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Socio-demographics predict behaviour during a pandemic

Nicholas W. Papageorge, Matthew Zahn, Michèle Belot, Eline van den Broek-Altenburg, Syngjoo Choi, Julian C. Jamison, Egon Tripodi 05 September 2020

Individual behaviours affect the spread of infectious disease. This column examines factors that predict individual behaviour during the COVID-19 pandemic in the US using novel survey data. People with lower income and less flexible work arrangements are less likely to engage in behaviours that limit the spread of disease. The burden of measures to stem the pandemic is unevenly distributed across socio-demographic groups in ways that affect behaviour and potentially the spread of illness. Policies that assume otherwise are unlikely to be effective or sustainable.

19



The spread of illness is driven not only by biological factors but also by human behaviour. This point is especially relevant today as countries respond to the COVID-19 pandemic. Efforts to contain and reduce transmission have centred around limiting certain behaviours through social distancing (Baldwin and Weder di Mauro 2020). While these policies have helped to ‘flatten the curve’ in many countries, much more needs to be done to fully contain the virus, particularly in the US (Askitas et al. 2020, Bartscher et al. 2020).

In the presence of strong externalities, individual behaviour may not align with socially optimal outcomes (Posner and Philipson 1993). This tension is especially salient where the costs of protective behaviours (i.e. those that limit the spread of illness) are unevenly distributed across sociodemographic groups (Pampel et al. 2010).

For example, in the COVID-19 pandemic, individuals who face a relatively low risk of serious illness but who are economically vulnerable (e.g. lacking comfortable housing, the ability to work from home, and so on) may not follow recommendations or directives to engage in protective behaviours, such as wearing masks or social distancing. In turn, these behaviours put high-risk groups (and those they encounter) in danger of infection and prolong the pandemic.

The point is that it is foolish to devise health policy based on the assumption that families who are economically struggling (e.g. those who reside in uncomfortable housing, cannot telework, and so on) will stay at home indefinitely. Yet, this is the reality that policymakers have faced as they respond to the pandemic.

Optimal policy design must account for the incentives and constraints of different types of people. In our recent paper (Papageorge et al. 2020), we explore the factors associated with individual self-protecting behaviours during the COVID-19 pandemic. Understanding what affects individual incentives to engage in these behaviours will be critical as we develop



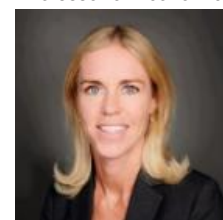
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effective humane policy, evaluate the current pandemic, make plans to emerge from it, and begin to prepare for future pandemics.

Data

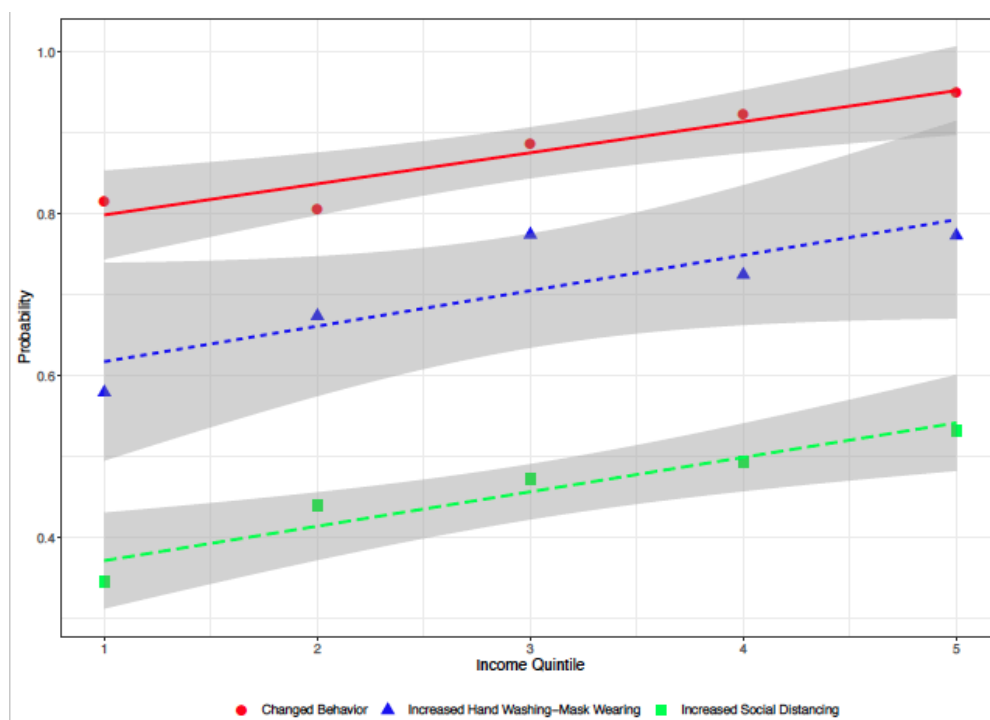
We rely on recent survey data from the third week of April 2020 (detailed in Belot et al. 2020). The data set follows roughly 6,000 individuals in six countries. We focus on the US sample, which contains information on around 1,000 individuals, with about 250 from each of the following states: California, Florida, New York, and Texas.¹ The survey is nationally representative along gender, age, household income, and race.

