The impact of Covid-19 restrictions on workers: Who is most exposed?

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Abstract

The coronavirus is severely disrupting labour markets. Businesses that rely on face-to-face communication or close physical proximity between co-workers and with customers are particularly vulnerable. While interventions such as occupational social distancing and remote working have become widespread responses to the pandemic, we know very little about which workers will be affected the most by these interventions. Does our age, gender, marital status, educational attainment, occupation, or location affect our ability to practice occupational socially distancing, or our ability to work remotely? Social distancing and remote working potential indices are constructed, by occupation, using O*Net data, and this is matched to individual level data on over 150,000 individuals in employment from the Irish Census 2011. This allows us to identify, at the individual level, worker characteristics which can explain the degree to which a given individual working in a certain occupation may be able to effectively socially distance in their workplace or engage in remote work. Our results indicate that Covid-19 restrictions are unequal across workers. Notably younger, male, less educated, non-nationals, the self-employed and those located outside the capital will find it more difficult to work remotely and more difficult to practice socially distancing in the workplace.

1. Introduction

The COVID-19 pandemic has led to an unprecedented shock to the economy and has disrupted labour markets around the world. In early 2020, as the virus spread from country to country, governments took action to save lives. Public health measures such as isolation, physical distancing, quarantine and the closure of non-essential businesses were introduced to reduce transmission. These measures which successfully slowed the spread of the virus (Gollwitzer, Martel, Marshall, Höhs, & Bargh, 2020; Nussbaumer-Streit et al., 2020) have been detrimental to the economy (Baldwin & Weder di Mauro, 2020; Goodell, 2020; Koren & Pető, 2020). Now, as the number of Covid-19 related deaths fall, governments are moving towards policies designed to re-open business and to save the economy (Ozili & Arun, 2020).

The current consensus is that Covid-19 spreads from person to person within a 3–6 feet radius through the transmission of respiratory droplets (Galbadage, Peterson, & Gunasekera, 2020). Since workplace interactions constitute the majority of social contacts among people of working ages (Lewandowski, 2020), workers are being encouraged to practice social distancing, and where possible, to work from home. Whilst social distancing is central to the easing of lockdown measures (Kissler, Tedijanto, Lipsitch, & Grad, 2020; Lewandowski, 2020) little is known about what individual characteristics are associated with these activities (Gollwitzer et al., 2020). Using data for over 150,000 Irish workers employed across 88 3-digit occupations, this paper examines (i) the individual level worker characteristics associated with a greater potential to socially distance in the workplace and (ii) the individual level worker characteristics associated with a greater potential to work remotely.

The pandemic has had a profound effect on the Irish economy and labour market. Between March and May 2020, Ireland witnessed a drastic reduction in the size and scope of economic activity. On 20th March 2020, the Irish Government introduced a range of measures to slow down the spread of Covid-19, including restrictions on travel and social gatherings, the closure of schools, and the requirement for businesses to put safeguards, such as social distancing in place to protect their staff and customers. On 27th March, the Government ordered all non-essential businesses to close their premises. Since then, large sectors of the economy have shut down while other sectors have moved their business (temporarily) online. Hotels, restaurants, non-food retailers, and the arts and entertainment sectors have been impacted the most (Department of Business Enterprise and Innovation, 2020). By 28th April, approximately 620,000 workers had lost their job or were furloughed[1] while a further 427,400 were in receipt of a Temporary Wage Subsidy Scheme payment.[2] Many workers lost their jobs before the mandatory closure order indicating that work in some sectors may be less compatible with social distancing (Byrne, Coates, Keenan, & McIndoe-Calder, 2020). The situation facing Ireland is not unique and is typical of most countries globally. Now as countries re-open it is important that we evaluate which workers

[1] These workers are receiving a Pandemic Unemployment Payment of €350 per week.

[2] The scheme allows workers to receive government support directly through their employer's payroll. They receive a payment of €410 per week or 70 per cent of the employee's average net weekly pay for employees earning less than or equal to €586 per week.

may find it difficult to return to work due to social distancing restrictions and which may find it difficult to continue to work remotely.

