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Despina Gavresi Anastasia Litina George Mavropoulos
Sofia Tsitou

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Department of Economics
University of Macedonia
156 Egnatia str
540 06 Thessaloniki
Greece
Fax: + 30 (0) 2310 891292
https://www.uom.gr/en/eco

The Role of Gender and Family Norms on the COVID-19 Spread in Europe

Despina Gavresi, Anastasia Litina, George Mavropoulos, Sofia Tsitou *

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Abstract

This paper explores the interplay between social norms i.e., attitudes on gender equality and strength of family ties, and the spread of COVID-19. To undertake our analysis we combine sub-national (Nuts 1 regions) data for the social norms from the Integrated Values Survey (IVS) from 1981 to 2019 and the spread of COVID-19 measured by the excess mortality rate in Nuts 1 European regions in 2020 and 2021. Exploiting regional variation, we empirically establish that in regions with norms favoring gender equality, the excess mortality associated with the spread of COVID-19 is lower. Our hypothesized underlying mechanism is that women respect social distancing more, thereby in a country where women enjoy more respect, the influence more strongly their families to do the same thus diminishing the virus diffusion. Concerning the strength of family times, we find that regions with stronger family ties are associated with a higher COVID-19 excess mortality rate, hinting to the higher involvement of the elderly in family affairs.

Keywords: COVID-19, Women Equality, Family Ties, Social Norms, Culture

JEL Codes: I10,O4,Z12

*Corresponding Author: Anastasia Litina: University of Macedonia, Greece, anastasia.litina@uom.edu.gr; Despina Gavresi: University of Luxembourg, despina.gavresi@uni.lu; George Mavropoulos: University of Macedonia, Greece, mavropoulos@uom.edu.gr; Sofia Tsitou: University of Macedonia, Greece, sofitsitou@gmail.com. The research project is supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the 4th Call for Action "Science and Society" Emblematic Action "Interventions to address the economic and social effects of the COVID-19 pandemic" (Project Number:4890).

1 Introduction

During the first months of 2020, the world experienced the rapid spread of the coronavirus disease (COVID-19). Already by early April 2020, COVID-19 had infected more than 1 million people and killed more than 60,000 people worldwide. As of January 2023, nearly 664 million cases and over 6.5 million deaths worldwide have been officially recorded (WHO-COVID-19 Weekly Epidemiological Approach). The data is derived from https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19—25-January-2023-last accessed on 27/08/2023. The initial responses varied widely across countries as this event had no precedent. Some countries were severely inflicted whereas others were far more successful than others in slowing down the rate of COVID-19 cases and deaths. While there was no official alignment in policies, the dominating initial reaction in the vast majority of inflicted countries was to impose different degrees of lockdowns (see e.g., Onyeaka et al. (2021)). Figure A.1 in the Appendix shows that as early as the 1st of April 2020, the vast majority of countries has already adopted some level of stay-at-home requirements (Mathieu et al., 2020).

Several studies on the topic have attempted to capture the role played by the implementation of differential policies. For instance, studies as e.g., Bargain and Aminjonov (2020) use a sample of European regions and account for country fixed effects, thereby capturing the differential role of policies. Others, such as Deopa and Fortunato (2021) for Switzerland or Laliotis and Minos (2022a) for Western Germany, study single countries and explicitly net out the role of policies. What is clear from all these studies, is that even when accounting for differential policies there are still unexplained variations in the rates of COVID-19 spread and mortality rates or any other

factors driving this result. Other factors that can potentially have an effect on the spread of COVID-19 have also been studied in an expanding literature such as population density and age structure (Kong et al., 2021), and social distancing (Cao et al., 2021; Toshkov et al., 2022).

In this paper, we focus on a particular set of cultural traits, namely on gender equality norms and family ties. Whereas several cultural traits can play a role on the spread of a pandemic we focus on the societal norms favoring women's equality (e.g., gender equality at work, family, and politics) and the degree of involvement of the elderly in family affairs. More analytically, we derive data from the Integrated Values Survey (IVS) which combines the datasets of the European Values Survey (EVS) and the World Values Survey (WVS), covering the years from 2008 to 2019, in order to construct the mean levels of gender norms and family ties across Nuts 1 European regions before the COVID-19 pandemic hit. The measure related to the impact of COVID-19 is excess mortality, i.e., the differences in the number of deaths that occurred in 2020 and 2021 with the average number of deaths that occurred in the corresponding weeks from 2015 to 2019. This measure is derived from Eurostat for each of the years 2020 and 2021. We further control for demographic and economic factors (e.g., life expectancy rate, population density, the share of old people (over 60 years) in the total population, the log total number of available hospital beds, and log GDP per capita). We last control for country fixed effects to capture anything that remains constant in a country over time as well as differences in COVID-19 related policies implemented in each country. The country fixed effects also capture the potential differences across countries in how COVID deaths are recorded, the rate of implementation of self-tests, and whatever relates to country level differences in how the threat of COVID-19 was perceived and treated.

Our findings suggest that in regions where gender equality is higher and family ties are looser, the excess mortality rate during the COVID-19 pandemic was found to be lower. On the one

hand, gender norms can crucially affect virus diffusion. As is well established, women have a higher degree of risk aversion. Thus, countries with norms favoring gender equality enhance lower rates of COVID-19 spread. Women respect social distancing more and help their families to respect the policies adopted by the national governments. On the other hand, while COVID-19 had severe implications for young and healthy people, yet the majority of the victims were either older adults or people with underlying health conditions. As a result, we also explore the degree of socialization of the elderly and their involvement in family affairs as crucial for exposure to the virus. As we cannot directly test this mechanism in the regional analysis, we take steps towards this direction in the country level analysis where more controls are available. Our findings are robust to various specifications. Analytically, in order to test the validity of our benchmark specification at the Nuts 1 regions, we use the COVID-19 confirmed cases as an alternative measure of COVID-19 exposure and we find that also in regions where gender norms are higher and family ties are weaker, the COVID-19 diffusion is milder. The reason why our analysis is taking place in Nuts 1 regions instead of Nuts 2 level is the limited availability of IVS observations at the Nuts 2 regions which makes this approach impractical, especially compared to the more abundant Nuts 1 data.

Additionally, in our regional analysis, we explore a potential source of heterogeneity. Specifically, whereas in our main specification, we exploit only the regional dimension, pooling our data for all regions and both periods, the temporal dimension is quite critical. Given that we have data for two years, we replicate our analysis separately for each year, i.e., for 2020 and for 2021. Interestingly, our findings suggest that culture matters for both periods thereby highlighting the persistent role of culture on individual's behavior. In the light of a new unidentified threat and in the absence of formal and clear medical solutions, culture always comes into play as a critical factor as it guides people's instinctive reactions and self-protection mechanisms. Interestingly though,

even when policies become more educated and science comes into play, culture still dramatizes an important role.

Overall, in view of the COVID-19 spread, and anticipating a future pandemic, understanding the cultural determinants and the sources of differences in policies' effectiveness in the containment of the pandemic is critical. The results of this paper shed light on the fact that disparities in socio-cultural and economic determinants can lead to essential disparities in COVID-19 incidence and diffusion. They also hint to the fact that governments should always factor in the role of culture. In the opposite case, the same policies can yield dramatically different outcomes, which in the midst of a pandemic can lead to thousands of deaths.

The structure of the paper is organized as follows. Section 2 presents the associated literature. Section 3 describes the data for the regional analysis, which is our benchmark analysis. Section 4 reports the empirical strategy, the benchmark findings and the robustness tests. Section 5 undertakes heterogeneity exercises for the benchmark sample. Section 6 concludes.

2 Literature review

The role of pandemics has been critical throughout history. The COVID-19 pandemic is the worst health crisis since World War II. It has affected and changed the life and work style of people all around the world. Governments are rapidly mobilizing to minimize transmission of COVID-19 through social distancing and travel restrictions to reduce fatalities and the outstripping of healthcare capacity. It is becoming clear that the pandemic's progression and impact may be strongly related to the demographic and cultural composition of the population i.e., attitudes on gender equality, family ties, age structure. The economic downturn caused by the current COVID-

19 outbreak has substantial implications for gender equality, both during the downturn and the subsequent recovery. Women are disproportionately negatively affected by the response to COVID-19 (Fortier, 2020; Adams-Prassl et al., 2020; Alon et al., 2020). The recession induced by COVID-19 impacted women's employment and labor force participation somewhat more relative to men but the aggregate female labor force participation rate did not plummet during the pandemic recession (Adams-Prassl et al., 2020; Goldin, 2022). Women tried to stay on their jobs as much as they could (Goldin, 2022). Women had a greater likelihood of teleworking, higher levels of education and a less-impacted occupational distribution, which all contributed to lessening negative impacts relative to men (Couch et al., 2022). The latter also find that male-female gaps in the employment-to-population ratio and hours worked for women with school-age children have widened but not for those with younger children. Furman et al. (2021) confirm that mothers with young children have experienced a larger decline in employment than men.

