)	0.04	(0.04)	0.03	(0.03)	0.02	(0.03)	0.01	(0.03)
Student	-0.10***	(0.02)	-0.10***	(0.02)	-0.10***	(0.02)	-0.10***	(0.02)	-0.11***	(0.02)
No spouse	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Lives with spouse	-0.03**	(0.01)	-0.03**	(0.01)	-0.03**	(0.01)	-0.03**	(0.01)	-0.03*	(0.01)
No children in household	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Children in household	0.03**	(0.02)	0.03*	(0.02)	0.03**	(0.02)	0.03**	(0.02)	0.03**	(0.02)
Primary education	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Secondary education	0.02	(0.03)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)	0.04	(0.03)
Tertiary education	-0.06**	(0.03)	-0.06**	(0.03)	-0.06*	(0.03)	-0.05*	(0.03)	-0.04	(0.03)
(Very) bad health			0.00	(.)	0.00	(.)	0.00	(.)	0.00	(.)
Fair health			-0.07**	(0.03)	-0.07**	(0.03)	-0.06**	(0.03)	-0.06**	(0.03)
Good health			-0.10***	(0.03)	-0.09***	(0.03)	-0.09***	(0.03)	-0.08***	(0.03)
Very good health			-0.05	(0.03)	-0.05	(0.03)	-0.05	(0.03)	-0.04	(0.03)
Chronic health problem / disability			-0.05***	(0.01)	-0.05***	(0.01)	-0.05***	(0.01)	-0.05***	(0.01)
Close person had Covid					-0.03**	(0.01)	-0.03**	(0.01)	-0.03**	(0.01)
Close person died of Covid					-0.04	(0.02)	-0.04*	(0.02)	-0.04*	(0.02)
Social media: Less than daily							0.00	(.)	0.00	(.)
Social media: Daily: under 3 hours							0.05***	(0.02)	0.04*	(0.02)
Social media: Daily: 3+ hours							0.10***	(0.02)	0.05**	(0.02)
Main news source: Traditional (press, radio, TV)									0.00	(.)
Main news source: Social media/blogs									0.20***	(0.02)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29755	29755	29755	29755	29755	29755	29755	29755	29755	29755
Pseudo R <sup>2</sup>	0.055	0.061	0.064	0.064	0.069	0.069	0.069	0.069	0.102	0.102



# The effect of social media on vaccine hesitancy

- Vaccine hesitancy can hinder the successful roll-out of vaccines.
- all 27 EU Member States, carried out between February and March 2021 (n = 29,755).
- We study the determinants of vaccine hesitancy, focusing on the role of social media use.
- In multivariate regression models, we find statistically significant ( $p < 0.05$ ) impacts on vaccine hesitancy of heavy use of social media and using social media as a main source of news.