International research has shown that those working in occupations requiring face-to-face interaction are more likely to have lost their job or experienced reduced working hours due to the pandemic than those who can perform their work remotely (Béland, Brodeur, & Wright, 2020; Gallacher & Hossain, 2020; Montenovo et al., 2020). As restrictions ease, and non-essential businesses re-open their premises, workers will be required to observe social distancing rules in the workplace. While these rules will affect all occupations, there is growing evidence that some will be impacted more than others. A growing literature, including this paper, use O*NET occupational data to capture the type of work conducted by each occupation and to investigate the impact of Covid-19 on jobs. Authors such as Barbieri, Basso, and Scicchitano (2020), Crowley and Doran (2020), Koren and Pető (2020), Mongey, Pilossoph, and Weinberg (2020) have shown that some occupations will find it easier to facilitate social distancing (e.g. Agriculture, Forestry and Fishing, Information and Communication) than others (e.g. Retail Trade, Accommodation and Food Services, Human Health). While this early work focused on identifying the ability of specific occupations to practice remote working and social distancing, more recent work is turning to the characteristics of individuals who can/cannot work at home and who can/cannot practice social distancing in the work place.

In the next section, we provide an overview of the related literature, before discussing the data in Section 3. Section 4 presents the results of our analysis, while Section 5 concludes the study with a discussion on policy implications.

2. Related Literature

Since the start of the year, a growing number of papers have examined which workers have lost their jobs (Binder, 2020; Montenovo et al., 2020), which workers are able to work from home (Dingel & Neiman, 2020), and which workers can practice social distancing in the workplace (Koren & Pető, 2020). While some studies are survey based, others use the Occupation Information Network (O*NET) data to identify the types of jobs which can be done from home and the types that can facilitate social distancing.

Early real-time survey based research focused on the impact of Covid-19 on work, income, travel, and spending habits. Binder (2020), for example, in a survey of 500 US consumers found that people were concerned about the impact of the virus on the economy, their health and their personal finances. Using data gathered in two waves (wave 1: end of March; wave 2: mid-April) across twelve countries (Australia, Austria, Austria, Canada, France, Germany, Italy, New-Zealand, Poland, Sweden, UK, USA) Foucault and Galasso (2020) found that 39.5% of workers were working from home by mid-April while 21.5% had stopped working. Adams-Prassl, Boneva, Golin, and Rauh (2020), using real time data for March and April for the UK, US and Germany, noted that workers who cannot work from home were more likely to report having lost their job.

By classifying the feasibility of working at home for all occupations from two O*NET surveys and merging it with occupational employment data in two-digit NAICS industries Dingel and

Neiman (2020) were among the first to build an index which identified the share of jobs that can be done at home. Examining US data, they noted that 37% of jobs can be performed from home and that some occupations (e.g. those in the *Information Technology* sector) are more conducive to remote working than others (e.g. those in the *Accommodation and Food Services* sector). A number of authors have adopted the Dingel and Neiman (2020) approach to measure the feasibility of remote working (see for example Gallacher & Hossain, 2020; Gottlieb, Grobovšek, & Poschke, 2020; Mongey et al., 2020; Montenovo et al., 2020), while others have extended their analysis by adding social distancing measures (Mongey et al., 2020; Mongey & Weinberg, 2020).

For many workers, remote working and physical distancing are intrinsically linked. Often those that cannot work remotely also find it difficult to practice social distancing in the workplace. Many businesses rely on daily face-to-face communication. In some cases, teamwork and interacting with colleagues is essential (e.g. the health care industry) while in others, interacting with customers is key (retail and social work). In many occupations, workers while not necessarily communicating with each other, work physically close to each other (e.g. those operating machinery, on production lines). Using O*Net data Koren and Pető (2020) developed an index to measure which sectors and which locations will be particularly hurt by social distancing and the extent to which occupational social distancing is possible. They noted that retail, hotels and restaurants, arts and entertainment and schools are the most affected sectors in the US. Their measure has been replicated and extended in the literature and has been used by authors such as Barbieri et al. (2020) and Crowley and Doran (2020).

Examining data for the first four months of 2020, researchers have begun to observe trends in the characteristics of those who lost their jobs due to the pandemic and those who have been able to work remotely. Using real-time survey data for twelve countries, Foucault and Galasso (2020) observed that a person's income, education and occupational status were related to their likelihood of working remotely in April 2020. They noted that college graduates, white collars workers and high-income earners were more likely to be working from home, whilst blue-collar workers, those without a high-school diploma, and low-income earners were more likely to have stopped work. While they observed gender differences in some countries (women were more likely to have stopped work in Austria, Canada, Germany, Italy, Poland and Sweden), they observed no difference across age groups or between urban-rural locations. Similarly Adams-Prassl et al. (2020), also using real-time data, noted that in the UK and US (but not Germany) that those without a college degree and women were more likely to have lost their job, while younger workers in all three countries were more likely to have experienced a fall in their earnings.