On the other hand, there is a strand of literature which argues that although women are typically less affected by recessions than men, female labor force participation has substantially and persistently dropped during COVID-19 pandemic (Alon et al., 2020; Albanesi and Kim, 2021; Luengo-Prado, 2021). The pandemic has resulted in a widening of the gender gaps in employment and labor force participation of roughly 2 percentage points (Luengo-Prado, 2021). Women in the labor market are more severely affected than men as they are more likely to work from home, reduce working hours, and become unemployed (Reichelt et al., 2021). The likely reason that led to this decline in female employment is lack of access to reliable childcare and in-person schooling (Albanesi and Kim, 2021). Closures of schools and daycare centers had massively increased childcare needs, which has a particularly large impact on working mothers (Alon et al., 2020). In general, women have carried a heavier load than men in the provision of childcare which is

associated with a reduction in working hours and an increased probability of transitioning out of employment (Zamarro and Prados, 2021). Moreover, Dang and Nguyen (2021) suggest that women are 24 percent more likely to permanently lose their job than men and women also expect their labor income to fall by 50 percent more than men do. These gender gaps can be explained by the different participation rates in work industries for men and women. Reichelt et al. (2021) argue that women's transitions to unemployment (when their partners remain in their jobs) are associated with more traditional gender-role attitudes and that men's transitions to unemployment (when their partners remain in their jobs) are associated with more egalitarian views.

The effect that the COVID-19 pandemic, and in general earlier recessions, had on gender equality is related to social attitudes and compliance to social norms. Previous literature finds substantial empirical support for the claim that women are more risk averse than men. Women are, on average, significantly less tolerant of risk (Hartog et al., 2002; Eckel and Grossman, 2008; Fan et al., 2020). Zhang and Palma (2022) find that women become more risk-averse in the social domain of self-reported propensity measures but men are more sensitive to the pandemic. Taking into account gender compliance to norms during the pandemic, it seems that women are 16 percent more likely to wear masks (Chuang et al., 2020). Women also worry more about their own health and the health of those around them and take more preventive actions (Fan et al., 2020). Finally, on gender trust, previous analyses find various results. Maddux and Brewer (2005) predict that men would tend to trust individuals based on whether or not they shared group memberships and women trust those who shared direct or indirect relationship connections. Buchan et al. (2008) find that men trust more than women, and women are more trustworthy than men, suggesting that men view social interactions more strategically than women. In general, men and women who have higher educational qualifications and higher occupational status tend to have more socially

liberal attitudes and more trusting of the democratic political system (Schoon et al., 2010). On the other hand, Haselhuhn et al. (2015) demonstrate that following a violation, women are more likely than men to maintain trust in the face of repeated untrustworthy actions and are more likely to regain trust in a transgressor than men. Women care more about maintaining relationships than men, and this greater relational investment mediates the relationship between gender and trust dynamics.

Family and social ties are crucial factors that can explain the remarkable impact of COVID-19 on individuals' attitudes. The family is the most primitive institution in society and the nature of its organization varies greatly across nationalities. In some cases family ties are weak and members only feel obligated up to a point to be linked to others members of the family and in other cases family ties are strong. Laliotis and Minos (2022b) observe that the number of infections and deaths during the early pandemic phase were much higher in Western Germany regions with arguably stronger family and social ties. Moreover, there is a strong positive correlation between countries' case fatality rates and the share of working-age families living with their parents (Bayer and Kuhn, 2020). Beland et al. (2020) support that during the pandemic the inability to maintain social ties significantly increase reported family stress and domestic violence. These findings are consistent with two alternative mechanisms: social isolation and decreased bargaining power for women. However, the importance of family and social ties in cultural behavior has been studied from earlier. Alesina and Giuliano (2014) support that differences in family values have an impact on attitudes and outcomes that are relevant to explain differences in growth across countries and the quality of institutions. There is an inverse relationship between family ties and participation in political activities, such that the more individuals rely on the family as a provider of services, insurance, and transfer of resources, the lower is one's civic engagement and political participation

(Alesina and Giuliano, 2011, 2014). Moreover, strong family ties are negatively correlated with generalized trust; they entail more household production of goods and services, less labor force participation of women, young adults living at home, and less geographical mobility since ties are more useful if people live close to each other (Alesina and Giuliano, 2010, 2014).

Another crucial factor that is under examination is the importance of family relationships for elderly people and how they have changed in the wake of the pandemic. Many years before the pandemic inter-generational relationships are known to be important in maintaining the well-being of older people. A key aspect of these relationships is the exchange of both emotional and instrumental social support. For elderly population, social integration and the strength of social and family ties are profoundly crucial factors for wealth, longevity and quality of life (Kweon et al., 1998; Zunzunegui et al., 2003). The main objective of societies should be to create friendlier conditions for older people, including physical and social infrastructures in order to participate in the community in personally and socially meaningful ways (Riley and Riley Jr, 1994; Scharlach and Lehning, 2013). Research of Yuryev et al. (2010) support that in countries where the elderly live with their families suicide rates are lower. In Eastern European countries, the status and the economic contribution of old people are less important, whereas in Western European countries the old population considered as more friendly and with more elderly relatives in the family. The pandemic has particularly impacted the lives of older population, since COVID-19 causes more severe morbidity and greater mortality than in other age groups (Crimmins, 2020; Dowd et al., 2020). Dowd et al. (2020) show higher mortality rates in countries with older populations. Countries with older populations will need to take more aggressive protective measures and pay more attention to those population groups that are more at risk. Bayer and Kuhn (2020) observe a positive relationship between the number of cases of COVID-19 and the share of people 30-49

years old living with their parents, arguing that social integration might be the factor behind the death toll in Italy. Lebrasseur et al. (2021) note that there is a need for more specific strategies for older adults to ensure that social contacts and family ties were preserved. Smith et al. (2020) insert the well-being COVID-19 social connectivity paradox: closer ties with loved ones enhances social connectivity and increases social inclusion but on the other hand increase also the risk of COVID-19 exposure and vice versa. This stresses the challenge for older adults who might need to find the balance at this continuum of risk. The study of Age (2020a,b) highlights the concern of older people about the loss of social connectivity and family members, especially when they might need them most. Before the pandemic older people take care of their children and grandchildren and they both gave and received affectionate support. This increased their sense of well-being and quality of life. However, the pandemic led families to a disequilibrium in the methods of support and the feelings of belonging: grandparents were no longer providing support for grandchildren but children were now providing more support to parents (Derrer-Merk et al., 2022).

Our research contributes to this literature by formally testing the interplay between social norms and the spread of COVID-19 at the sub-national level of European countries which allows us to capture a wide range of unobservables and to net out country level differences in the responses to the pandemic. The results of this paper shed light on the fact that disparities in socio-cultural and economic determinants can lead to essential disparities in COVID-19 incidence and diffusion, suggesting that these determinants should remain targets of research and control for future pandemics.

3 Data

To explore the effect of social norms (e.g., attitudes on gender equality and family ties) on the spread of COVID-19 in European regions, we employ data from the Integrated Values Survey (IVS) which combines the datasets of the European Values Survey (EVS) and the World Values Survey (WVS), covering the years from 2008 to 2019. The IVS contains a rich set of questions that capture several aspects of gender attitudes and socialization in family affairs as well as personal characteristics such as country and year of birth, gender, age, education, occupation status, and other demographic characteristics and cultural attitudes of individuals residing in several countries worldwide.

In our analysis, to capture a rich picture of attitudes toward women, we employ several proxies for attitudes toward women's equality. More specifically, we look into four major dimensions of norms that assign different roles to men and women within the household. The first dimension is about the rights that women have when jobs are scarce. Respondents are given the question "Please listen to each description and tell me whether men should have more rights to jobs than women when jobs are scarce". Additionally, the second proxy examines perceptions about women and whether they are better as political leaders. Respondents are given the question "Please listen to each description and tell me whether men are better than women as political leaders". The third proxy is about the traditional norm that requires women to stay in the house and respondents answer the question "Please listen to each description and tell me whether women should be prepared to cut down on paid work for sake of family" and the last regards whether individuals believe or not that women are better than men as business executives responding to

the question "Please listen to each description and tell me whether men are better than women as business executives". All the variables on attitudes toward women are measured on a scale between 1 (strongly agree) and 5 (strongly disagree).

As far as family ties are concerned, we use three proxies according to Alesina and Giuliano (2010) and Alesina and Giuliano (2014). The first proxy asks how important is family for the respondent's life. Answers vary from 1-4 with 1 indicating that family is very important and 4 indicating it is not important at all. The second proxy asks whether love and respect to parents is taken as given or whether it should be earned; The value of 1 indicates that it should always be taken for granted and the value of 2 that it should be earned, whereas the third proxy asks whether parents should fulfill their responsibilities towards their children at the expense of their own well-being; The value of 1 indicates that they should do the utmost best for their children, while 2 indicates that they should not sacrifice their own well-being. Overall, in all three questions lower values correspond to stronger family times. Note that, in order to reduce the number of variables and to combine the three components to a single variable, our approach is to conduct a principal component analysis and to employ the first component as the explanatory variable.

