Work ethics, stay-at-home measures and COVID-19 diffusion

How is the pandemic affected by the way people perceive work?

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Abstract
Non-pharmaceutical interventions aimed at reducing the spread of COVID-19 rely largely on voluntary compliance among the target population to be effective, since such measures, which are aimed at the entire population, are very hard to enforce. In this paper, we focus on the impact of different work ethics on the spread of COVID-19. There are indeed reasons to believe that populations with different attitudes toward work will react differently to stay-at-home orders and other policies that forbid people from working. By means of a quantitative analysis, using hybrid model estimators, we test the impact of different work ethics on COVID-19 diffusion in a sample of 30 European countries. Results show that the more a population holds certain beliefs about work—namely, that it is humiliating to receive money without working, that people who do not work become lazy, and that work always comes first—the higher contagion rates of COVID-19 are, ceteris paribus. On the other hand, the more a population perceives work as a social duty, the lower contagion rates are. All this suggests that different work ethics matter in the containment of COVID-19.

Keywords COVID-19 · Work ethics · Non-pharmaceutical intervention · Hybrid model

JEL Classification I12 · I18

Introduction
The COVID-19 pandemic that has scoured the world since early 2020 will without any doubt be remembered in human history as the defining event of the end of this first quarter of the twenty-first century. With about 170 million cases as of early June 2021 and over 3.5 million deaths [40], this event has profoundly affected all domains of life for virtually the entire global population. In the middle of the second year of the pandemic, research on the subject continues to be of the utmost importance, due its relevance both in advancing scientific knowledge and offering insights to policymakers.

Many different disciplines have studied the phenomenon from numerous different angles. The social science literature has focused its efforts in particular on studying the impact of different policies put in place to stem the spread of the virus [3] and [2, 4, 21, 27, 37] and the determinants of the efficacy of non-pharmaceutical interventions (NPIs) [5].

NPIs are a very specific kind of policy. In the absence of a cure or a vaccine (at least throughout 2020), the best option for governments around the world was to prevent the spread of COVID-19 by reducing opportunities for contagion and imposing social distancing. This is a remedy that is conceptually similar to the manner in which the first public authorities created to preserve public health fought the plague in the Middle Ages [8]. Since they are aimed at the entire population, NPIs cannot really be implemented through the use of force by public authorities, since this would require a quantity of resources that is not normally available to the police. This implies that the success of NPIs is principally dependent on the degree of voluntary compliance with them among the population. It is supposed that such compliance, among a number of other determinants, also depends on the socio-cultural characteristics of the population. Previous contributions have focused on the impact...
of certain population characteristics on NPI effectiveness (for instance: [14], which focused on trust in politicians, [10], which focused on socio-economic conditions [3], and [4], which focused on social capital and the quality of institutions). The objective of this work is to study the impact of another important socio-cultural characteristic, namely the work ethic, on the efficacy of NPIs.

The literature has already suggested that COVID-19 may have affected the work ethic in home office situations ([41] highlight the need to support individuals working from home in exceptional situations to avoid ethical problems), since in these situations, employees may either behave with integrity and in accordance with a strong work ethic and high ethical standards, or choose unethical behavior, motivated by a weak work ethic. We believe that beyond the impact of COVID-19 on productivity through changed work ethics, it is also worthwhile to investigate another aspect of this relationship: whether different sorts of work ethic have had an impact on the spread of COVID-19.

There are reasons to believe that a cultural approach toward work, and the way this activity is perceived by the population, has an impact on the overall attitude towards NPIs. Work is an important part of the identity of each adult. This notion may be reconnected to a fairly consolidated literature in the social sciences, which as early as the 1960s was exploring the different ways in which employment contributes to shaping personal identity. More recent contributions have suggested that a process of detachment of meaning from work has occurred in recent years [15, 16, 22, 32, 35], even though this view has been challenged and the literature also provides alternative reconstructions [17] and [18, 20, 36].