Using O*Net data for the US, Béland et al. (2020) note that Covid-19 increased the unemployment rate and decreased labour force participation and working hours. They found that men, younger workers, Hispanics, less-educated workers, and those working close to co-workers and unable to work remotely were most impacted by the changing labour market conditions. Using working-from-home and face-to-face communication indices constructed from O*Net, Montenovo et al. (2020) noted that women, Hispanics and younger workers were more likely to have lost their jobs between February and April 2020 in the US. They found that these workers were more likely to be in jobs that required face-

to-face interaction and offered fewer remote working prospects. Using a version of the Dingel and Neiman (2020) remote working index and a measure of low personal proximity in the workplace, Mongey and Weinberg (2020) using sectoral data for the US found that those who cannot work from home are more likely to have been born outside the US, be single, non-white and have a lower-income. They also rent their home, lack a college degree, lack employer provided health insurance, and are likely to have an unstable job. They note that females, which being more likely to work from home, are also more likely to have occupations requiring high physical proximity, suggesting that this group of workers may have difficulty returning to the workplace as restrictions ease.

Similar results are observed across the globe. Using the Dingel and Neiman (2020) methodology Gallacher and Hossain (2020) construct a remote working index for Canada. They find that female workers and immigrants have occupations which allow for a greater possibility of remote working, while younger workers, part-time workers, small firm workers, seasonal/contractual workers, single workers and workers without a college degree are less likely to be able to work from home. In Europe, Lewandowski (2020), using six indicators from O*NET and the European Working Condition Survey (EWCS) to measure the spread of Covid-19, find that female workers, younger workers, and less educated workers are more likely to be exposed to the virus. Pouliakas and Branka (2020) argue that 23% of total EU-27 employment (about 45 million jobs) will face some disruption due to Covid-19. They argue that the burden of social distancing falls disproportionately on women, older employees, non-natives, the lower-educated, those working longer hours and employed in micro-sized workplaces. This recent work clearly demonstrates that the labour market impacts of Covid-19 differ significantly across countries and employee characteristics.

Building on work by authors such as Montenovo et al. (2020), Mongey and Weinberg (2020) and Gallacher and Hossain (2020) we examine how a range of characteristics impact an individual's ability to work remotely and their ability to practice occupational social distancing in Ireland.

3. Data

We employ two datasets for our analysis. Firstly, information is extrapolated that provides information on worker tasks, context and activities from O*Net which enables the formation of social distancing and remote working potential indices. Secondly, we exploit Irish Census data from IPUMS international to examine what types of people are less (or more) exposed from social distancing restrictions and remote work. In this section, more detailed information is provided on the indices and individual data employed.

*3.1 O*NET Data*

O*NET is the primary source of occupational information in the United States and is used to understand the changing world of work and how it impacts the workforce and the economy. It provides standardised definitions and detailed data on the mix of knowledge, skills, abilities tasks and activities for almost a thousand occupations. We draw on the O*NET data related to work activities and work context for the construction of our indices. Alongside this, it is necessary to conduct a crosswalk so that O*NET occupational codes can be

matched to CSO occupational Irish Census data. O*NET provides 968 occupational codes that can be matched to the 2010 US standard occupational classifications. As the US SOCs do not directly match to the Irish CSO codes; we follow Crowley and Doran (2019) who conduct a cross-walk, using a series of established international classifications, for converting US SOC codes to their UK and Irish equivalent. They draw on the International Standard Occupation Classifications (ISOC) to facilitate the crosswalk. In O*NET, the occupational codes are at 6 digit level, which is a more granular disaggregation than ISOC. Consequently, for some ISOC codes that contain two or more US SOC codes we have averaged data to provide a single value. Further aggregation is required when converting ISOC codes to UK SOC's using the Office for National Statistics (2010) conversion framework. Following this, the UK SOC codes can be matched one for one with the Irish SOC code, providing occupational level data originally sourced from O*NET for 318 detailed occupations for application in the Irish case.