Our key outcome variable is the excess mortality rate which is the difference between the number of deaths that occurred in 2020 and 2021 with the average number of deaths that occurred in the corresponding weeks from 2015 to 2019. The age structure of the population and the deaths are not taken into account. The raw data are derived from Eurostat. In our analysis, we employ the Nuts 1 data for each of the years 2020 and 2021.

Beyond our main explanatory variables, our analysis controls for a wide range of Nuts 1 regional characteristics such as life expectancy rate, population density, the share of old people (over 60 years) in the total population, the logged total number of available hospital beds, and logged

GDP per capita. All these variables are coming from Eurostat and they are considered as the determinants of COVID-19 spread into societies and they can capture the stage of development, as well as other demographic determinants. Table 1 documents the descriptive statistics of all the variables explained above and used in our analysis. In our analysis, we always account for country fixed effects as well as capture unobservables that remain constant at the country level.

Last, we merge our data, ending up with a sample of Nuts 1 European regions. In our benchmark specification, we exploit primarily the spatial dimension of our data, i.e., we exploit the spatial variation in the mean values of excess mortality rates reported and gender and family norms variables across all available Nuts 1 regions. However, each region appears twice and we pool our data in the benchmark specification in order to exploit the fact that the excess mortality rate is available for two regions. However, in the heterogeneity section we also replicate our analysis for each year separately. The underlying idea is to explore if culture had a differential role in each time period. To visualize our data we provide regional maps (e.g., see Figures A.2-A.10 in the Online Appendix) concerning our gender norms data (e.g., men do not have more rights to jobs than women, men do not make political leaders than women, women do not want a home and children and men do not make better business executives than women) and family ties (e.g., family is not important, not respect and love parents and parents not sacrifice their well-being). Starting with attitudes favoring women, we find that the regions with the lowest levels of men do not have more rights to jobs than women when jobs are scarce e.g., the Isole Nuts 1 region in Italy (ITG with a mean value of gender norms of 2.58) whereas the region with the highest value is Hamburg (DE6 with a mean gender norms value of 5.48). Precisely, The gender norms variables take a score between 1-5 with 1 indicating the lower value of norms favoring women's equality and 5 the lower level of attitudes against women's equality. As far as the family ties are

concerned, it is observed that Sachsen scores the lowest level of family ties with an average value of 0.64 whereas Latvia (LV0) scores the highest value of strong family ties of 1.40.

The Online Appendix provides a detailed description of all the variables used in the baseline analysis, the associated maps and a correlation matrix (e.g., see Table A.1) which presents the correlation for all variables. As anticipated, some controls, especially GDP per capita, are highly correlated with some of the gender and family norms. Yet their values are still below 0.7 or 0.8 which is typically referred to as a rule of thumb value. Specifically, is argued that multicollinearity problems are not likely to exist if bivariate correlations are below cut-off values, typically 0.7 or 0.8 (Judge et al., 1991).

4 Nuts 1 regional analysis

In this section, we describe our empirical specification and the main results in Nuts 1 regions.

4.1 Empirical strategy

In our benchmark analysis, we implement an OLS regression model to examine the effect of several social norms e.g., attitudes toward women and family ties on the spread of COVID-19 and more specifically, on the COVID-19 deaths in (Nuts 1) European regions. Thus, we estimate the following model:

$$y_r = a_0 + \alpha_1 Norms_r + \alpha_2 X_r + \beta_c + \epsilon_r, \tag{1}$$

where y_r denotes the excess mortality rate reported in region r for both periods, i.e., 2020 and

2021. $Norms_r$ is the mean value of individuals' level of gender norms and family ties in region r. X_r includes a number of Nuts 1 regional-level controls that can have an impact on COVID-19 spread. More specifically, we control for life expectancy rate, population density, the share of old people (over 60 years) in the total population, the logged total number of available hospital beds, and the logged GDP per capita, whereas β_c is the country fixed effects, that capture unobserved heterogeneity at the country level. Finally, ϵ_r is the region-specific error term. The standard errors are robust and clustered at the Nuts 1 regions. Last, sample weights are used in our analysis as the use of weights is important when averaging the individual data in order to make the sample representative.

Our empirical strategy does not preclude identification concerns. There are two sources of concern. The first is reverse causality. To this end our analysis has throughout relied on using past values of gender and family norms, to mitigate reverse causality concerns. Specifically, our gender norms and family ties variables have been constructed using the IVS data for the period 2008-2019. Meaning that the gender norms and family ties in each of the institutions have been observed prior to the onset of the COVID-19 outbreak. Therefore, they are completely unaffected by how each country handled the crisis and reflect profound differences in gender norms and family ties across countries. This approach mitigates reverse causality concerns.

The second is omitted variable bias. Concerning this, we have attempted to include various country level controls that can explain excess mortality as well as country fixed effects to account for any unobservables that remain constant at the country level over time. Though admittedly we cannot eliminate all possible bias, we attempt, via a series of additional heterogeneity checks to ensure a meaningful correlation between gender and family norms and COVID-19 related excess mortality.

4.2 Empirical findings

This section reports the empirical findings for our baseline analysis. Table 1 presents the benchmark results and documents the effect of attitudes toward gender equality on COVID-19 excess mortality rate reported in Nuts 1 European regions. Analytically, Table 2 reports the results for attitudes toward women; i) women have more rights than men ii) women are better as political leaders, iii) women should stay at home with children, and last, iv) women are better business executives. Throughout Columns 1 to 4, we include the full set of regional controls and country fixed effects. Our findings suggest that in (Nuts 1) regions where individuals express attitudes in favor of gender equality in society, the percentage of excess mortality between 2020 and 2021 due to COVID-19 spread is decreasing. Moreover, the magnitude of the effect is sizable. Analytically, the coefficient of men do not have more rights to jobs than women variable is 4.3. This means that, for every one-unit increase in this variable (which ranges from 1 to 5), the excess mortality rate (which ranges from 0 to 100) is expected to decrease by 4.8 percentage points. In a similar fashion, men do not make political leaders than women reduce the excess mortality rate by 5.0 percentage points, women do not want a home and children by 4.2 percentage points and men do not make better business executives than women by 4.9 percentage points. All results are significant at the 1% level including the full set of controls and fixed effects. Contemplating on the mechanism, we hypothesize that in regions with stronger gender equality norms tend to comply more with distancing measures and they potentially acknowledge the effectiveness of the political system to deal with a generalized crisis.

[INSERT TABLE 2 HERE]

In Table 3 we also present our benchmark results but here we explore the effect of family ties on the spread of COVID-19 as the degree of socialization of the elderly people as they were the majority of the victims during the pandemic and their involvement in family affairs played an important role in the spread of COVID-19. In Table 3 we report that in regions where the family ties were looser, the excess mortality is lower. In all Columns (1-3) we include the full set of regional controls and country-fixed effects. Analytically, the coefficient of the family is significant and its magnitude is 10.8. This means that, for every one-unit increase in this variable, the excess mortality rate is expected to decrease by 10.8 percentage points. In a similar fashion, not respecting and love parents reduces the excess mortality rate by 4.8 percentage points. Last, the coefficient on "parents do not sacrifice their well-being" is 4.6 percentage points and the principal component of family ties decreases the excess mortality rates by 1.3 percentage points. All results are significant at the 1% level. Contemplating the source of the effect, we hypothesize that in regions with looser family ties individuals are more respectful and tend to comply more with distancing measures.

[INSERT TABLE 3 HERE]

Overall, according to the findings of our benchmark analysis, it is reported that both gender norms and family ties have a severe impact on the COVID-19 excess mortality rate in European societies.

4.3 Robustness

4.3.1 Alternative attitudes toward women

As a further robustness check of the validity of the benchmark findings, we explore the effect of attitudes toward women on COVID-19 deaths, using another source of data on gender norms, the European Social Survey (ESS). We replicate the benchmark analysis employing data from the ten waves of the European Social Survey (2008-2019), a repeated cross-section survey that quantifies the attitudes, beliefs, and behavioral patterns of citizens in 34 European countries. The sample comprises individuals from Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Germany, Finland, France, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kosovo, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Russia, Sweden, Slovenia, Slovakia, Spain, Switzerland, Turkey, United Kingdom, and Ukraine. We use three dimensions of norms that assign different roles to men and women within the household. The first proxy is whether women should stay at home and take care of their families. Respondents are given the question "A woman should be prepared to cut down on her paid work for the sake of her family". In addition, the second measure of gender norms is about gender rights to jobs. Respondents are given the question "Please listen to each description and tell me whether men should have more rights to job than women when jobs are scarce". Last, the third proxy measures the proportion of women in the workplace. Individuals respond to the question "What is the proportion of women at your workplace? Women are more than men". All the variables on gender norms are measured on a scale between 1 (strongly agree) and 5 (strongly disagree).