Despite these features, it is not a random sample of people in the US. We cannot make causal claims (e.g. that income causes more mask-wearing) because there could be selection on unobservable variables that drive behaviour.

Results

We first document a striking and robust pattern in the data: higher income is associated with higher levels of self-protective behaviours. Figure 1 illustrates this relationship for three different measures: (i) whether the respondent changed any behaviour at all in response to the pandemic; (ii) whether the respondent increased social-distancing behaviours; and (iii) whether the respondent increased handwashing or mask-wearing.

Figure 1 Probability of actions by income quintile



On average, individuals in the highest income quintile are between 13 and 19 percentage points (16% to 54%) more likely to engage in protective behaviours compared to individuals in the lowest income quintile.

This pattern is apparent when looking at other measures of behaviour change. The survey collected information about how frequently respondents engaged in 15 different activities before the pandemic, at the start of the pandemic, and a few weeks after the pandemic began. These behaviours ranged from handwashing and eating healthy, to visiting large open or closed spaces, and visiting friends and family. Respondents could answer on a scale ranging from 1 (never) to 5 (always). Given this data structure, we can observe how respondents changed their behaviour over time.



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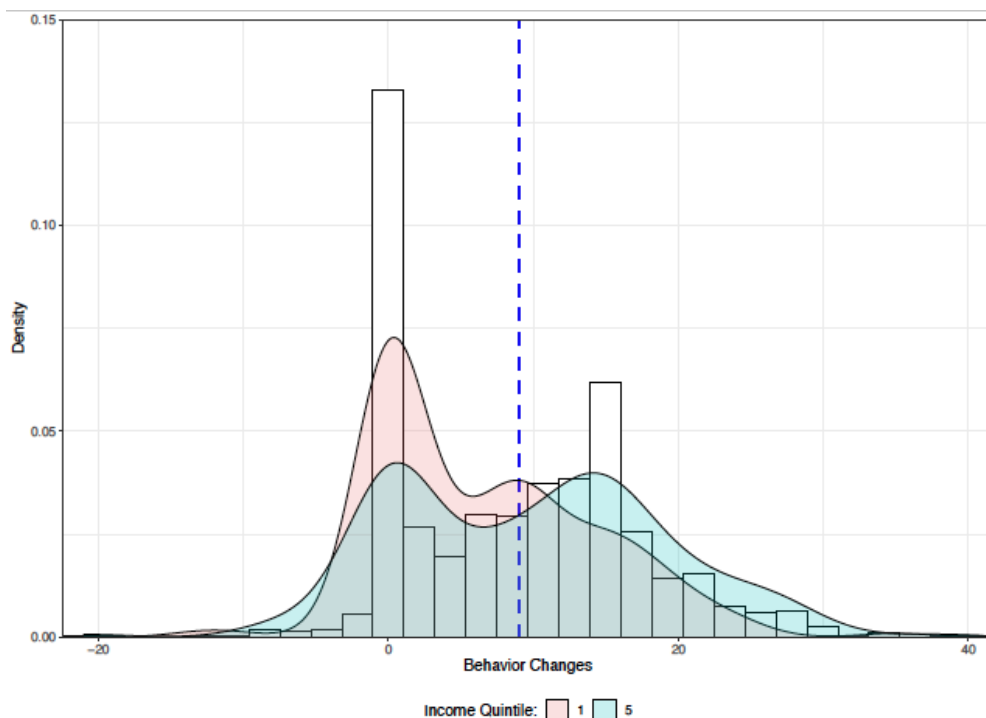
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To get a sense of behaviour change, we construct a count variable for each individual for the number of changes toward (or away from) self-protection, from before the pandemic to a few weeks after it began. Changes are normalised such that self-protecting changes are positive, while reducing these behaviours are recorded as negative.² Figure 2 plots the distribution for the resulting variable and the densities for the highest and lowest income quintiles.

There are two main takeaways. First, very few people exhibit a net decline in self-protecting behaviours. Second, most people either do not change their behaviour much or make fairly large changes. The size of these changes increases with a respondent's income. A larger group of low-income people make no changes and a smaller group of high-income people show more self-protective behaviours.

Figure 2 Distribution of behaviour changes



While the previous results have highlighted an income gradient for behaviour change, we document a similarly striking pattern when looking at the consequences of the pandemic across income. Figure 3 summarises the relationship between income quintiles and lost income, changes in work status, and job losses.