3.1.1 Constructing a Social Distancing Index

The social distancing index is constructed based on work by Koren and Pető (2020) who initially constructed a social distancing index for the U.S. This social distancing index has previously been transitioned with adjustments to the Irish context by Crowley and Doran (2020). The index is comprised of information from 15 different questions using O*Net data. A detailed list and the precise questions and coding are displayed in Appendix 1. There are three broad categories to which the underlying questions used in the index relate, specifically teamwork requirements, customer orientation and physical presence. A further underlying commonality of the questions is how they relate to the degree to which face-to-face interaction is required for each occupational role and in turn, the ability of workers with the associated occupation to engage in social distancing measures in a workplace. Each variable takes a value ranging from 0 to 100 and an unweighted average of the social distancing indicator is used as a measure of social distancing potential for each occupation.

3.1.2 Constructing a Remote Working Index

The remote working index is based on work by Dingel and Neiman (2020) which has previously been transitioned to the Irish context by Crowley and Doran (2020). The construction of the index exploits O*Net data using information from 17 questions. The precise questions obtained from O*Net which comprise this index are presented in Appendix 2. In summary, the questions contain data that relates to workers being able to use remote communications such as e-mail, whether the job requires the operation of specialised equipment, the degree to which workers need to use protective equipment and whether the worker performs for people or directly serves customers. Again, the values range for each indicator from 0 to 100 and the unweighted average of the 17 indicators is used as the indicator for remote working potential value for each occupation.

3.2 Sample of Ammonised Individual Level Irish Census Data 2011

Next, we obtain data from IPUMS International for the Irish Census of 2011. This provides ammonised data on the individual characteristics of 156,287 working individuals in Ireland in the year 2011. In the 2011 Census, it was identified that the total number of people in employment was 1,807,369. Therefore, our sample represents 8.64% of the entire Irish workforce. The sample is a random sample of the total population and is designed to provide a representative sample.

Critically, this data provides information at the three-digit occupational code level for the employment of each individual. This three-digit code allows us to merge the indices created and outlined in the previous section, with the individual level data.

In addition to this, the Irish census provides detailed information on a variety of socio-economic characteristics. Table 1 presents summary statistics of the explanatory variables used in this paper derived from the IPUMS Irish Census ammonised data. The average social distancing and remote working index recorded across individuals is 49.35 and 59.98, respectively.

Table 1: Descriptive Statistics for Sample

Variable Name	Census 2011 Variables
Social Distancing Index	49.35
Remote Work Index	59.98
Gender	
Female	48%
Marital Status	
Never married	38%
Married	55%
Separated (including divorced)	6%
Widowed	1%
Highest Level of Education	
Primary (including not formal)	6%
Lower secondary	13%
Upper secondary	38%
Third level, non degree	6%
Third level, degree or higher	37%
Work Class	
Employee	83%
Self-employed with paid employees	6%
Self-employed without paid employees	11%
Dissability	
No disability	94%
Age	
Age	40.59
Age Squared	1789.74
NUTS3 Region	
Dublin	30%
Border	10%
Mid-East	12%
Midlands	6%
Mid-West	8%
South-East	10%

South-West	15%
West	10%
NACE Sector	
Agriculture, Forestry And Fishing	5%
Mining And Quarrying	0%
Manufacturing	12%
Electricity, Gas, Steam And Air Conditioning Supply	1%
Water Supply; Sewerage, Waste Management And Remediation Activities	1%
Construction	5%
Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	16%
Transportation And Storage	5%
Accommodation And Food Service Activities	6%
Information And Communication	4%
Financial And Insurance Activities	6%
Real Estate Activities	1%
Professional, Scientific And Technical Activities	6%
Administrative And Support Service Activities	4%
Public Administration And Defence; Social Security	7%
Education	11%
Human Health And Social Work Activities	7%
Arts, Entertainment And Recreation	2%
Other Service Activities	2%
Activities Of Households As Employers; Undifferentiated Goods- And Se	0%
Activities Of Extra Territorial Organisations And Bodies	0%
Nationality	
Irish	84%

4. Empirical Model

When estimating the effect of individual level characteristics on an individual's ability to social distance or work from home we use the following model. We estimate this model twice, once for each index.

$$Index_i = \beta_0 + \beta_1 Female_i + \beta_2 MaritalStatus_i + \beta_3 Education_i + \beta_4 Disability_i + \beta_5 Age_i + \beta_6 Region_i + \beta_7 NACE_i + \beta_8 Irish_i + \varepsilon_i \quad (1)$$