Table 4 reports the benchmark results for attitudes toward women derived from the European Social Survey (ESS). In all Columns (1-3), we include the full set of regional controls and country-fixed effects. Our findings suggest that for every one-unit increase in these variables in regions

where individuals support gender equality, the excess mortality rate is decreasing. This means that, for every one-unit increase in each of the attitudes toward women variable (which ranges from 1 to 4), the excess mortality rate (which ranges from 0 to 100) is expected to decrease. Analytically, in regions where individuals believe that women should not be prepared to cut down their work for the sake of family, the excess mortality is decreasing by 2.0 percentage points. Men should not have more rights to jobs than women when the jobs are scarce reduces the excess mortality rate by 1.6 percentage points and last, when the proportion of women at the workplace is higher, the excess mortality is reduced by 1.9 percentage points. The results remain robust but now they are qualitatively and quantitatively weaker.

[INSERT TABLE 4 HERE]

5 Heterogeneity sources

5.1 Gender and Family Norms During the COVID-19 Pandemic

This subsection explores whether gender equality norms and family ties played a differential role in the beginning of the pandemic and in the midst of the pandemic. It is important to highlight that our gender norms and family ties data do not have time variation, as they are averaged for the period 2008-2019 before the pandemic. As discussed above what really varies is the excess mortality across the years 2020 and 2021. To this end, and in order to study the temporal role of culture we reproduce our benchmark results separately for each year. We take into account in our baseline analysis the time variation coming from the COVID-19 excess mortality rate. Using time

variation in our analysis helps us to eliminate unobserved heterogeneity and we can investigate the relationship between norms and family ties across countries and its effect on COVID-19 spread and mortality rates across the years. The results are reported in Table 5 where we replicate our baseline analysis, focusing explicitly on the year 2020 (Panel A) whereas in Panel B, we focus on the year 2021. Interestingly, our findings suggest that the negative effect of attitudes favoring gender equality in COVID-19 excess mortality is lower in magnitude but more significant in the second year of the pandemic in 2021. However, when formally testing if this is the case, implementing Wald tests, we do not find statistically significant differences between the two years. Despite the fact that the effect of gender norms on the COVID-19 spread is significant for the second year of the pandemic, when we implement a Wald test to see if the differences are statistically significant, we find no effect. This suggests that there seem to be no systematic differences between the two samples.

[INSERT TABLE 5 HERE]

On the other hand, Table 6 reports the negative effect of family ties on the COVID-19 excess mortality rate between 2020 (Panel A) and 2021 (Panel B). The results are somewhat stable in relation to the case of gender norms, as the effect of family ties became even more negative in 2021, indicating that family ties could have a severe impact on COVID-19 spread in the second year of the pandemic, where the COVID-19 mortality rates were even higher. However, testing this effect using the Wald test, we find a significant effect on looser family ties and the belief that family is not important on excess mortality in the second year of the pandemic. Thus, we can infer that family ties played an important role on the COVID-19 spread and excess mortality in European regions.

[INSERT TABLE 6 HERE]

6 Conclusions

This paper establishes the role of gender norms and family ties as important determinants of the COVID-19 spread and excess mortality in European regions. Exploiting regional variation across Nuts 1 regions in Europe, we establish that higher levels of attitudes favoring gender equality and looser family ties lead to a decreasing rate of COVID-19 spread measured by the excess mortality rate during the years of COVID-19 pandemic from 2020 to 2021. We thus establish the critical role of culture, and more specifically the role of gender and family norms on health outcomes.

Additionally, in this paper, we exploit only the regional dimension pooling our data for all regions and the years 2020 and 2021. Yet the temporal dimension is quite critical. We replicate our analysis separately for each year. Interestingly, our findings suggest that culture matters for both periods thereby highlighting the persistent role of culture in individual decisions. Furthermore, our results remain robust when we replicate our benchmark analysis using data from the ESS.

Policy-wise, our findings suggest that adopting a uniform set of measures is not sufficient in achieving a goal. All proposed policies should always embed the relevant cultural elements in order to maximize their effectiveness. The opposite can ultimately result in adverse outcomes, which in the case of COVID-19 translates into several more human losses.

Tables

Table 1: Descriptive Statistics

	no. obs	mean	sd	min	max
Nuts 1 COVID-19 Measure					
Excess Mortality Rate	128	12.80	8.61	-0.24	44.14
Nuts 1 Gender Norms					
Men do not have more rights to jobs than women	128	3.82	0.63	2.54	5.48
Men do not make better political leaders than women	128	3.15	0.44	1.98	4.48
Women do not want a home and children	120	2.60	0.61	1.47	4.55
Men do not make better business executives than women	128	3.22	0.41	2.12	4.46
Nuts 1 Family Ties					
Family not important	128	1.16	0.20	0.64	1.82
Not respect and love parents	116	1.41	0.49	0.49	2.54
Parents not sacrifice their well-being	116	1.40	0.51	0.47	2.61
P.C.A.	116	0.12	1.86	-3.89	4.47
Nuts 1 Characteristics					
Population Share over 60	128	33.53	5.14	24.17	44.87
Population Density	128	320.13	608.48	5.97	4013.46
(Logged) GDP per capita	128	9.91	0.65	8.37	11.00
Life Expectancy	128	30.62	2.35	25.95	33.97
(Logged) Hospital Beds	128	3.42	5.97	0	15.29

Notes: The table reports the descriptive statistics.

Table 2: Benchmark analysis: COVID-19 mortality and gender norms in Nuts 1 Regions

	Excess Mortality Rate			
	(1)	(2)	(3)	(4)
Men do not have more rights to jobs than women	-4.2645***			
	[1.5572]			
Men do not make political leaders than women		-5.0132***		
		[1.7454]		
Women do not want a home and children			-4.2335***	
			[.8413]	
Men do not make better business executives than women				-4.9243***
				[1.7837]
R-squared	.47	.46	.47	.46
Observations	128	128	136	128
Nuts 1 Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Cluster SE	Nuts 1	Nuts 1	Nuts 1	Nuts 1

Notes: This table establishes the effect of gender norms on the COVID-19 excess mortality rate in Nuts 1 European regions. The analysis controls for the logged GDP per capita, population density, the share of the population over 60 years, life expectancy, and the available hospital beds as well as country fixed effects. Robust standard errors, clustered at the country level are shown in parenthesis; *** denotes statistical significance at 1% level, ** at the 5% level, and * at 10% confidence level. Sample weights are used in our analysis.

Table 3: Benchmark analysis: COVID-19 mortality and family ties in Nuts 1 regions

	Excess Mortality Rate			
	(1)	(2)	(3)	(4)
Family not important	-10.8252***			
	[2.3355]			
Not respect and love parents		-4.7616***		
		[.9344]		
Parents not sacrifice their well-being			-4.5886***	
			[.9820]	
P.C.A.				-1.2785***
				[.2528]
R-squared	.45	.49	.48	.49
Sample	144	132	132	132
Nuts 1 Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Cluster SE	Nuts 1	Nuts 1	Nuts 1	Nuts 1

Notes: This table establishes the effect of family ties on the COVID-19 excess mortality rate in Nuts 1 European regions. The analysis controls for the logged GDP per capita, population density, the share of the population over 60 years, life expectancy, and the logged available hospital beds as well as country fixed effects. Robust standard errors, clustered at the country level are shown in parenthesis; *** denotes statistical significance at 1% level, ** at the 5% level, and * at 10% confidence level. Sample weights are used in our analysis.

Table 4: Robustness: COVID-19 mortality and gender norms in Nuts 1 regions using the ESS sample

	Excess Mortality Rate		
	(1)	(2)	(3)
Women should not be prepared to cut down work for family	-1.6919		
	[1.0884]		
Men should not have more rights to job		-1.4063*	
		[.7215]	
Proportion of women at workplace			-2.3754***
			[.7641]
R-squared	.45	.43	.50
Observations	124	142	106
Nuts 1 Controls	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Cluster SE	Nuts 1	Nuts 1	Nuts 1

Notes: This table establishes the effect of gender norms on the COVID-19 excess mortality rate in Nuts 1 European regions using the ESS sample. The analysis controls for the logged GDP per capita, population density, the share of the population over 60 years, life expectancy, and the available hospital beds as well as country fixed effects. Robust standard errors, clustered at the country level are shown in parenthesis; *** denotes statistical significance at 1% level, ** at the 5% level, and * at 10% confidence level. Sample weights are used in our analysis.

