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"Social Capital and Resilience to the Covid-19 crisis. Evidence for senior Europeans"

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APPENDICE
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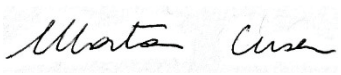
Firma (signature) 

ABSTRACT

Has social capital positively contributed to human resilience during the Covid-19 crisis?
The pandemic provoked by this virus has hugely impacted on people's mental health, increasing depression and sadness. The aim of this thesis is to study whether social capital, measured with trust in others, has buffered these negative effects, decreasing the probability of worsening the own psychological condition.
Focusing on European seniors and relying on the SHARE dataset, I find a positive and significant relation between trust in others and individual resilience. These results are valid both with the individual level measure of social capital and with the aggregate level one, computed by NUTS 1. Furthermore, considering the second indicator, the relation is proved also with IV methodology, taking into account this way endogeneity and strengthening the claim for causal effects. Therefore, my thesis provides empirical evidence for European seniors of a causal effect of social capital on human resilience to the Covid-19 crisis.

CONTENTS

INTRODUCTION

Covid-19 has been a dramatic and unexpected shock for the whole world. In 2020, it has caused the death to around 1.88 million people. The bill becomes three times more, with an excess mortality[1] estimated at around 5.64 million, when deaths caused by a health system under strong pressure are additionally considered.[2] The impact for the economy has been without precedent since the second world war. Global GDP has decreased by -3.4%, almost tripling the reduction occurred for the financial crisis in 2009 (-1.3%).[3]

However, the negative impacts of the pandemic have not been limited to deaths and economic hardships. Indeed, the shock has hugely affected also mental health. Of course, the attention has been firstly focused on the physical health consequences determined by this new virus and, secondly, on the economic downturn induced by lockdowns and restrictions aimed at its containment. Nevertheless, with the progressive reduction in health system pressure and with the economic recovery, more concerns and consequent attention have been devoted to the psychological worsening of the population. In fact, the virus has impacted on people's mental health in many different ways. First of all, there have been the direct effects of the pandemic itself, from the fear for this unknown virus, to the pain for loved ones lost and the general uncertainty of the period. Secondly, there have been the consequences of the restrictions imposed, which have determined social isolation, possible new difficulties in family relationships, challenges in managing the novel smart working or the children home education. According to the OECD/European Union report on health of 2020[4], after the Corona outbreak, European states have experienced a widespread increase in anxiety levels. Looking at country level surveys conducted in Belgium, Czech Republic, Denmark, France and UK in the period of March-April 2020, all these nations report increases in this psychological disease. For Belgium, Czech Republic and France the post-outbreak percentages almost double the pre-outbreak ones. They were respectively 11%, 7% and 14% and they became 20%, 14% and 27%. For UK and Demark, the increase has been more

[1] "Excess mortality" consists in the additional deaths with respect to the expected ones under normal conditions. In the context of the Covid-19 pandemic, it includes therefore both Covid deaths and all the ones determined by a health system under strong pressure

[2] Data available at: COVID-19 Data Explorer - Our World in Data.

[3] Data available at: GDP per capita growth (annual %) | Data (worldbank.org)

[4] OECD/European Union (2020), Health at a Glance: Europe 2020: State of Health in the EU Cycle, OECD Publishing, Paris, https://doi.org/10.1787/82129230-en, pag.65-66

moderate, but they had initial higher levels. The change has been from 27% to 33% for UK, and from 23% to 25% for Denmark. Although these surveys differ across countries and therefore the comparability is limited, a clear increasing trend within their borders emerges for all. Studies conducted in UK and Belgium show that young people have been the most vulnerable age category (see respectively Banks and Xu (2020) e Sciensano (2020) in OECD/European Union (2020)).

Furthermore, some experts warn that these damages are likely to be long term (see Iqbal et al. (2020)[5]), exacerbating the overall consequences of the pandemic on mental health.

Thus, this third impact of the pandemic on mental health is crucial too.

In my thesis I focus on this third impact. In particular, I want to explore the human capacity of reacting at the shock of Covid-19, not being psychologically damaged by it. This capacity is called in general human resilience and I further detail it in Paragraph 1.1.1.

Human resilience is of great interest for the economists for the costs that allows to save. It avoids in fact increases in the number of affected people and in the intensity of their illness, which are responsible for direct and indirect costs. According to the estimates computed before the pandemic in Europe (OECD/EU (2018)[6]), the direct costs of treatments expenditure are calculated at around 1.3% of GDP. In addition, further 1.2% GDP is devoted to social security benefits. On the other hand, the indirect costs regard the negative impacts on the labour market. The main damage is imputed to the lower unemployment rates of people with depression and it is estimated to determine a loss of around 1.2% GDP. Additional losses are related to lower productivity levels and to mortality and suicide of these mentally ill people. Thus, human resilience permits to limit further worsening in this already expensive bill of mental health problems.