Where $Index_i$ is the dependent variable, which is the relevant index in each estimation (either the social distance index or the remote working index). $Female_i$ is a binary variable taking a value of 1 if individual *i* is female. $MaritalStatus_i$ is a series of binary variables indicating the marital status of individual *i*. $Education_i$ is a series of binary variables indicating the highest level of educational attainment of individual *i*. $Disability_i$ is a binary variable which takes a value of 1 if individual *i* does not have a disability. Age_i is a series of two continuous variables, the first indicating the age of individual *i* and the second indicating the square of the age of individual *i* to account for potential non-linearities on the effect of age on the dependent variable. $Region_i$ is a series of binary variables indicating the NUTS3 region in which individual *i* lives. $NACE_i$ is a series of binary variables indicating

the NACE sector individual *i* is employed in. $Irish_i$ is a binary variable taking a value of 1 if individual *i* is Irish. ε_i is the error term.

The model is estimated using ordinary least squares (OLS) with heteroskedastic robust standard errors. Variance of Inflation (VIF) tests for potential multicollinearity are applied and in all cases report a mean VIF of below 5, suggesting that multicollinarity is not a problem within the model.

5. Results

The results of our empirical analysis are presented in Table 2. Notably, the marginal effects associated with many explanatory variables are considerably larger in the remote work index case. We can observe that females have on average a higher occupational social distancing and remote working potential, relative to men. This finding is supported by similar results using Canadian data by Gallacher and Hossain (2020) and Béland et al. (2020). However, the division of labour associated with household tasks, particularly caring responsibilities with schools and crèches closed may impede females from taking advantage of this higher potential to work remotely and conduct social distancing in the workplace.

Social distancing and remote working potential increases with education levels. The base category is primary education. T-tests of each individual education coefficient indicates that there is a statistically significant difference between all coefficients (with the exception upper second and third level for social distancing). Therefore, each step up the educational ladder that individuals take increases their ability to socially distance in work and engage in remote work. This supports the consistent findings for higher levels of human capital across the literature in the US, Canada and Europe (Béland et al., 2020; Foucault & Galasso, 2020; Gallacher & Hossain, 2020; Mongey & Weinberg, 2020).

There is a non-linear relationship identified between age and social distancing, and between age and remote working potential indicating that social distancing and remote working potential both increase with age but at decreasing rates. Consequently, the social distancing measures and the opportunity for remote work may impact younger and older worker's more than middle-aged individuals. Previously in the literature, the results on age were contained to younger individuals being more vulnerable to the Covid-19 pandemic (Béland et al., 2020; Gallacher & Hossain, 2020; Montenovo et al., 2020). Whilst we identify some evidence of a diminishing potential associated with age, the marginal plot distribution in Appendix 3 indicates that younger individuals are still clearly the more impacted age group.

We identify that non-nationals are associated with a lower social distancing and remote working potential relative to nationals. Again, this finding is consistent with other studies identifying marginal groups to be more economically vulnerable in this crisis (Béland et al., 2020; Mongey & Weinberg, 2020; Montenovo et al., 2020). The geography of the economic crisis is likely to play out differently in Ireland, with individuals in all regions, experiencing lower social distancing potential relative to individuals in the capital city (Dublin). This is consistent with the previous results of Crowley and Doran (2020) who identified that workers located in larger, more dense and affluent urban areas are less exposed to remote working or social distancing measures.

Some new results to the Covid-19 literature related to the marital, working and disability status of individuals and their implications for social distancing in the workplace and remote work. Firstly, we find conflicting results for married individuals, who have on average a lower social distancing potential, but a higher remote working potential, relative to never married individuals. As with marital status, we also find conflicting results for self-employed individuals with paid employees, who have lower social distancing potential, but higher remote working potential, relative to individuals with an employee status. However, self-employed individuals without paid employees suffer from lower potential for both indices. Individuals reporting a disability also have lower social distancing potential in the workplace.

Individuals working in most sectors have more social distancing potential relative to workers employed in skilled agriculture and related trades. The only exceptions are for workers in human health and social work activities and other service activities. Lastly, the results indicate that there are sector differences between social distancing potential and remote work potential. Whilst, workers in human health and social work activities and in other service activities have less social distancing potential; they have more remote working potential relative to individuals working in agriculture and related trades.