Coming to the case at hand, during the first half of 2020 the vast majority of European governments, to safeguard public health, imposed lockdowns and other very restrictive NPIs on their citizens, and forced many businesses and even entire industries to shut down. Among other consequences, these impositions made it impossible for many workers to continue working, at least in a manner that was legal. Together with these restrictions, many governments provided support for the workers they asked to stay at home [11, 38]. This, along with the shutdown of many services, also opened the door to a rise in underground work and the flourishing of a grey market, in which workers continued to offer some of the services that were temporarily banned by the government to protect public health. The stringency measures put in place to safeguard public health, which relied principally on voluntary compliance, since it was impossible for the police to control each and any citizen (and their justification not to stay at home) across the national territory, found a counterbalance in the willingness of citizens to accept to stay at home and not work. There are, therefore, reasons to believe that the mainstream work ethic of a population, given the impact it has on the willingness of citizens to stay at home, comply with NPIs, and accept public subsidies instead of continuing to work, may play a role in the efficacy of NPIs. Furthermore, it may be useful in helping to explain the heterogeneity of the spread of COVID-19 in different countries.

Therefore, we may state the following research question: does the way people perceive work impact on their compliance with NPIs, and thus on the spread of COVID-19?

This research question is important for at least two principal reasons. First, the coronavirus pandemic remains an important threat to a large number of countries around the world. Novel research devoted to assessing the importance of different socio-cultural characteristics with regard to NPI effectiveness helps policymakers to know what to expect from a policy, and thus enables them to design better interventions. Second, scholars have predicted that global pandemics will continue to be a significant threat in future [1, 26, 34]. This means that further research devoted to understanding the impact of socio-cultural characteristics on NPI effectiveness is likely to remain relevant and necessary in the near future.

The rest of the paper is organized as follows. The next section explains the research strategy and the methodology adopted, and presents the data; section three presents the results, while the final section concludes.

### Research strategy, methodology and data

It seems valid to consider the imposition of NPIs by public authorities as the principal determinant in reducing coronavirus, especially during the pandemic’s first wave. This is because in the absence of cures or vaccines, social distancing and other NPIs are the only ways to halt the spread of the epidemic. It also seems acceptable to consider NPIs as a kind of policy that is hard for public authorities to implement through the use of force (especially in Western democracies). Indeed, since an NPI targets the entire population, its total enforcement by the police would require resources beyond any government’s means. We may derive from this that NPI effectiveness thus depends primarily on voluntary compliance among the population. Hence, comparing country-level COVID-19 diffusion rates among different countries, controlling for the different levels of NPI stringency, is a good proxy of the levels of compliance with these policies among the population.

Modeling the spread of COVID-19 contagion in a cross-country perspective remains even today a daunting task, given the lack of exact information at our disposal. For this reason too, data-driven models have proven to be a good option for estimating the trend of the contagion, and more precisely the impact NPIs have on it [5].
The empirical literature in these cases offers three main options: a Pooled Ordinary Least Square, a Random Effects estimation, or a Fixed Effect estimation. According to Woolridge (2010), the first of these has to be preferred when the sample changes during the time span analyzed (i.e., the observed population is not always composed of the same individuals). That does not happen in our case, though, and we may thus exclude the Pooled OLS as an estimator. In these cases, the empirical literature often makes use of so-called fixed-effects estimations. It is widely recognized in the literature that fixed-effects models have an advantage over random effects models when analyzing panel data, because they control for all level 2 characteristics, whether measured or unmeasured [9, 13, 23, 39]. This characteristic becomes especially important when modeling a new phenomenon whose determinants are not yet entirely clear, and in which time-invariant characteristics (such as demographic composition, population density, characteristics of the healthcare system, and more generally all the characteristics that do not change over the timespan analyzed) are very likely to play a relevant role. Using fixed effects, the empirical estimation implicitly controls for all the variables not included in the regression that do not change in the timespan analyzed, and which may influence the spread of COVID-19.

Nonetheless, this theoretically important econometric advantage is at the same time the major drawback of these kinds of models. The ability to implicitly control for all the time-invariant characteristics makes these models unable to estimate the impact of a variable that does not vary within the level of observation and timespan.

Previous contributions in the literature have proposed that this limit be overcome by dividing the sample by quantiles of the variable of interest, and separately estimating the impact on different subsamples, before proceeding to a comparison of the betas [5 and 6]. This empirical strategy has two main limitations. The first is that it is based on comparing betas that have been estimated in different samples, which may of course be affected by different biases and errors, leading to inconsistent conclusions. The second is that dividing the sample by quantiles of one variable also implies dividing it by all the variables that are highly correlated with it, creating uncertainty in the identification of the effect.