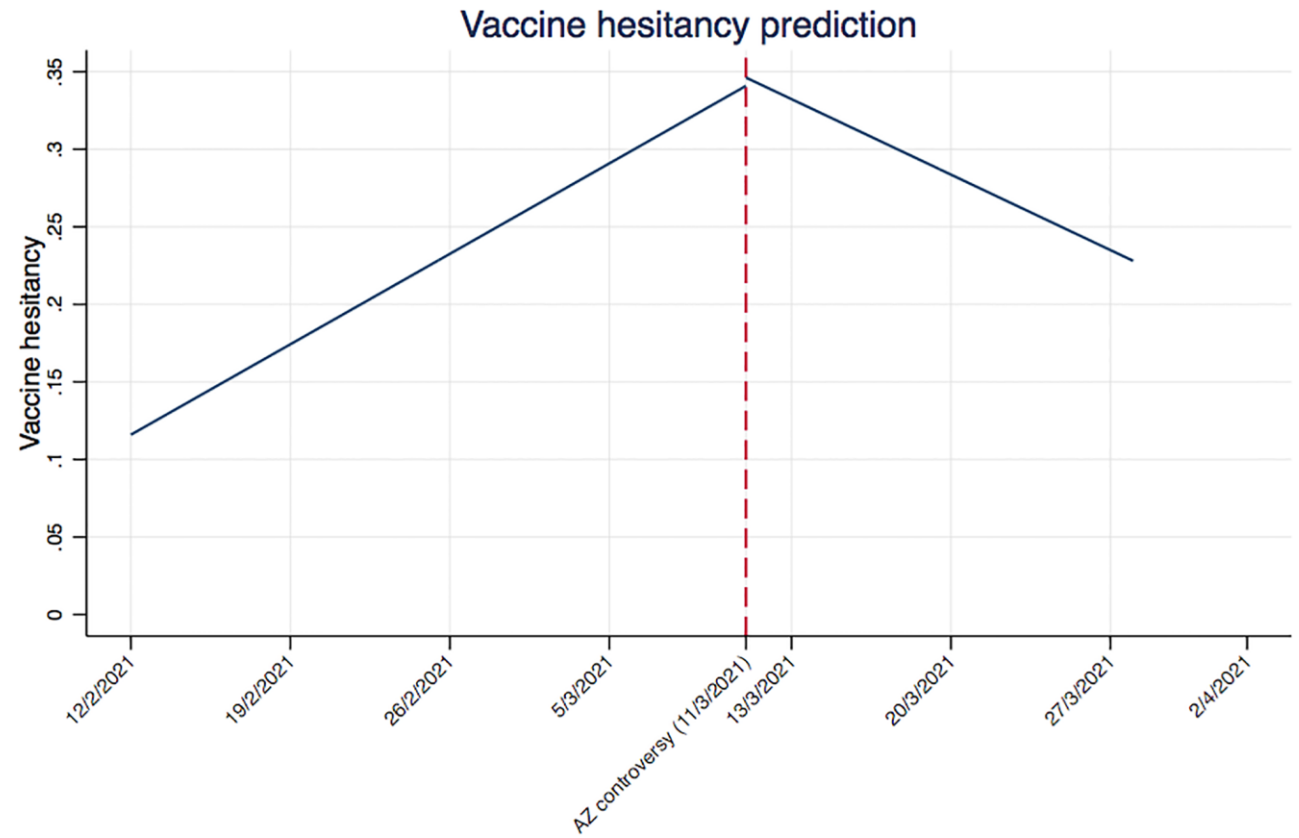
# Did the AstraZeneca suspension increased vaccine hesitancy in Europe?

- Yes, slightly.

VARIABLES	(1)	(2)	(3)	(4)
	vaccine hesitancy	vaccine hesitancy	vaccine hesitancy	vaccine hesitancy
Trend	0.004*** (0.004-0.005)	0.007*** (0.006-0.007)	0.008*** (0.007-0.008)	0.002*** (0.002-0.003)
AstraZeneca controversy		-0.075*** (-0.094-0.055)	0.413*** (0.330-0.496)	0.230*** (0.157-0.302)
Trend* AstraZeneca controversy			-0.015*** (-0.017-0.012)	-0.007*** (-0.010-0.005)
Age group (Ref:25-34)				
18-24	-0.064*** (-0.090-0.038)	-0.061*** (-0.087-0.036)	-0.052*** (-0.077-0.026)	0.004 (-0.019-0.027)
35-44	0.004 (-0.013-0.021)	0.002 (-0.014-0.019)	-0.000 (-0.017-0.017)	-0.029*** (-0.044-0.014)
45-54	0.011 (-0.005-0.028)	0.009 (-0.008-0.025)	0.005 (-0.011-0.022)	-0.040*** (-0.054-0.026)
> = 55	-0.035*** (-0.049-0.020)	-0.039*** (-0.053-0.024)	-0.043*** (-0.058-0.028)	-0.077*** (-0.090-0.064)
Female	-0.022*** (-0.031-0.013)	-0.022*** (-0.031-0.013)	-0.019*** (-0.028-0.010)	-0.010** (-0.018-0.002)
Tertiary education	-0.104*** (-0.114-0.094)	-0.103*** (-0.113-0.093)	-0.102*** (-0.112-0.092)	-0.055*** (-0.063-0.046)
Tested positive to COVID-19	0.033*** (0.016-0.051)	0.034*** (0.017-0.051)	0.036*** (0.019-0.053)	0.027*** (0.012-0.043)
Death of acquaintance	-0.067*** (-0.080-0.053)	-0.067*** (-0.080-0.053)	-0.066*** (-0.079-0.053)	-0.057*** (-0.070-0.045)
Trust in the government				-0.010*** (-0.012-0.008)
Trust in the EU				-0.020*** (-0.022-0.018)
Trust in the healthcare system				-0.017*** (-0.019-0.015)
Trust in pharmaceutical firms				-0.044*** (-0.046-0.042)
Constant	0.255*** (0.237-0.273)	0.236*** (0.218-0.254)	0.219*** (0.201-0.237)	0.742*** (0.721-0.762)
Observations	35,390	35,390	35,390	35,390
R-squared	0.036	0.038	0.042	0.253