Table 2: OLS Estimation of Equation (1)

VARIABLES	Social Distance Index	Remote Work Index
Gender		
Female	1.623***	3.683***
	-0.0298	-0.0382
Marital status		
Married	-0.110***	0.246***
	-0.0341	-0.0438
Separated (including divorced)	-0.0804	-0.0374
	-0.0653	-0.0838
Widowed	-0.0378	-0.401**
	-0.127	-0.163
Highest level of education completed		
Lower secondary	0.134*	1.175***
	-0.0692	-0.0888
Upper secondary	0.732***	3.514***
	-0.0644	-0.0827
Third level, non degree	0.761***	5.522***
	-0.0824	-0.106
Third level, degree or higher	1.311***	8.046***
	-0.0675	-0.0866
Class of worker		
Self-employed with paid employees	-0.988***	1.561***
	-0.0575	-0.0739
Self-employed without paid employees	-0.465***	-0.748***
	-0.0493	-0.0633
Disability		
No disability	-0.139**	-0.00325

	-0.0569	-0.073
Age		
Age	0.0468***	0.0678***
	-0.00778	-0.00999
Age Squared	-0.000353***	-0.000253**
	-8.73E-05	-0.000112
NUTS3 Region		
Border	-0.526***	-1.266***
	-0.0494	-0.0634
Mid-East	-0.447***	-0.850***
	-0.0461	-0.0591
Midlands	-0.788***	-1.371***
	-0.0611	-0.0784
Mid-West	-0.667***	-1.240***
	-0.054	-0.0694
South-East	-0.653***	-1.505***
	-0.0497	-0.0638
South-West	-0.636***	-1.312***
	-0.0432	-0.0554
West	-0.644***	-1.490***
	-0.0501	-0.0644
Broad NACE		
Mining And Quarrying	1.931***	6.713***
	-0.247	-0.317
Manufacturing	3.449***	8.249***
	-0.0782	-0.1
Electricity,Gas, Steam And Air Conditioning Supply	3.975***	11.12***
	-0.172	-0.221
Water Supply; Sewerage, Waste Management And Remediation Activities	2.607***	9.309***
	-0.19	-0.244
Construction	1.732***	4.383***
	-0.0854	-0.11
Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	0.992***	12.39***
	-0.075	-0.0962
Transportation And Storage	1.477***	8.671***
	-0.0888	-0.114
Accommodation And Food Service Activities	0.997***	11.55***
	-0.0868	-0.111
Information And Communication	7.262***	16.76***
	-0.0955	-0.123
Financial And Insurance Activities	7.230***	18.15***
	-0.0901	-0.116
Real Estate Activities	5.165***	15.92***
	-0.192	-0.246
Professional, Scientific And Technical Activities	6.808***	15.94***

	-0.0879	-0.113
Administrative And Support Service Activities	3.527***	9.938***
	-0.0967	-0.124
Public Administration And Defence; Compulsory Social Security	1.541***	10.95***
	-0.0862	-0.111
Education	5.930***	16.78***
	-0.0826	-0.106
Human Health And Social Work Activities	-4.203***	10.36***
	-0.087	-0.112
Arts, Entertainment And Recreation	3.207***	13.49***
	-0.119	-0.153
Other Service Activities	-0.349***	12.52***
	-0.109	-0.14
Activities Of Households As Employers;Undifferentiated Goods- And Services-Producing Activities Of Households For Own Use	1.971***	14.41***
	-0.419	-0.538
Activities Of Extra Territorial Organisations And Bodies	4.795***	14.32***
	-0.596	-0.765
Nationality		
Irish	0.204***	1.745***
	-0.0382	-0.049
Constant	43.20***	35.32***
	-0.207	-0.266
Observations	156,287	156,287
R-squared	0.288	0.509

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6. Conclusions

Presently, in most countries people are strongly prioritizing health benefits over economic losses (Glover, Heathcote, Krueger, & Ríos-Rull, 2020). A critical question for policymakers responding to the Covid-19 crisis is what types of people are most likely to bear the burden from the economic fallout? Ireland closed non-essential sectors of the economy when it went into a state of 'lockdown' in March 2020 to curb the spread of Covid-19. The winners and losers of the health-wealth trade-off is an element of the crisis that arguably needs closer attention. The inevitable trade off also places policymakers in an unfortunate conundrum. The objective of this paper was to examine the types of people that will be most affected by social distancing and remote working for the Irish case. The occupations associated with younger, male, less well-educated individuals, non-nationals and individuals located outside the capital are the primary groups disproportionately affected by government interventions to limit the spread of Covid-19. The types of individuals most at risk in this crisis are also those that were most economically vulnerable pre-Covid 19.