A different strategy may be employed that includes time-invariant variables while keeping the advantages of a fixed-effects estimation. Indeed, it has been proposed in the literature that within effects be estimated in random-effects models [9, 29–31, 39]. These models are also known as hybrid models. As explained by Shrunk [33], this approach offers a number of advantages, among them the possibility of including random slopes, enabling the effects of time-invariant variables to vary between clusters, and thus permitting their estimation.

In other words, via this empirical approach we may estimate the impact of an independent time-invariant variable on a dependent variable in the context of a fixed-effects estimation. This means that we may have the advantages of a fixed-effects model, in terms of controlling for observed and unobserved characteristics, and at the same time, we are able to test the impact on this relationship of a time-invariant variable (which is typically the case for a work ethic).

In more formal terms, the research question may be modelled through the following equation:

\[
\Delta i_{ct} = \alpha + \beta_1 (i_{ct-1} - \bar{i}_c) + \beta_2 \bar{X} + \beta_3 (Str_{ct-1} - \bar{Str}_c) + \beta_4 \bar{Str}_c + \beta_5 WE_c + \epsilon,
\]

where the dependent variable \(\Delta i\) is new COVID-19 cases at time \(t\) (with respect to \(t-1\)), in country \(c\). This, following the principal literature on the theme [5–7], is modeled as a function of the total infections in country \(c\) on the previous day \((i_{c,t-1})\), decomposed into its within country part (the difference from the country mean of each observation \(i_{c,t-1} - \bar{i}_c)\) and between country (each country mean, \(\bar{i}_c)\); and as a function of \(Str\), an index measuring the level of stringency of the different NPIs that are in place for at least 28 days (4 weeks, in order to allow them to have an effect on the reporting of new COVID-19 cases: this will be explained in more detail below), once again decomposed into its within and between effects. Furthermore, the equation includes \(X\), a matrix of country-invariant control variables, and \(WE\), a time-invariant variable for each of the variables proxying different work ethics, useful in order to test our hypotheses.

This approach allows us to estimate (in \(\beta_6\)) the impact of different work ethics on the trend of COVID-19 cases, taking into account both the specific evolution of the contagion in a country (with regard to the total cases on the previous day) and the level of stringency of the NPIs implemented in the period. Thus, on the assumption that NPIs are designed to have a significant impact on curbing the infection curve, and that they are the principal (if not the only) cause of a reduction in cases, the impact of \(WE\) on \(\Delta i\) measures the impact of different work ethics on the efficiency of these kinds of policies (since the trend in cases should be due principally to NPIs).

In other words, the assumption is that the relationship between \(\Delta i\) and \(WE\) is due to the efficiency of NPIs, given that during the first wave, there were no vaccines to prevent contagion. This means that, as already assumed, compliance with NPIs can be considered as the main causal factor for reductions in COVID-19 cases at that time.
In order to estimate Eq. (1), several data are needed: the daily number of COVID-19 cases in a set of countries; daily data on the stringency of NPIs in a set of countries; and a country-level operationalization of control variables and various work ethics.

The first two variables are operationalized with data gathered from the Oxford COVID-19 Government Response Tracker dataset (hereafter OxCGRT, \cite{24}1). This is a dataset compiled from publicly available information by a cross-disciplinary Oxford University team of academics and students from every part of the world, led by the Blavatnik School of Government \cite{25}. OxCGRT offers a country-by-country daily estimation of COVID-19 cases. To avoid biased estimations due to the variance of reporting, we focused on the first wave of the pandemic, from 1 January 2020 to 31 August 2020. From OxCGRT, we computed both:

- **New cases pc**, the operationalization of \( \Delta i \) in Eq. (1), as the first difference between the COVID-19 cases of day \( i \) and \( i - 1 \) for each country \( c \), divided by the population of country \( c \) (data from 2019 variable in the World Bank dataset) in order to have per capita values;

- and **Cases pc**, the operationalization of \( i_{t - 1} \) in Eq. (1), which is equal to the absolute value of cases in country \( c \) at \( t - 1 \), divided once again by the population of country \( c \), to obtain a per capita variable.