Notes: Estimation results from the Eq 1. Data come from the third wave of the Eurofound "Living, Working and COVID-19". The outcome variable represents a dummy variable equal to 1 if the individual is (rather) unlikely to get vaccinated if he or she was offered the vaccine against COVID-19 and 0 otherwise. Trend is a continuous variable equal to the day of interview. AZControversy is a dummy variable that takes value 1 since 11 March 2021 (date of the controversy), and 0 before. Robust standard errors are employed. 95% confidence intervals are presented in parentheses.

\*\*\* p<0.01,  
\*\* p<0.05,  
\* p<0.1.



# Conclusions – in the search of Herakles.





# The papers

Social Science & Medicine 303 (2022) 114906

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: [www.elsevier.com/locate/socscimed](http://www.elsevier.com/locate/socscimed)

### The association between COVID-19 policy responses and mental well-being: Evidence from 28 European countries

Veronica Toffolutti<sup>a,b,\*</sup>, Samuel Plach<sup>a</sup>, Teodora Maksimovic<sup>c</sup>, Giorgio Piccitto<sup>d</sup>, Massimiliano Mascherini<sup>e</sup>, Letizia Mencarini<sup>f,g</sup>, Arnstein Aasve<sup>h,i</sup>

<sup>a</sup> Centre for Health Economics & Policy Innovation, Department of Economics & Public Policy, Imperial College London - Business School, Exhibition Road, South Kensington, London, SW7 2AZ, United Kingdom

<sup>b</sup> Carlo P. Donatoni<sup>†</sup> Centre for Research on Social Dynamics and Public Policy, Bocconi University, Via G. Roegneri, 1, 20138, Milano, Italy

<sup>c</sup> European Foundation for the Improvement of Living and Working Conditions, Wyttivätkatu, Helsinki, Finland, 00400, Finland

<sup>d</sup> Department of Social and Political Science, Bocconi University, Via G. Roegneri, 1, 20138, Milano, Italy