Critically, the Covid-19 crisis is likely to further exacerbate existing economic inequalities in Irish society.

The present unemployment pandemic payment and the temporary wage subsidy scheme implemented by the Irish government will continue to be a vital safety net in the months ahead. Considering the significant economic costs of the crisis and the types of groups affected; the prioritization of health benefits over economic losses may need to be revisited as the crisis evolves. Or alternatively, a balance may be struck by targeted isolation strategies towards more at risk individuals such as those with underlying conditions and older people, whilst enabling younger cohorts to continue working normally leading to substantial economic and societal benefits without enormous health costs (Bank, 2020; Oswald & Powdthavee, 2020). Targeted policy responses will be critical in the medium and longer term, including job reintegration, digital and portable reskilling, promoting entrepreneurship, educational and job support initiatives to assist the workers most affected by the crisis (Green, 2020; OECD, 2020; Pouliakas & Branka, 2020).

Previously in the Irish case, Crowley and Doran (2020) identified that the Covid-19 crisis will hit jobs located in economically weaker and smaller urban areas harder. Again, this paper lends further support to their findings where individuals located in the capital have more remote working and social distancing potential in the workplace. In this context, targeted policy responses (as outlined above) but with a place sensitive approach, taking account of local context, and enhancing opportunities locally will be important in solving the societal and spatial inequalities that are likely to emerge. This type of approach is in line with the place-based policy literature (Dijkstra, Poelman, & Rodríquez-Pose, 2018; Hendrickson, Muro, & Galston, 2018; Iammarino, Rodriguez-Pose, & Storper, 2018) focusing on building assets in areas, rather than patching over inequality deficits using welfare redistribution measures, and in turn enhancing long run regional industrial structures and employment opportunities in lagging areas (Green, 2020; OECD, 2020).

We would like to note two limitations with this study. Firstly, O*NET data is based on occupational work from the United States. Consequently, O*NET data is used as an approximation of the workplace environment for the same occupations in Ireland. Secondly, the individual data is not from the most recent Irish Census as ammonised individual level data is currently unavailable for the 2016 Irish Census. Despite this limitation, the 2011 data should be a reliable and close proxy for individual level data and associated occupational data for the Irish case in 2020.

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Appendix 1: Definition of elements of Social Distancing Index

Variable	Original Coding	Recoding	Context
How important is it to work with others in a group or team in this job?	0 - Not important at all 25 - Fairly important 50 - Important 75 - Very important 100 - Extremely important	0 - Extremely important 25 - Very important 50 - Important 75 - Fairly important 100 - Not important at all	Face to face discussions several time a week and often more than e-mails, letters, and memos.
Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Getting members of a group to work together to accomplish tasks.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Encouraging and building mutual trust, respect, and cooperation among team members.	0 – Not important 100 – Important	0 – Important 100 – Not important	
How important is it to work with external customers or the public in this job?	0 - Not important at all 25 - Fairly important 50 - Important 75 - Very important 100 - Extremely important	0 - Extremely important 25 - Very important 50 - Important 75 - Fairly important 100 - Not important at all	Face to face discussions several times a week
Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Providing personal	0 – Not important	0 – Important	

assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.	100 – Important	100 – Not important	
Developing constructive and cooperative working relationships with others, and maintaining them over time.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.	0 – Not important 100 – Important	0 – Important 100 – Not important	Density of co-workers like shared office or more
Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.	0 – Not important 100 – Important	0 – Important 100 – Not important	
Inspecting equipment, structures, or materials to identify the cause of errors or	0 – Not important 100 – Important	0 – Important 100 – Not important	

other problems or defects.			
To what extent does this job require the worker to perform job tasks in close physical proximity to other people?	0 - I don't work near other people (beyond 100 ft.) 25 - I work with others but not closely (e.g., private office) 50 - Slightly close (e.g., shared office) 75 - Moderately close (at arm's length 100 - Very close (near touching)	0 - Very close (near touching) 25 - Moderately close (at arm's length 50 - Slightly close (e.g., shared office) 75 - I work with others but not closely (e.g., private office) 0 - I don't work near other people (beyond 100 ft.)	Physical Proximity