To operationalize the level of stringency of NPIs on a daily basis, we relied on the same source \cite{24}. OxCGRT also offers the **Oxford Stringency Index**, a measure of the different policies implemented in order to fight COVID-19 in each country \( c \) for each day \( t \). It is calculated as the sum of several different sub-indexes, then rescaled as a single variable on a 0–100 base. We used this index, labeled **Str**, as a proxy of all the NPIs that may affect the dependent variable **New Cases pc**. More precisely, this index takes into account: workplace closures, cancellation of public events, restrictions on the size of gatherings, closures of public transportation, home confinement orders, and restrictions on internal and international travel. In the estimation, this variable is lagged, given that NPIs need some time to show results in terms of reducing contagions.

As explained, we measure the spread of COVID-19, and consequently the efficacy of NPIs, through the daily count of new people who were tested positive. But for testing to take place, it was very likely that one would need to exhibit some symptoms first. This was even truer during the first wave (which we are analyzing), since mass testing and mandatory tests were used less in Europe than during the second wave. The literature suggests that 97.5% of those who develop symptoms of COVID-19 do so within 11.5 days of infection, with a 95% confidence interval of between 8.2 and 15.6 days \cite{28}. Moreover, more time is need after developing symptoms to get tested and finally appear in the statistics. For this reason, we chose to delay the variable **Str** by four weeks (28 days), to measure the impact of **Str** on people that were not likely to be tested positive after the NPI was enforced. In other words, the value of **Str** in country \( c \) when \( t = 29 \) is equal to the value of the Oxford Stringency index for country \( c \) on day \( t \). This is to avoid referring to a change in **New cases pc** that is unlikely to be due to the NPIs, given that not enough time has passed to allow the NPIs to have an impact on contagion spread.

To control for other variables that may play a role in this relationship, we included in Eq. (1) a matrix \( X \). It is composed of four different variables:

- **GDPPc**, the Gross Domestic Product per capita expressed in constant dollars from 2010 (data from the World Bank referred to 2019), to capture socio-economic differences in the population which, as suggested by previous contributions, are likely to have an effect \cite{12}. Data are referred to 2019, and thus before the pandemic, in order to avoid any **look behind** effect;

- **PopDens**, the population per square kilometer (data from the World Bank referred to 2018, the last year for which data are available), which, as suggested in the literature, is likely to have an effect \cite{2}.

- **MedAge**, the population median age (data from United Nations referred to 2020), another difference between the countries that may also play an important role in the spread of the contagion.

- **T**, a series of dichotomous dummy variables for each month analyzed. Variables are equal to 1 if the observation is referred to a given month, and to 0 otherwise. This time fixed effects are useful to capture the inertia of the time passage, and more generally any specific effect that may have affected a given observed month, such as a surge in the spread of the virus or a change in the detection protocols.

Finally, there is the operationalization of **WE** in Eq. (1). To test the impact of different work ethics on the spread of COVID-19 empirically, we computed a country average of certain answers to the last available edition of the European Value Study (EVS), which was carried out in 2017 \cite{19}. This survey collects individual level data through interviews performed in several European countries. Since the interviews in question date from 2017, the work ethic proxies are prior to the COVID-19 crises, and hence are not affected by the

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1 We use the latest version available at the time of writing, namely the edition of 26 March 2021.
The different ways national governments have managed the pandemic. There is thus no risk of reverse causality.

Four different operationalizations of WE were calculated from the EVS [19]. For all of them, we used answers to Q12 of EVS [19], which asks interviewees: “Do you agree or disagree with the following statements?”.

First, we investigated the attitude toward receiving subsidies, for which we built the HRMWW (Humiliating to receive money without working) variable. We started from variable v47 from EVS [19], collecting responses to the “It is humiliating to receive money without having to work for it” statement of Q12. Each respondent may choose an answer on a 1–5 scale, which range from “Agree strongly” to “Disagree Strongly”. We rescaled the variable by multiplying the original data by -1 to switch signs, and added 5 to obtain higher values for people that “Agree strongly” and make it easier to read coefficients. We then computed country median values, and thus built the HRMWW variable.