**ARTICLE INFO**

**Keywords:** COVID-19; Public health; Non-pharmaceutical interventions; NPIs; Mental well-being

**ABSTRACT**

This study assesses how the implementation and timing of non-pharmaceutical policy interventions (NPIs), deployed by most governments, to curb the COVID-19 pandemic, were associated with individuals' mental well-being (MWB) across 28 European countries. This is done both for the general population and across key groups. We analyse longitudinal data for 15,147 respondents from three waves of the Eurofound Living, Working and COVID-19 survey, covering the period April 2020–March 2022. MWB is measured by the WHO-5 index. Our evidence suggests that restrictions on international travel, private gatherings, and contact tracing (workplace closures) were negatively (positively) associated with MWB by about, respectively, -0.43 (0.09) CI: [-0.79 to -0.07], -0.24 (0.09) CI: [-0.38 to -0.10], and -0.22 (0.09) CI: [-0.36 to -0.08] (0.29 (0.09) CI: 0.11 to 0.46) points. These results correspond to -3.5%, -1.5%, and -1.4% (-1.4%) change compared to pre-pandemic levels. However, these findings mask important group-differences. Women compared to men fared worse under stay-at-home requirements, internet access restrictions, private gathering restrictions, public events cancellations, school closures, and workplace closures. Those residing with children below 12, compared to those who do not, fared worse under public events cancellation, school closures and workplace closures. Conversely, those living with children 12-17, compared to those who do not, fared better under internet access restrictions and public events cancellation. Women Europeans via a-vis Eastern Europeans fared better under NPIs limiting their mobility and easing their duties, whereas they fared worse under health-related NPIs. This study provides timely evidence of the use of inequalities during the COVID-19 pandemic and offers strategies for mitigating them.

**1. Introduction**

The European Union (EU) and the UK have been hit hard by the COVID-19 pandemic, with five countries – Italy, France, Spain, Germany, and the UK – among the ten countries globally with the most COVID-19 cases and deaths (Johns Hopkins University, 2022). By 5 January 2022, more than 60 million confirmed COVID-19 cases and over 1.5 million COVID-related deaths have been reported in the EU and the UK (ECDC, 2022). Besides causing disease and death, COVID-19 has generated a ‘parallel epidemic of poor mental health’ (WHO, 2021). The effects, here, could linger long after the pandemic has subsided. ‘Mental illness is taking its toll, both on those who were already at risk, as well as on those who have never sought mental health support before’, said Hans Kluge, director of WHO Europe, during a press briefing on 28 January 2022 (WHO, 2022). There is increasing evidence for a surge in mental health problems, greater vulnerability (Costenisova et al., 2021) and alarming implications for emotional and social functioning (Mazzoni et al., 2020). As far as the USA is concerned, evidence shows that, during the pandemic, there has been a ‘parallel epidemic of poor mental health’ (WHO, 2021). The effects, here, could linger long after the pandemic has subsided. ‘Mental illness is taking its toll, both on those who were already at risk, as well as on those who have never sought mental health support before’, said Hans Kluge, director of WHO Europe, during a press briefing on 28 January 2022 (WHO, 2022). There is increasing evidence for a surge in mental health problems, greater vulnerability (Costenisova et al., 2021) and alarming implications for emotional and social functioning (Mazzoni et al., 2020). As far as the USA is concerned, evidence shows that, during the pandemic, there has been a ‘parallel epidemic of poor mental health’ (WHO, 2021).

\* Corresponding author. Centre for Health Economics & Policy Innovation, Department of Economics & Public Policy, Imperial College London - Business School, Exhibition Road, South Kensington, London, SW7 2AZ, United Kingdom.

E-mail address: [v.toffolutti@imperial.ac.uk](mailto:v.toffolutti@imperial.ac.uk) (V. Toffolutti), [samuel.plach@imperial.ac.uk](mailto:samuel.plach@imperial.ac.uk) (S. Plach), [teodora.maksimovic@imperial.ac.uk](mailto:teodora.maksimovic@imperial.ac.uk) (T. Maksimovic), [giorgio.piccitto@imperial.ac.uk](mailto:giorgio.piccitto@imperial.ac.uk) (G. Piccitto), [massimiliano.mascherini@eurofound.europa.eu](mailto:massimiliano.mascherini@eurofound.europa.eu) (M. Mascherini), [letizia.mencarini@imperial.ac.uk](mailto:letizia.mencarini@imperial.ac.uk) (L. Mencarini), [arnstein.aasve@eurofound.europa.eu](mailto:arnstein.aasve@eurofound.europa.eu) (A. Aasve).