Figure 3 Realised losses and labour market changes by income

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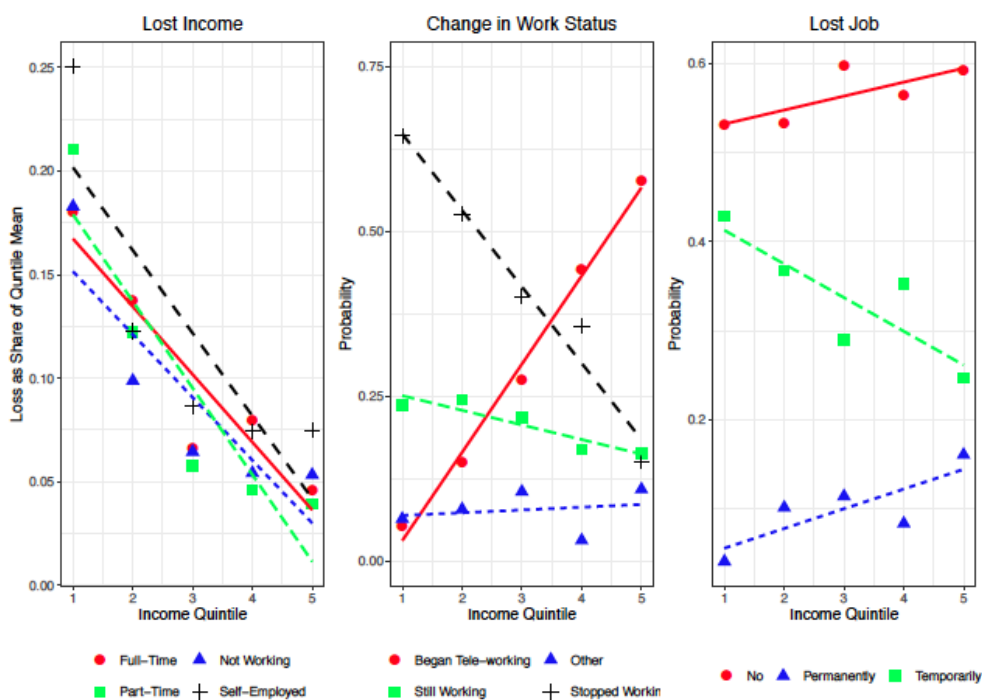
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The left panel shows that realised financial losses due to the pandemic represented between 17% and just over 20% of income for members of the lowest income quintile versus about 5% for the highest income quintile.

From the middle panel, we also see that full-time employment and the ability to work from home increase with income. Low-income respondents were most likely to report either having stopped working or no change to their work status. Over 50% of respondents in the highest income quintile transitioned to teleworking compared with the 10% of the lowest income quintile that did so.

Finally, from the right panel, we see that lower-income people were more likely to report a temporary separation from work. Higher-income people were most likely to report having not lost their jobs.

The analysis up to this point has demonstrated that several factors are related to income. These factors could help to explain differences across income groups in self-protective behaviours depicted in Figure 1.

For each of these behaviours, we estimate linear probability models as a function of income and different sets of explanatory variables. These include socio-demographics (i.e. race, gender, state, age), pre-existing health conditions, housing and work arrangements, income loss, and beliefs and perceptions about the pandemic.

In general, we find that income, work arrangements such as teleworking, lost income, and beliefs about the effectiveness of social distancing are significantly associated with self-protective measures.

Relative to the lowest income quintile, a member of the highest income quintile is 10 to 30 percentage points more likely to engage in self-protective behaviours. When all controls are included, this is an increase of 13% to 50%, on average.

A respondent with access to telework is 9 to 14 percentage points more likely to take up self-protective behaviours relative to somebody that continues to work. With all controls included, this represents an 11% to 32% increase. These findings are robust to the inclusion of multiple sets of controls and different sample restrictions.⁴

Conclusion

Many of these findings are not surprising. This study began as a speculative blog post (DeLuca et al. 2020) predicting what types of people would face the most difficulty in complying with measures to slow the spread of the virus. Specifically, it expected social distancing would harm the poorest and most vulnerable members of society, thus raising questions about its stability. This prediction is supported by our analysis.

We demonstrate that the initial economic consequences of the pandemic were particularly harmful to low-income individuals and that the recommended protective behaviours may place relatively large burdens on them.

We take this as evidence of the value that experienced social scientists bring to the table. Social scientists should work alongside health-policy experts to develop humane policies that alleviate the burdens of the protective measures, making them more sustainable and less costly for large segments of the population. This collaboration will prevent the adoption of foolish policies, which may prolong future pandemics and exacerbate their impact.

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Endnotes

1 Belot et al. (2020) use data for all six countries to quantify the economic impacts of the pandemic and how attitudes about measures taken by public authorities to respond to the pandemic vary across individual characteristics and countries.

2 To fix ideas, suppose an individual answered 3 (sometimes) for handwashing and 3 (sometimes) for taking public transportation before the pandemic and 5 and 4, respectively, during the pandemic. The increase in handwashing accounts for 2 increases in self-protective behaviours and the increase in taking public transportation is recorded as a 1 increment decrease in self-protective behaviours. Taken together this results in a net effect of $2 - 1 = 1$.

3 For the full set of results and a discussion of robustness, please see Papageorge et al.

(2020).

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