Second, we investigated the fear of becoming lazy, for which we built the Lazy variable. Similar to before, we started from variable v48 from EVS [19], which states: “People who don’t work turn lazy”. We then rescaled this, and computed the country median.

Third, we investigated the feeling of duty towards society. To do this, we built the Social responsibility variable, computing the country median of variable v49 from EVS [19], which states: “Work is a duty towards society”. Once again we rescaled the variable to obtain higher values for people that agree strongly, and to facilitate the readability of the results.

Finally, we built the WACF (Work Always Comes First) variable, rescaling variable v50 from the same source and then computing the country median. This collects the responses to the statement “Work should always come first, even if it means less spare time”.

All this leads to the creation of a panel dataset composed of 30 different countries (all those included in [19]) observed for 244 days (between 1 January 2020 and 31 August 2020). Having chosen to lag Str (to allow the NPIs to have an effect on New Cases pc) by 28 days, 28 observations per country are lost, leaving us with 6480 observations in the regressions (30 countries multiplied by 216 days).

Descriptive statistics of all the variables used in the analysis are presented in Table 1. Finally, please note that, while they are not the result of a sampling operation, countries we have been able to include in the regressions (reported in Appendix 1 represent a significant part of the European continent. Indeed, the sample includes countries in the European Union (16 out of 30, or 53.33% as well as those outside it; it includes very populous countries such as France and Germany, and smaller ones such as Switzerland and Albania; and finally it includes countries that have adopted different strategies to fight COVID-19, at least during the first wave of the crisis (such as Italy and Sweden).
Results and discussion

Results are presented in Table 2. All the coefficients were estimated through F-GLS Hybrid Models, with standard errors clustered at a country level. In all the specifications, which only differ according to the operationalization of the WE variable in Eq. (1), YCases pc has a positive and statistically (very) significant coefficient, in its between component. This suggests that, as expected, the more COVID-19 cases per capita there were yesterday, the more new COVID-19 cases per capita there will be today. This is simply a further confirmation that new cases are a function of the total amount of cases that there were, and that the pandemic trend is exponential in nature.

The negative and statistically significant value of Str (lagged for 28 days) in its within component suggests that stringency measures, on average, have a negative impact on NewCases pc. This result is in line with what we expected, and what has been highlighted by Alfano and Ercolano [5] concerning lockdowns.

GDPpc and MedAge do not play any significant role in this relationship. This suggests that, on average, the impact of these variables in our sample is not statistically significant on NewCases pc, after controlling for YCases, Str, and all the other variables. On the other hand, in two of the four specifications of the model (2.1 and 2.3), PopDens has a negative and statistically significant impact on NewCases pc. This suggests that the more densely populated a country is, the fewer new cases there were. This may seem counterintuitive given that we might have expected population density to play a positive role in the spread of the contagion. However, this result is in line with what Alfano et al. [2] have already highlighted, and suggests that more densely populated areas are more controlled, and stringency measures are enacted more efficiently, leading to a lower number of cases.

Finally, coming to the variables of most interest for the present work, HRMWW, Lazy and WACF (specifications 2.1, 2.2, and 2.4, respectively), all have a positive and statistically (very) significant impact on NewCases pc. This suggests that countries whose citizens on average believe that it is humiliating to receive money without working, that people

| Specifications | NewCases pc | NewCases pc | NewCases pc | NewCases pc |
|---------------|-------------|-------------|-------------|-------------|
| (2.1)         | YCases pc_within | 0.00206     | (1.54)      | 0.00207     | (1.57)      |
|               | YCases pc_between | 0.00965***  | (14.97)     | 0.00982***  | (21.52)     |
|               | L28.Str_within   | -0.0000000203* | (-1.69)   | -0.0000000200* | (-1.67)     |
|               | L28.Str_between  | 7.47e−08    | (1.14)      | 7.95e−08    | (1.25)      |
|               | GDPpc            | 2.56e−21    | (1.49)      | 1.20e−21    | (0.50)      |
|               | PopDens          | -1.17e−08*  | (-1.86)     | -8.44e−09   | (-1.14)     |
|               | MedAge           | 5.60e−08    | (0.23)      | -9.47e−08   | (-0.55)     |
|               | HRMWW            | 0.000000352*** | (3.84)    | 0.000000352*** | (3.24)     |
|               | Lazy             | 0.000000352*** | (3.84)    | -0.000000488*** | (-3.58) |
| Social responsibility | -0.000000352*** | (3.84)    | -0.000000488*** | (-3.58) |
| WACF           | 0.000000254*    | (1.94)      | 0.000000254* | (1.94)     |
| Constant       | -0.0000357**    | (-2.19)     | -0.000000878 | (-0.55)    |
| Observations   | 6480           | 6480        | 6480        | 6480        |