Table 5: Heterogeneity: COVID-19 mortality and gender norms in Nuts 1 regions during the pandemic years

	Excess Mortality Rate			
	(1)	(2)	(3)	(4)
Panel A. Year=2020				
Men do not have more rights to jobs than women	-5.9701*			
	[3.2362]			
Men do not make political leaders than women		-5.9437*		
		[3.2931]		
Women do not want a home and children			-4.0244**	
			[1.6467]	
Men do not make better business executives than women				-5.6075*
				[3.2178]
R-squared	.63	.60	.64	.59
Observations	64	64	68	64
Panel B. Year=2021				
Men do not have more rights to jobs than women	-2.5589**			
	[1.2001]			
Men do not make political leaders than women		-4.0827**		
		[1.6070]		
Women do not want a home and children			-4.4425***	
			[.8585]	
Men do not make better business executives than women				-4.2410**
				[1.6707]
R-squared	.93	.93	.96	.93
Observations	64	64	68	64
Panel C. Wald Test				
β_{2021} - β_{2020}(p-value)	0.1836			
β_{2021} - β_{2020}(p-value)		0.4624		
β_{2021} - β_{2020}(p-value)			0.7415	
β_{2021} - β_{2020}(p-value)				0.5649
Nuts 1 Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Cluster SE	Nuts 1	Nuts 1	Nuts 1	Nuts 1

Notes: This table establishes the effect of gender norms on the COVID-19 excess mortality rate in the Nuts 1 regions, restricting the sample to the first year of the pandemic in 2020 (Panel A) and in 2021 (Panel B). The analysis controls for the logged GDP per capita, population density, the share of the population over 60 years, life expectancy, and the logged available hospital beds as well as country fixed effects. Robust standard errors, clustered at the country level are shown in parenthesis; *** denotes statistical significance at 1% level, ** at the 5% level, and * at 10% confidence level. Sample weights are used in our analysis.

Table 6: Heterogeneity: COVID-19 mortality and family ties in Nuts 1 regions during the pandemic years

	Excess Mortality Rate			
	(1)	(2)	(3)	(4)
Panel A. Year=2020				
Family not important	-10.7653**			
	[5.1225]			
Not respect and love parents		-4.4985**		
		[1.9252]		
Parents not sacrifice their well-being			-4.2771**	
			[1.9741]	
P.C.A.				-1.2884**
				[.5585]
R-squared	.62	.69	.69	.70
Observations	72	66	66	66
Panel B. Year=2021				
Family not important	-10.8851***			
	[2.0534]			
Not respect and love parents		-5.0246***		
		[.8422]		
Parents not sacrifice their well-being			-4.9002***	
			[.8724]	
P.C.A.				-1.3597***
				[.2278]
R-squared	.96	.97	.96	.97
Observations	72	66	66	66
Panel C. Wald Test				
β_{2021} - β_{2020}(p-value)	0.9770***			
β_{2021} - β_{2020}(p-value)		0.7141		
β_{2021} - β_{2020}(p-value)			0.6629	
β_{2021} - β_{2020}(p-value)				0.8665**
Nuts 1 Controls	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes
Cluster SE	Nuts 1	Nuts 1	Nuts 1	Nuts 1

Notes: This table establishes the effect of family ties on the COVID-19 excess mortality rate in the Nuts 1 European regions, restricting the sample to the first year of the pandemic in 2020 (Panel A) and in 2021 (Panel B). The analysis controls for the logged GDP per capita, population density, the share of the population over 60 years, life expectancy, and the logged available hospital beds as well as country fixed effects. Robust standard errors, clustered a the country level are shown in parenthesis; *** denotes statistical significance at 1% level, ** at the 5% level, and * at 10% confidence level. Sample weights are used in our analysis.

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A Online Appendix

Gender norms

Men and rights to work. Individuals respond to the question "Please listen to each description and tell me whether men should have more rights to job than women when jobs are scarce. Use this card for your answer." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the Integrated Values Survey (IVS).

Men as political leaders. Individuals respond to the question "Please listen to each description and tell me whether men are better than women as political leaders. Use this card for your answer." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the Integrated Values Survey (IVS).

Women and family. Individuals respond to the question "Please listen to each description and tell me whether women should be prepared to cut down on paid work for sake of family. Use this card for your answer." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the Integrated Values Survey (IVS).

Men as business executives. Individuals respond to the question "Please listen to each description and tell me whether men are better than women as business executives. Use this card for your answer." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the Integrated Values Survey (IVS).

Family ties

The importance of family in life. Individuals respond to the question "How important is family in your life". The range of answers is between 1 to 4 with 1 indicating "very important" and 4 indicating "not at all important". The source of the data is the Integrated Values Survey (IVS).

Respect and love to parents. Individuals respond about love and respect to parents and if it should be taken as given. There are two answers for this question, 1 indicates that "love and respect to parents should be taken as given" and 2 indicates that "love and respect to parents should be earned". The source of the data is the Integrated Values Survey (IVS).

Responsibilities of parents to their children. Individuals respond about the responsibilities that parents have towards their children. It has also two answers, 1 indicates that "parents' duty is to do their best for their children even at the expense of their own well-being" and 2 indicates that "parents have a life of their own and should not be asked to sacrifice their own well-being for the sake of their children". Higher values indicate weaker family ties. The source of the data is the Integrated Values Survey (IVS).

P.C.A. The first principal component is computed as the component of the family ties described above.

Gender norms (European Social Survey)

Women and family. Individuals respond to the question "I am now going to read out some statements about men and women and their place in the family. Using this card, please tell me how much you agree or disagree with the following statements. A woman should be prepared to cut down on her paid work for the sake of her family." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the European Social Survey (ESS).

Men and rights to work. Individuals respond to the question "Please listen to each description and tell me whether men should have more rights to job than women when jobs are scarce. Use this card for your answer." 1 means strongly agree, and 5 means strongly disagree. The source of the data is the European Social Survey (ESS).

Women proportion at the workplace. Individuals respond to the question "What is the proportion of women at your workplace?" Use this card for your answer." 1 means none, and 7 means all. The source of the data is the European Social Survey (ESS).

COVID-19 variables

The excess mortality rate is derived from the Eurostat and is calculated as means of the period 2020 and 2021.

COVID-19 Excess Mortality Rate. Excess mortality compares the number of deaths that occurred in 2020 and 2021 with the average number of deaths that occurred in the corresponding weeks of 2015 to 2019 in Nuts 1 regions. The age structure of the population and the deaths is not taken into account. It is measured as a 3-week average percentage change compared to 2015-2019. The source of the data is the Eurostat. The variable is derived for the period 2020 and 2021 for

all Nuts 1 regions.

Control variables

GDP per capita in PPP. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources The source of the data is the Eurostat.

Life Expectancy. Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. The source of the data is the Eurostat.

Population Density. Population density is a measure of population per unit area. The source of the data is the Eurostat.

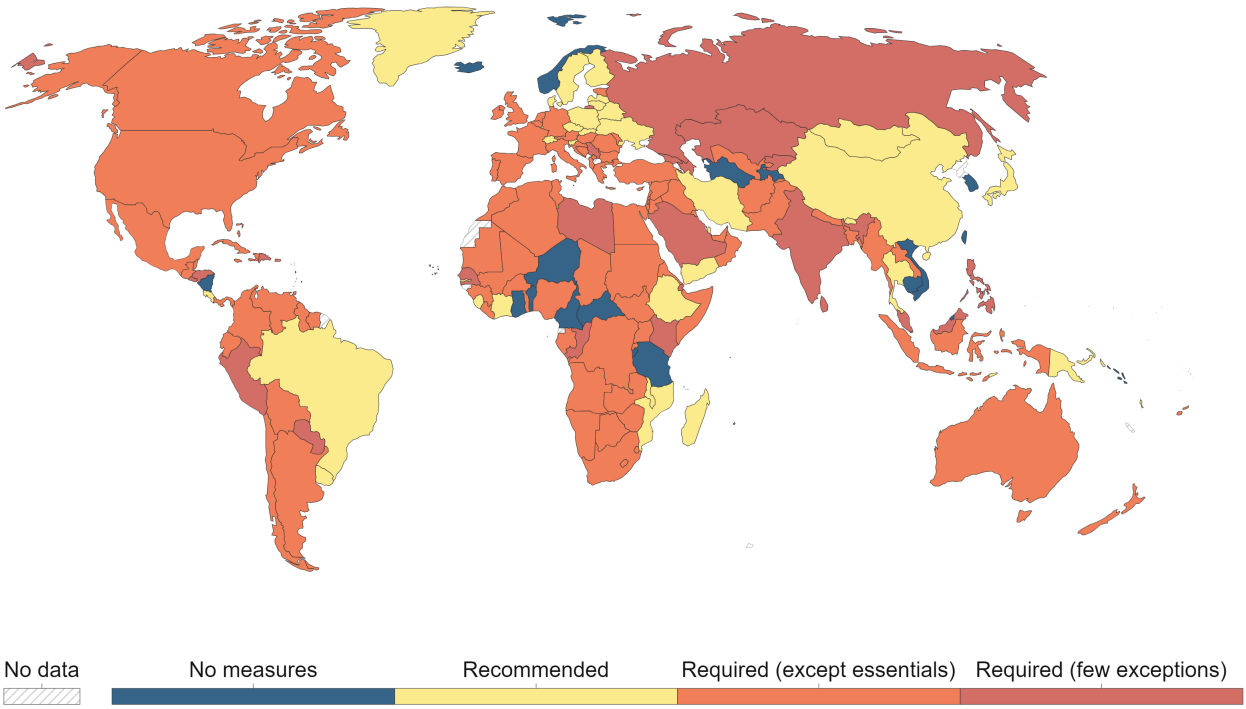
Share of Old Population. The share of old population is measured as the percentage of people over the age of 60 as a fraction of the total population. The source of the data is the Eurostat.