Furthermore, the study of human resilience is crucial nowadays for the always more frequent shocks, like the Covid-19 one, which make even more useful knowledge on this human protective capacity. In fact, climate change in particular is and is going to be responsible for other present and future massive shocks. Scientists of the Intergovernmental Panel on Climate Change (IPCC), which is the most authoritative source of scientific research on the topic, in their last report of 2021[7] warn exactly against the impact of climate change on extreme

[5] Iqbal, S. Z., Li, B., Onigu-Otito, E., Naqvi, M. F., & Shah, A. A. (2020). The long-term mental health effects of COVID-19. *Psychiatric Annals*, *50*(12), 522-525.

[6] OECD/EU (2018), Health at a Glance: Europe 2018: State of Health in the EU Cycle, OECD Publishing, Paris. https://doi.org/10.1787/health_glance_eur-2018-en.

[7] IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E.

events. They argue that "human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, (…), has strengthened since AR5". Specifically, they stress that "it is virtually certain [8] that hot extremes (including heatwaves) have become more frequent and more intense across most land regions since 1950s". These changes in extreme events and, in particular, their worsening clearly represent huge shocks for human health and activities. The consequences are already visible. Zhao et al. (2021)[9], in their article published in the Lancet, quantify with around 5 million deaths per year the effect of temperature alteration imputed to climate change. Thus, the study on human resilience is essential to better deal with these current and upcoming shocks.

Among the many potential drivers of human resilience, I have decided to focus on social capital. Social capital refers to whatever can increase bonds within a society, intensifying the social net, from social relationships to interpersonal trust. I explain in detail what social capital is in Paragraph 1.1.2. I have decided to explore the effect of this form of capital because, although the attention is given mainly to two other forms of capital (the financial and physical one), there is growing evidence of the role played by social capital too in building resilience. In fact, at the occurrence of a crisis and in its prevention, the emphasis is put mainly on the financial capital, with credit needs, and on the physical one, with new or renewed infrastructures. However, as I detail in the literature review of Chapter 1, there are papers emphasizing also the relevance of social capital and I want to contribute with my work to this field of research.

Thus, my thesis aims at assessing if, considering the specific shock of the Covid crisis, social capital has played a role in the resilience of people. Specifically, I attempt to disclose causal effects and not just correlations. I focus on the European context, on its population aged 50+ and on interpersonal trust, as a measure of social capital.

Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.
For a briefer discussion: IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [MassonDelmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

[8] "virtually certain" in the IPCC "Likelihood Scale" corresponds to 99-100% probability

[9] Zhao, Q., Guo, Y., Ye, T., Gasparrini, A., Tong, S., Overcenco, A., ... & Li, S. (2021). Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study. *The Lancet Planetary Health*, *5*(7), e415-e425.

The thesis is organized as follows: Chapter 1 provides the literature review, Chapter 2 explains the empirical strategy, Chapter 3 describes the data employed, Chapter 4 presents the results of the estimations and Chapter 5, 6 and 7 discuss respectively the robustness tests, the potential channels of transmission and finally the heterogeneous effects among different subgroups of the sample.

1. LITERATURE REVIEW

This work is related to three subfields in the literature on social capital.

The first one regards the relationship between social capital and outcomes related to Covid-19. The second one concerns its association with resilience. Finally, the third and last one focuses on social capital and health.

Before presenting the main findings in these three strands of the literature I define and describe resilience and social capital, the two core concepts of my thesis.

1.1 PRELIMINARY DEFINITIONS

1.1.1 Resilience

According to Masten and Obradovic (2008), resilience regards the "processes of, capacity for, or patterns of positive adaptation during or following exposure to adverse experiences that have the potential to disrupt or destroy the successful functioning or development of the person".

Following their explanation, resilience can be experienced under three different situations: "(1) achieving better than expected outcomes in high-risk groups of people (…); (2) sustaining competence or maintaining effective functioning under highly adverse conditions (…); and (3) regaining or attaining effective or normal functioning following a period of exposure to traumatic experiences or conditions of overwhelming adversity (…)." In my thesis, the third case is the one under consideration. In fact, the authors themselves clarify that it "includes recovery after a crisis or catastrophe", as the Covid pandemic is.

In addition, they present three ways the individuals can manifest resilience: "resistance", "normal recovery" and "positive transformation". "Resistance" applies when the individual is not affected by the shock at all, "normal recovery" when, after an initial decline in functioning, there is a recovery with the end of the crisis, and finally "positive transformation" when the shock induces an improvement in the person.

The study on human resilience emerged during the 70s. Looking at the evolution in time of the recurrence of the word "resilience" with Google Books Ngram Viewer[10] gives an idea of the growing importance attributed to the concept. Recently, the growth has been exponential, showing its crucial role nowadays.