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

$t$ statistics in parentheses
who do not work turn lazy, and that work comes always first, even if this means less spare time, have more new daily cases of COVID-19 per capita than countries where people agree less with those statements, ceteris paribus for NPIs and all the other variables. On the other hand, specification 2.3 shows that Social responsibility is negatively correlated in a statistically (very) significant way with NewCases pc: the more a population agrees with the statement that work is a duty towards society, the fewer new cases of COVID-19 per capita there are, once again controlling for NPIs and all the time-invariant variables.

As explained above, it seems reasonable to suppose that the main determinant in reducing the spread of coronavirus during its first wave (i.e., from early January 2020 to the end of August of the same year) was the imposition of NPIs by national governments, since in the absence of effective cures for COVID-19, or of vaccines, this was the only remedy left for authorities to try to halt the spread of the epidemic. It also seems acceptable to suppose that NPIs are difficult for public authorities to enforce with the use of force (which should be especially the case in the countries in our sample, which are generally characterized by levels of democracy and respect for civil rights above the average). The conjunction of these two assumptions implies that the degree of the spread of COVID-19 over time is also a good proxy of the degree of compliance with NPIs among the population. As we have assumed, different work ethics may act as an incentive to infringe, or not, on NPIs, given their effect on the way people look at work, and on people’s willingness to keep working, even when it is forbidden.

Given our assumptions, these findings show that the belief that it is humiliating to receive money without working (such as public subsidies to support families forced to stay at home during the first wave), the fear of becoming lazy if time is spent without working (as was requested of many workers during the first wave), and the belief that work is the most important thing, all act as an incentive not to comply with NPIs. This implies that these perceptions of work may lead to a higher circulation of people in the countries characterized by such work ethics, so that they may keep working and, consequently, that these will lead to a higher spread of COVID-19. On the other hand, countries populated by people who look at work mainly as a way to serve society are characterized by greater compliance with NPIs. Indeed, results in specification 2.3 show how Social responsibility has a negative impact on NewCases pc, probably because people that look at work as a public duty may easily see stay-at-home orders as a responsibility towards the society that is more important than work, at least during a pandemic.

Conclusions

The COVID-19 pandemic was without a doubt the major event of 2020, and probably one that will be remembered for a very long time. Over a year after the beginning of the crisis, at the threshold of the summer of 2021, it is still not clear whether we are finally emerging from it, or simply experiencing another seasonal pause, as many countries did in the summer of 2020.

The crisis is interesting also because it has made many intellectuals and laymen re-think what is legitimate for public authority to ask of the individual citizen. It seems safe to state that it would have been inconceivable at the start of 2020 to imagine a Western democracy forcing many of the privately owned businesses within its borders to close, or asking the majority of its population to stay at home, and more generally issuing so many restrictions on personal freedom to protect public health. The impact of the actions of each citizen on the well-being of others, and consequently the extent to which we all are interconnected, has been severely re-evaluated during the last year, while the role of public authorities in protecting citizens, or certain parts of the population, has been greatly re-evaluated and possibly re-shaped.

Of course, the way people perceive work plays an important role in this discontinuity, and more specifically in how citizens have reacted to this important change in their everyday lives. While there have been previous attempts to highlight certain socio-cultural characteristics that may have played a role in this relationship [3], Bargain and Aminjonov, 2021), to the best of our knowledge, this is the first attempt to look at the impact of different work ethics on the spread of COVID-19. Our findings show that countries characterized by higher agreement on certain attitudes to work—namely, that it is humiliating to receive money without working, that people who do not work turn lazy, and that work comes always first, even if it means less spare time—experience more new daily cases of COVID-19 per capita than countries where people agree to a lesser extent with those statements, ceteris paribus for NPIs. On the other hand, countries characterized by a population that agrees that work is a duty toward society experience fewer new daily cases of COVID-19 per capita than countries where people agree less with that statement.