Appendix 2: Definition of elements of Remote Working Index

Variable definition	Original coding	New coding
How often do you use electronic mail in this job?	0-Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	same as original
How often does this job require working outdoors, exposed to all weather conditions?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How often does this job require working outdoors, under cover (e.g., structure with roof but no walls)?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How frequently does this job require the worker to deal with physical aggression of violent individuals?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How much does this job require wearing common protective or safety equipment such as safety shoes, glasses, gloves, hard hats or life jackets?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How much does this job require wearing specialized protective or safety equipment such as breathing apparatus, safety	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week

harness, full protection suits, or radiation protection?	75 - Once a week or more but not every day 100 - Every day	75 – Once a year or more but not every month 100 - Never
How much does this job require walking and running?	0 – Never 25 - Less than half the time 50 - About half the time 75 - More than half the time 100 - Continually or almost continually	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How often does this job require exposure to minor burns, cuts, bites, or stings?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
How often does this job require exposure to disease/infections?	0 - Never 25 - Once a year or more but not every month 50 - Once a month or more but not every week 75 - Once a week or more but not every day 100 - Every day	0 – Every day 25 – Once a week or more but not every day 50 – Once a month or more but not every week 75 – Once a year or more but not every month 100 - Never
Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.	0 – Not important 100 – Important	0 – Important 100 – Not important
Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.	0 – Not important 100 – Important	0 – Important 100 – Not important
Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).	0 – Not important 100 – Important	0 – Important 100 – Not important
Running, maneuvering,	0 – Not important	0 – Important

navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.	100 – Important	100 – Not important
Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.	0 – Not important 100 – Important	0 – Important 100 – Not important
Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.	0 – Not important 100 – Important	0 – Important 100 – Not important
Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.	0 – Not important 100 – Important	0 – Important 100 – Not important
Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.	0 – Not important 100 – Important	0 – Important 100 – Not important

Appendix 3

Figure 1: Plot of age and age squared marginal effects at means social distancing

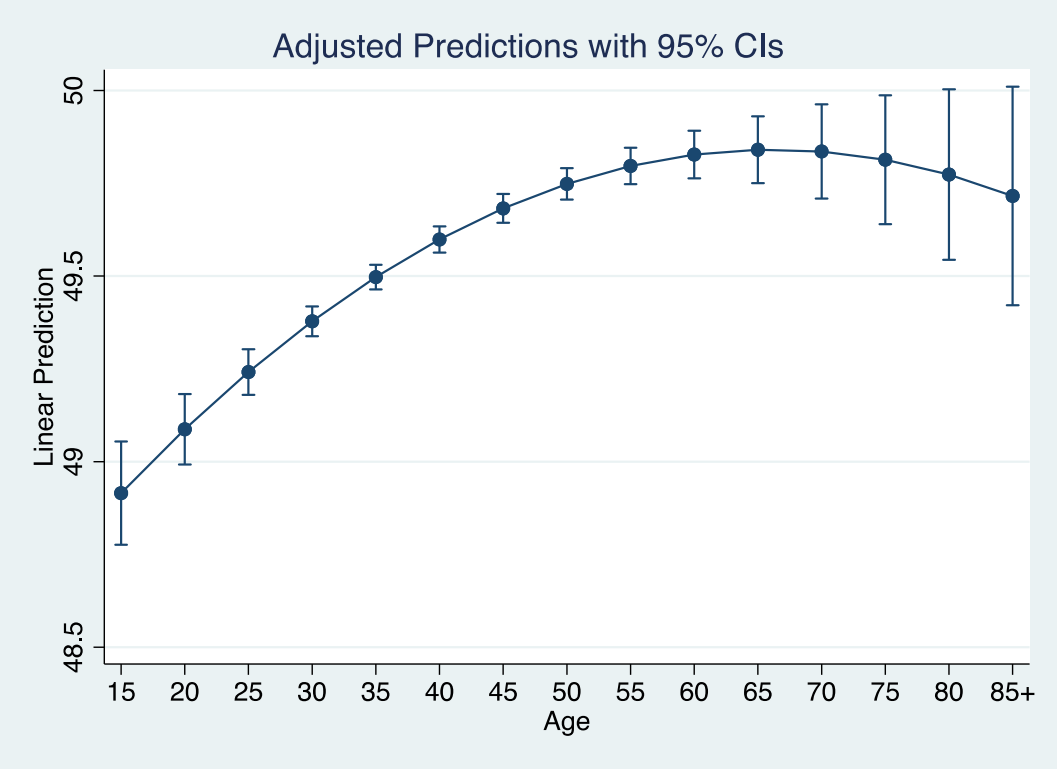

Figure 2: Plot of age and age squared marginal effects at means remote working