<https://doi.org/10.1016/j.socscimed.2022.114906>

Received 17 May 2022; Received in revised form 27 February 2022; Accepted 11 March 2022

Available online 14 March 2022

0277-9536/© 2022 Elsevier Ltd. All rights reserved.

Vaccine 40 (2022) 2215–2225

Contents lists available at ScienceDirect

Vaccine

journal homepage: [www.elsevier.com/locate/vaccine](http://www.elsevier.com/locate/vaccine)

### Social media use and vaccine hesitancy in the European Union

Massimiliano Mascherini<sup>a</sup>, Sanna Nivakoski<sup>b</sup>

<sup>a</sup> Eurofound (European Foundation for the Improvement of Living and Working Conditions, Wyttivätkatu, Loughstown, Co. Dublin, D18 IR65, Ireland)

**ARTICLE INFO**

**Keywords:** COVID-19; Vaccine; Hesitancy; Social media; News sources

**ABSTRACT**

Vaccine hesitancy can hinder the successful roll-out of vaccines. This paper examines COVID-19 vaccine hesitancy in the European Union, drawing from a large-scale cross-national survey covering all 27 EU Member States, carried out between February and March 2021 (n = 29,755). We study the determinants of vaccine hesitancy, focusing on the role of social media use. In multivariate regression models, we find statistically significant (p < 0.05) impacts on vaccine hesitancy of heavy use of social media and using social media as a main source of news. However, the effect of social media and the drivers of vaccine hesitancy vary depending on the reason for hesitancy. Most notably, hesitancy due to health concerns is mainly driven by physical health status and less by social media use, while views that COVID-19 risks are exaggerated (or that COVID-19 does not exist) are more common among men, people in good health, and those using social media as their main source of news.

© 2022 Elsevier Ltd. All rights reserved.

**1. Introduction**

Vaccines play a crucial role in the response to the COVID-19 crisis. They can boost the immune response against the original SARS-CoV-2 virus, as well as provide protection against the emerging viral variants that could render existing vaccines ineffective. The vaccine rollout in the European Union has been difficult, with Member States facing continuous challenges in relation to the limited supply of vaccines. Beyond issues related to the logistics of developing, testing, manufacturing and distributing vaccines, the public's confidence in and acceptance of vaccines is far from universal. Effective and clear communication about the efficacy and safety of vaccines likely plays a crucial role in addressing vaccine hesitancy.

Vaccine hesitancy is defined by the World Health Organisation as a ‘delay in acceptance or refusal of vaccines despite availability of vaccination services’ [1]. While vaccine hesitancy can be traced back to the 1800s [2], it has recently become a serious threat that can hinder the efforts that have led to the advancement of human health through science [3]. This has become even more relevant during the COVID-19 pandemic, with vaccine hesitancy potentially undermining communities' ability to reach thresholds of coverage necessary for herd immunity against COVID-19 – unnecessarily perpetuating the pandemic and resulting in untold suffering and deaths [4].

\* Corresponding author. address: [massimiliano.mascherini@eurofound.europa.eu](mailto:massimiliano.mascherini@eurofound.europa.eu)

PLOS ONE

RESEARCH ARTICLE

### Information and vaccine hesitancy: Evidence from the early stage of the vaccine roll-out in 28 European countries

Francesca Agosti<sup>1</sup>, Veronica Toffolutti<sup>1,2</sup>, Nicolò Cavalli<sup>1,3,4</sup>, Sanna Nivakoski<sup>5</sup>, Massimiliano Mascherini<sup>6</sup>, Arnstein Aasve<sup>1,2,4</sup>

<sup>1</sup> Carlo F. Donatoni Centre for Research on Social Dynamics and Public Policies, Bocconi University, Milano, Italy, <sup>2</sup> Wolfson Institute for Population Health – Centre for Evaluation and Methods, Queen Mary University, London, United Kingdom, <sup>3</sup> Department of Social and Political Science, Bocconi University, Milano, Italy, <sup>4</sup> Nuffield College, University of Oxford, Oxford, United Kingdom, <sup>5</sup> European Foundation for the Improvement of Living and Working Conditions, Dublin, Ireland