Hospital Beds. The number of available hospital beds measured in hundreds. The source of the data is the Eurostat.

Additional tables and figures

In this section, we provide additional tables and figures for our variables.

Figure A.1: Stay at Home Requirements During the Pandemic



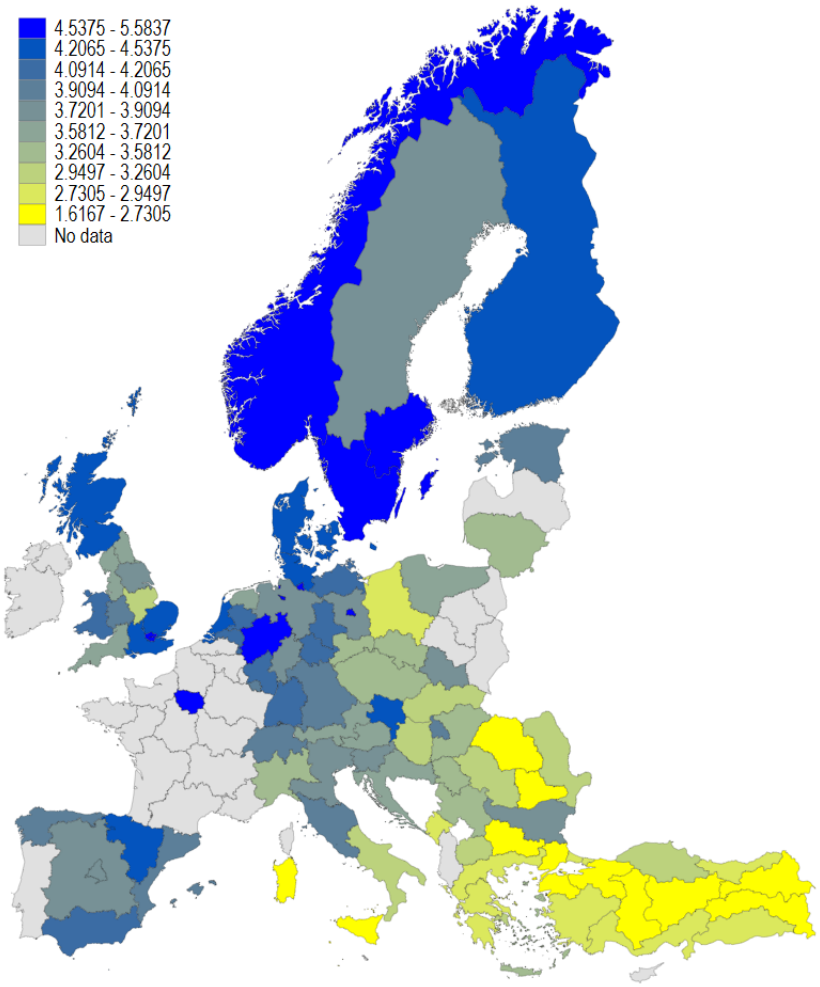
Source: Oxford COVID-19 Government Response Tracker.

Table A.1: Correlation matrix

	Men do not have more rights to jobs than women	Men do not make political leaders than women	Women do not want a home and children	Men do not make better business executives than women	Family not important	Not respect and love parents	Parents not sacrifice their well-being	P.C.A.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of Population over 60	0.2517	0.2931	0.1339	0.2346	-0.0580	0.1354	0.0679	0.0528
Population Density	0.4354	0.4530	0.4133	0.4301	0.3709	0.1724	0.1524	0.2417
(Logged) GDP per capita	0.6748	0.6518	0.6081	0.6113	0.2604	0.4645	0.2797	0.3536
Life Expectancy	0.5365	0.6121	0.4690	0.5759	0.1015	0.2837	0.1175	0.1772
(Logged) Hospital Beds	0.3508	0.3573	0.2585	0.3041	0.1278	0.3207	0.3828	0.2949

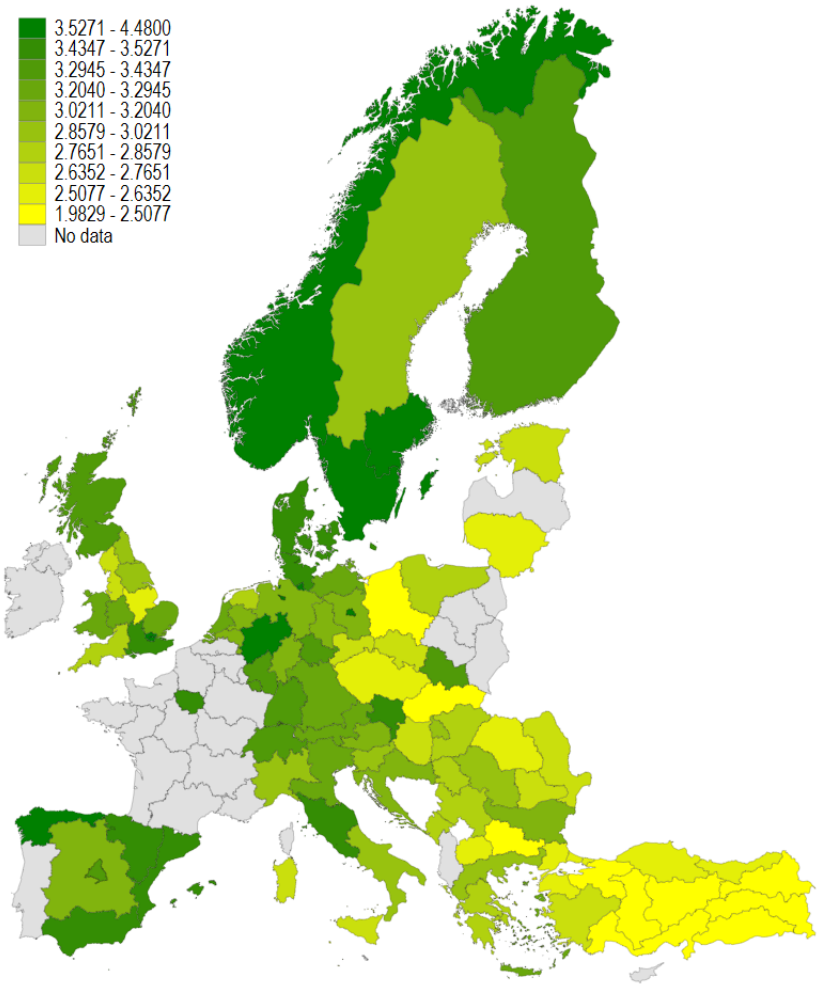
Notes: This table establishes the correlation between gender and family norms variables, GDP per capita, population density, the share of the population over 60 years, life expectancy, and the available hospital beds.