These findings may be important for a number of stakeholders. First, these results suggest that there may be a different attitude towards NPIs and compliance with them in different bodies of society, characterized by different perceptions of work and its importance. Aside from material necessity, NPI infringement may be due to the way people perceive work and the role it plays in the life of each citizen, which is an important thing to consider when designing a
policy aimed at imposing social distancing. Accordingly, this is something policymakers should consider when designing their strategies to keep a country safe. Second, forbidding work in countries that attribute great importance to this aspect of adult life may backfire, since people may continue to work without any controls, which will lead to higher contagion rates than would be the case if people were allowed to continue to work in safe environments. This suggests that in countries with a given work ethic, allowing citizens to keep working, and imposing extra safeguards to keep the population safe, may have better results than shutting down businesses and forbidding work.

Although this expands the literature related to NPI efficacy and previous findings on COVID-19 determinants, the present analysis has some limitations and strengths that warrant attention. First, the sample of countries analyzed is not the result of a sampling operation of a bigger population, and since it is derived from the availability of data, this may have affected the results. We nonetheless believe that the countries we have been able to include in the regressions (reported in Appendix 1) represent an important part of the European continent.

A second limitation is due to the reporting of COVID-19 cases, which is not a perfect operationalization of the effective number of cases that each country has experienced. Indeed, these data are gathered from a number of national sources, and are of course a function of various decisions taken at the national level, such as testing policy, the quality of the tests used, the number of asymptomatic cases, and so on. While we recognize that this may cause some biases in the analysis, and consider it important to warn the reader about this shortcoming, at the same time, it is difficult to imagine any other way to proxy the spread of COVID-19, or possible solutions for these limitations. Indeed, either deaths or excess deaths seem to be a worse option in this regard. The former is affected by the very same problems in the reporting of cases, since people that have an incentive to report more (or fewer) COVID-19 cases face similar incentives in reporting more (or fewer) COVID-19 deaths. The latter, meanwhile, although it may seem a useful operationalization of the effects of COVID-19 in a country, suffers from other problems. First, the availability of data about the daily number of deaths in 2019 and 2020 is very limited, and in the case of many countries is not available at all. This reduces the effective possibility of using daily excess deaths as a proxy for the spread of COVID-19. Second, and more important, while there is no doubt that COVID-19 has caused many deaths, it is very hard to compute which deaths occurred because of a lack of compliance with NPIs, and which would have occurred regardless. More precisely, while it seems reasonable to connect the event of COVID-19 contagion to a personal lack of compliance with an NPI that occurred a short time before, it is harder to connect COVID-19 deaths to the moment when the contagion occurred, which may be an event distant in time from death, and hard to connect to the level of stringency of measures. Moreover, deaths are much more dependent on other factors than cases, as highlighted in the relevant literature [12].

On the other hand, the main strengths of this study are twofold. The first is that this research compares results from a large number of countries. This implies that our findings have a greater external validity than single-nation studies, and are more easily generalizable and applicable to new cases.

Second, the use of positive cases as our main dependent variable, while affected by the limitations that have already been discussed, has the benefit of also delivering information about behavior in private places, and the attention paid to the precautions necessary to avoid contagion, aside from mobility. While mobility obviously plays a very important role in spreading contagion, given that we must live with the virus for a long time, and given the necessity of producing and restoring certain habits, precautions, such as the use of masks, washing hands and avoiding unnecessary interpersonal physical contact are very important to avoid contagion, even when mobility is reduced.

In conclusion, this paper highlights the importance of different work ethics for the enforcement of successful policies. The central role played by the way people perceive work in the spread of COVID-19 suggests that these characteristics must be taken seriously into account when designing an NPI and when deciding the set of restrictions to be implemented, if the containment of the contagion is to be achieved successfully.

Further studies may be devoted to extending these findings to a different geographic region or a wider set of countries, exploiting data from other surveys, or analyzing different dimensions of work ethics.

Appendix 1—Countries included in the analysis

Albania, Austria, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Iceland, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

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