\* [arnstein.aasve@eurofound.europa.eu](mailto:arnstein.aasve@eurofound.europa.eu)

**OPEN ACCESS**

**Citation:** Agosti F, Toffolutti V, Cavalli N, Nivakoski S, Mascherini M, Aasve A (2022) Information and vaccine hesitancy: Evidence from the early stage of the vaccine roll-out in 28 European countries. PLoS ONE 17(9): e0273555. <https://doi.org/10.1371/journal.pone.0273555>

**Editor:** Renka Sans, National Institute of Public Finance and Policy, INDIA

**Received:** December 8, 2021

**Accepted:** August 11, 2022

**Published:** September 21, 2022

**Copyright:** © 2022 Agosti et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Data Availability Statement:** The data underlying the results presented in the study are available from Eurofound (<https://www.eurofound.europa.eu/>).

**Funding:** The authors received no specific funding for this work.

**Competing interests:** The authors have declared that no competing interests exist.

**Abstract**

The success of mass vaccination programs against SARS-CoV-2 hinges on the public's acceptance of the vaccines. During a vaccine roll-out, individuals have limited information about the potential side-effects and benefits. Given the public health concern of the COVID pandemic, providing appropriate information fast matters for the success of the campaign. In this paper, time-trends in vaccine hesitancy were examined using a sample of 35,390 respondents from the Eurofound's Living, Working and COVID-19 (LWC) data collected between 12 February and 28 March 2021 across 28 European countries. The data cover the initial stage of the vaccine roll-out. We exploit the fact that during this period, news about rare cases of blood clots with low blood platelets were potentially linked to the Oxford/AstraZeneca vaccine (or Vaxzevria). Multivariate regression models were used to analyze (i) vaccine hesitancy trends, and whether any trend-change was associated with the link between the AstraZeneca vaccine (i) and blood clots (AstraZeneca controversy), and (ii) the suspension among several European countries. Our estimates show that vaccine hesitancy increased over the early stage of the vaccine roll-out (0.002, 95% CI: [0.002 to 0.003]), a positive shift took place in the likelihood of hesitancy following the controversy (0.230, 95% CI: [0.157 to 0.302]), with the trend subsequently turning negative (-0.007, 95% CI: [-0.010 to -0.005]). Countries deciding to suspend the AstraZeneca vaccine experienced an increase in vaccine hesitancy after the suspensions (0.068, 95% CI: [0.04 to 0.095]). Trust in institutions is negatively associated with vaccine hesitancy. The results suggest that SARS-CoV-2 vaccine hesitancy increased steadily since the beginning of the vaccine roll-out and the AstraZeneca controversy and its suspension, made modest (though significant) contributions to increased hesitancy.

EUROFOUND

ecdc

TECHNICAL REPORT

### Impact of selected non-pharmaceutical interventions on EU adults' work-life balance during the COVID-19 pandemic, 2020–2022

August 2023

[www.ecdc.europa.eu](http://www.ecdc.europa.eu)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8893322/pdf/main.pdf>

[https://www.ecdc.europa.eu/sites/default/files/documents/Impact\\_of\\_selected\\_NPIs\\_on\\_EU\\_adult\\_work-life\\_balance\\_during\\_COVID-19\\_pandemic.pdf](https://www.ecdc.europa.eu/sites/default/files/documents/Impact_of_selected_NPIs_on_EU_adult_work-life_balance_during_COVID-19_pandemic.pdf)

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273555>

<https://pubmed.ncbi.nlm.nih.gov/35313221/>

# Thank you for your attention



[mam@eurofound.europa.eu](mailto:mam@eurofound.europa.eu)