Figure A.2: Men do not have more rights to jobs than women



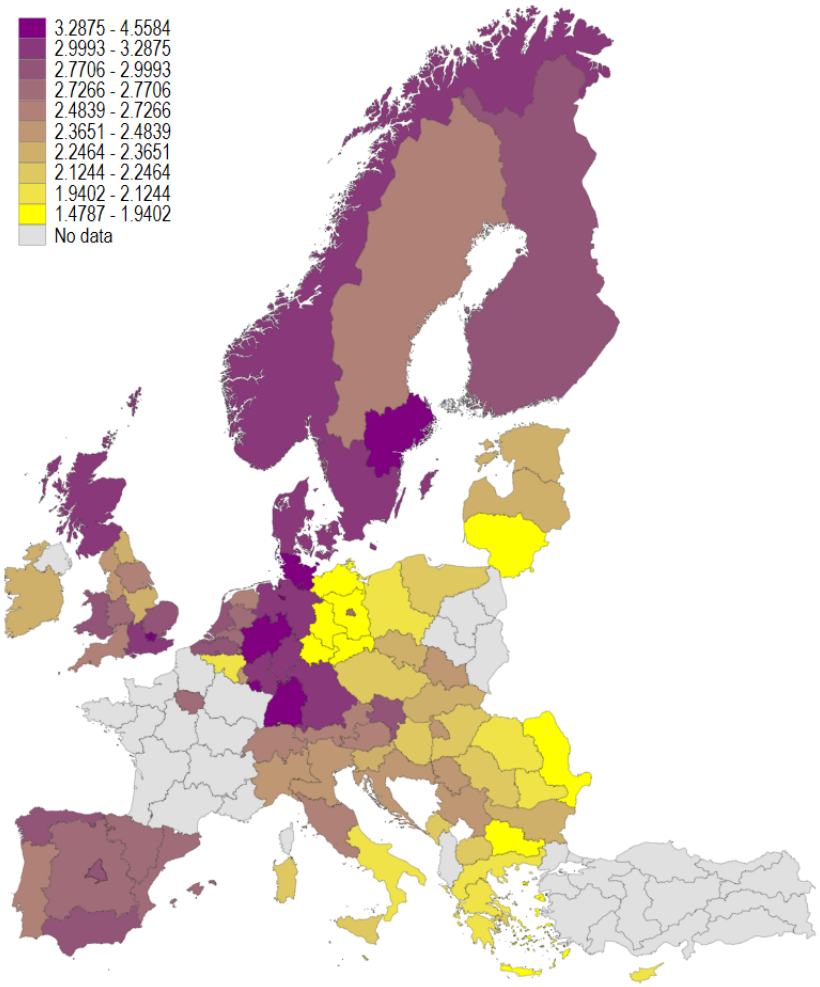
Notes: This map presents the mean level of gender norms indicating that men do not have more rights to jobs than women in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.3: Men do not make political leaders than women



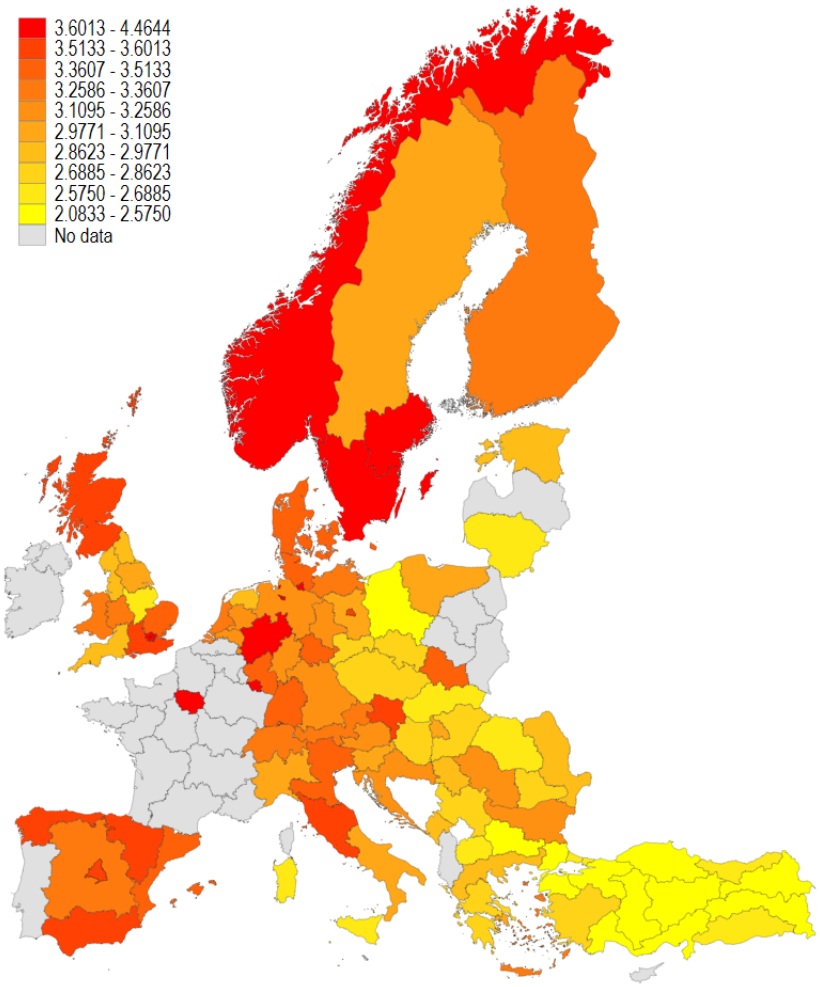
Notes: This map presents the mean level of gender norms indicating that men do not make political leaders than women in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.4: Women do not want a home and children



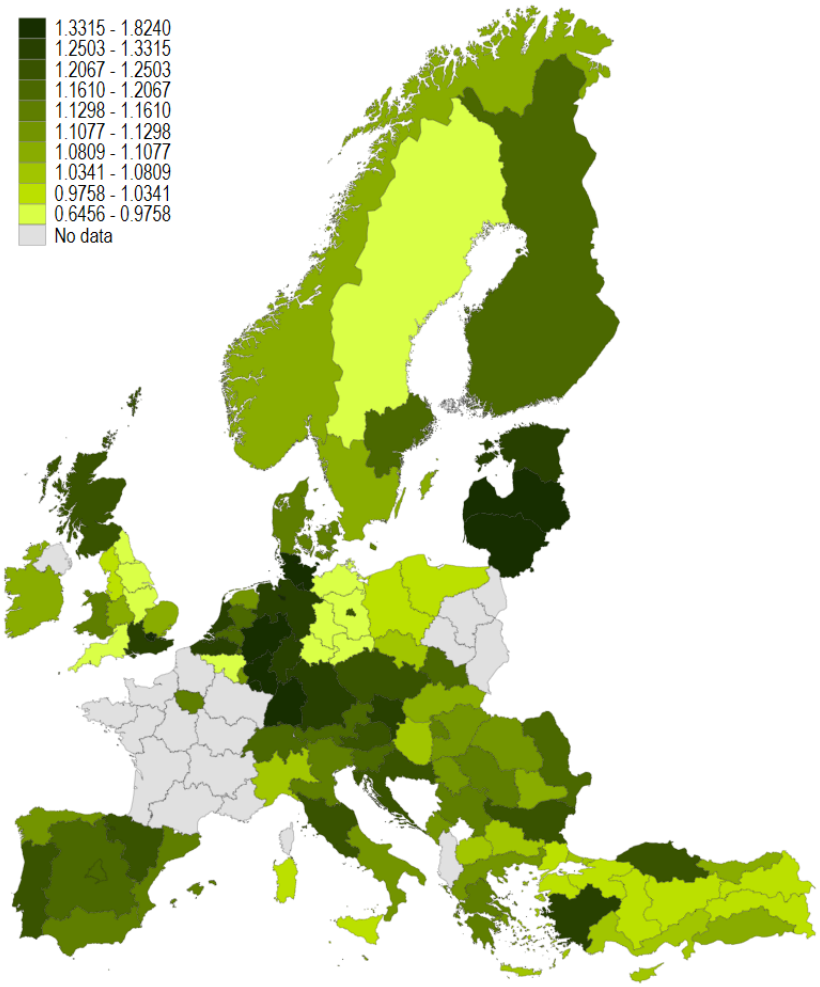
Notes: This map presents the mean level of gender norms indicating that women do not want a home and children in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.5: Men do not make better business executives than women



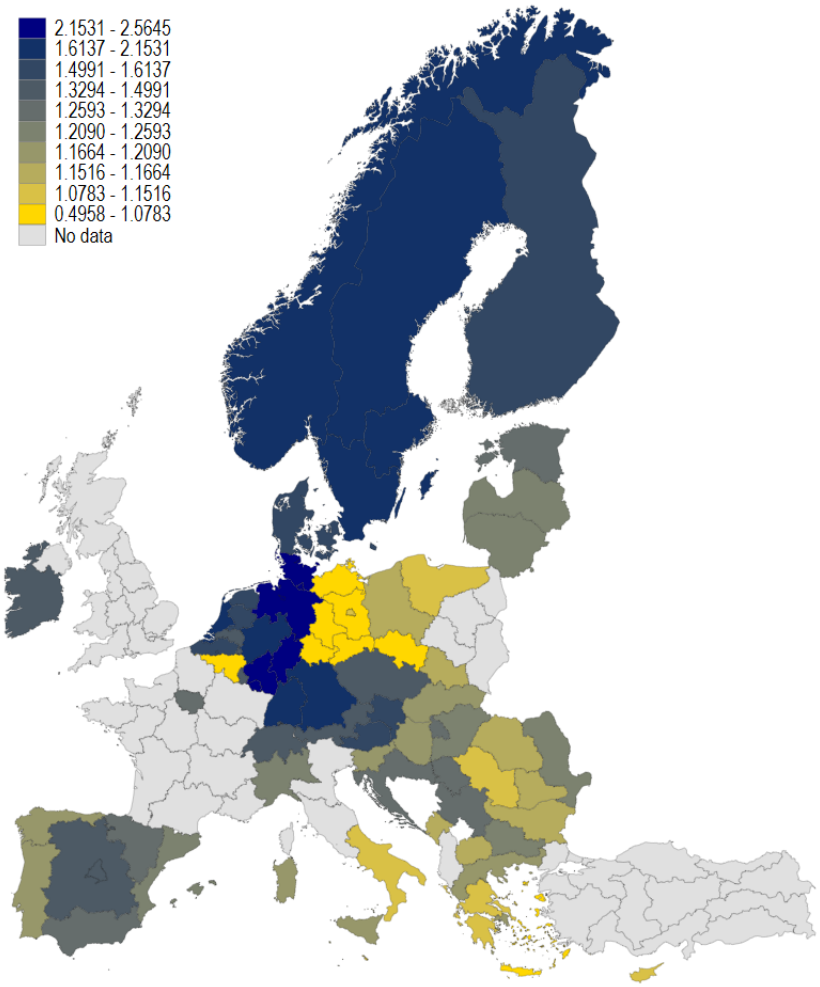
Notes: This map presents the mean level of gender norms indicating that men do not make better business executives than women in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.6: Family not important



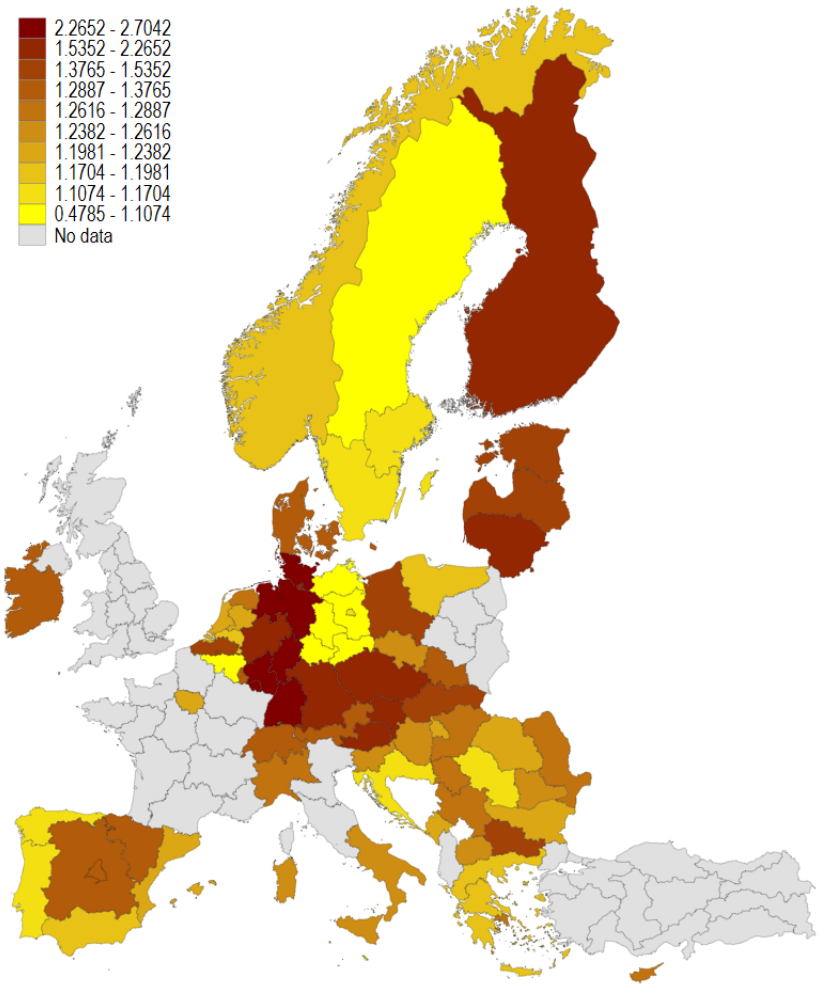
Notes: This map presents the mean level of family ties indicating that family is not important in Nuts 1 regions from 2008 to 2019.
Source: Integrated Values Survey (IVS).

Figure A.7: Not respect and love parents



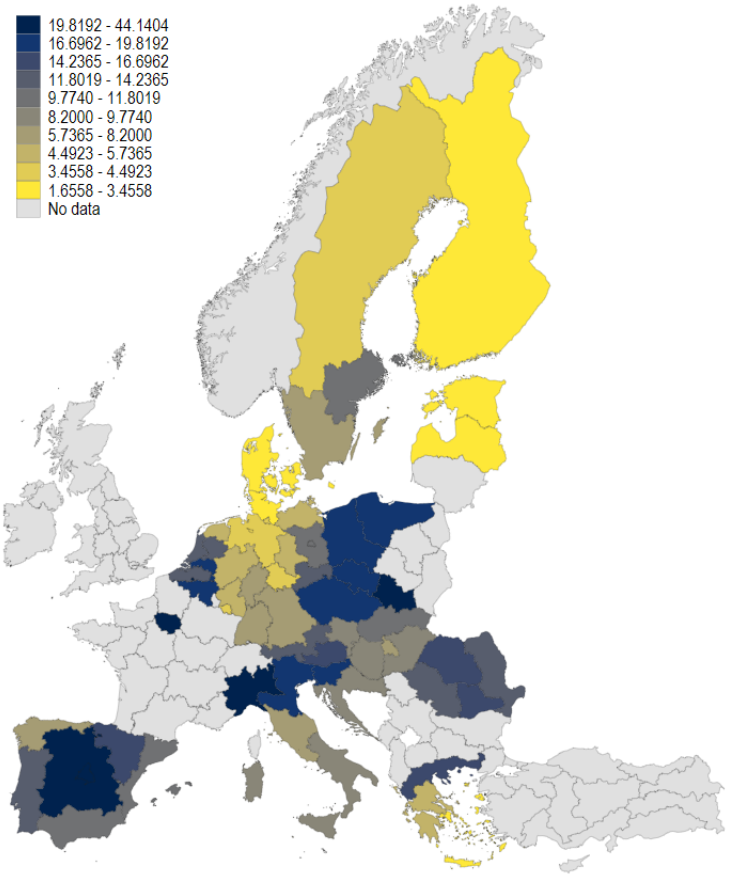
Notes: This map presents the mean level of family ties indicating that children do not respect and love parents in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.8: Parents not sacrifice their well-being



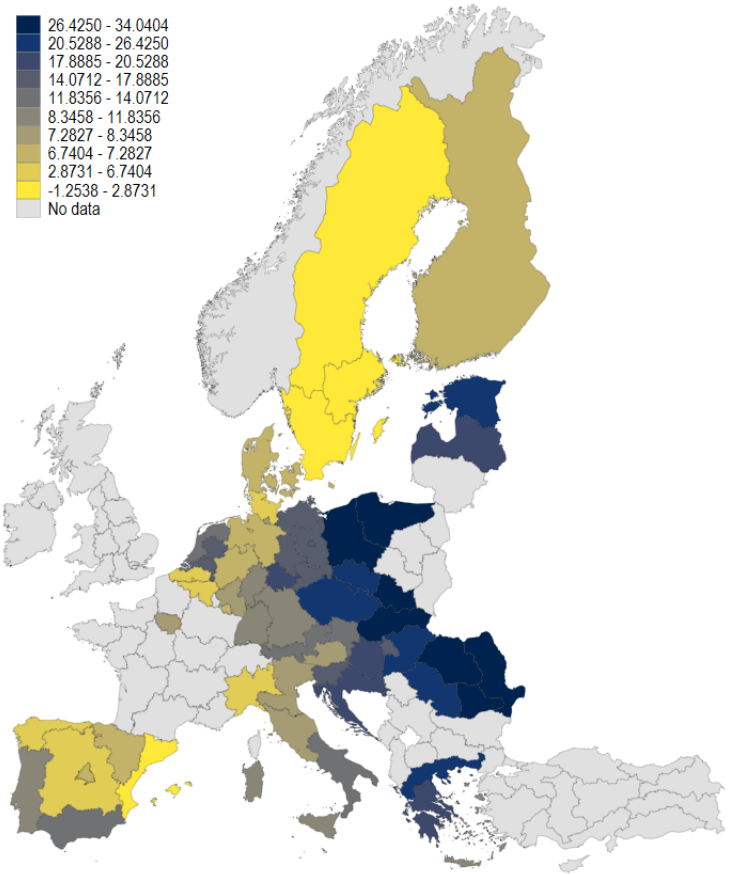
Notes: This map presents the mean level of family ties indicating that parents do not sacrifice their well-being in Nuts 1 regions from 2008 to 2019. *Source: Integrated Values Survey (IVS).*

Figure A.9: Excess mortality in 2020



Notes: This map presents the mean level of COVID-19 spread measured by the excess mortality rate in Nuts 1 regions for the first year of the pandemic, in 2020. *Source: Eurostat.*

Figure A.10: Excess mortality in 2021



Notes: This map presents the mean level of COVID-19 spread measured by the excess mortality rate in Nuts 1 regions for the first year of the pandemic, in 2020. *Source: Eurostat.*