1.1.2 Social Capital

There is not a shared definition of social capital. It is a huge concept and therefore, depending on the authors, the focus is on different aspects. This is true from the initial contributions of Loury and Bourdieu to the developments of Coleman, Putnam and Portes. Also the numerous works dealing with social capital more recently, which looking at Google Ngram Viewer[11] have seen an exponential growth since the 90s, rely on one or the other characteristic. Islam et al. (2006) summarize the elements which constitute social capital with: "social trust/reciprocity, collective efficacy, participation in voluntary organizations and social integration for mutual benefit". Thus, social capital is a form of capital which comprehends elements related to social action, individual networks, and personal attitudes with respect to others.

Exposing its different classifications is useful in order to understand the wideness and complexity of the concept.

First of all, the literature distinguishes between two different *dimensions*: the cognitive and the structural one. Quoting again Islam et al. (2006), the cognitive dimension includes the more immaterial aspects, comprising "norms, values, attitudes and beliefs". The structural one, instead, is made up of the "externally observable aspects of social organization", like social networks and participation in voluntary associations and political parties.

A second distinction regards the *type of relation with other people involved* (ibidem). It can be horizontal, in the so-called bonding and bridging social capital, and vertical, in the linking social capital. The former type concerns "ties among individuals or groups of equals or near-equals". Specifically, bonding social capital involves strong bonds with close and similar people, like family members and close friends, while bridging social capital regards relations with people from different socio-economic backgrounds, like for example the ones in associations. The latter type regards "hierarchical or unequal relations due to differences in power or resources bases and status". Linking social capital is the type which characterizes for example the relation between citizens and their political representatives.

[10] Available at: Google Ngram Viewer
[11] Available at: Google Ngram Viewer

The third and last classification is based on the *level* at which social capital is assessed. It can be at the individual or at the collective one. Assessing social capital at the individual level means that it is considered as an individual asset. This approach follows the Bourdieu's one and it is also named "social network approach" for the consequent focus on the social networks of the individual. On the other hand, considering social capital at the collective level, implies that it is evaluated as a collective attribute, specific of a certain region. Putnam is the main exponent of this different approach, also called "social cohesion approach" for the consequent focus on the local social cohesion.

1.2 SOCIAL CAPITAL AND COVID-19 RELATED OUTCOMES

There is a growing literature investigating the impact of social capital on many different outcomes connected to Covid-19.

Outcomes investigated and findings on social distancing

Wu (2021) summarizes the numerous contributions in his literature review. The variables that have been investigated so far regard: the number of Covid-19 cases and its growth rate, testing rates, mobility, and social distancing. According to this review and to my knowledge, resilience has not been tackled yet. The results converge to the conclusion that regions with high levels of social capital, in general, handled the pandemic better. For example, Borgonovi and Andrieu (2020) document, for US counties, a causal effect of social capital on mobility, that was reduced more quickly. In addition, they show that the effect on the reduction in mobility of shelter-in-place[12] orders and number of Covid cases is higher in areas well-endowed with social capital. By so doing, they shed light also on these indirect channels that amplify the direct positive contribution of social capital on the limitation of movements. As they evocatively argue, recalling Putnam, "Communities that 'bowl together' in normal times, are able to 'bowl alone' to a greater degree than other". The overall consequent effect of this influence is clearly visible in their map of vulnerability, where it emerges that low levels of social capital at the community level, combined with large share of the population with pre-existing medical conditions, are associated with more severe health outcomes, proving this way the link between social capital, which determines lower mobility, and severe health outcomes.

[12] "Shelter-in-place" means "to remain in the building that you are in during an emergency such as an extreme weather event or a shooting" (SHELTER | meaning in the Cambridge English Dictionary)

Analogous findings are shared in two similar investigations related to civic capital, which is close and in part overlapping with the notion of social capital. It consists in fact in the elements that "help a group overcome the free-rider problem in the pursuit of socially valuable activities" (see Guiso et al. (2011)[13]). Barrios et al. (2021) analyse the same relation for the US and Europe, while Durante et al. (2021), not quoted in Wu (2021), focus on Italy and prove the validity of the results also for Germany. Using voter participation for the US and generalized trust for Europe, Barrios et al. (2021) report a reduction of mobility in areas more endowed with civic capital. They deepen the results to the individuals of these areas, where they assess larger effects for individuals with higher sense of civic duty. In addition, in the American context, they extend these findings to the period of re-opening, when high civic capital counties have kept better levels of social distancing, proving the long-lasting nature of the relation. Finally, they confirm the same protective influence also looking at usage of face masks. Durante et al. (2021), who in their measure of civic capital include also trust, verify the same persistence of the positive impact of civic capital, confirming it both before and after the national lockdown. Furthermore, using a SIR (Susceptible-Infected-Recovered) model[14], they quantify the beneficial effect of civic capital through higher social distancing. According to their estimates, we would have observed a 60% reduction of Covid-related deaths had all provinces shared the same civic capital as the top quartile ones.

The importance of taking into account the complex nature of social capital

Another relevant consideration that contributes to the development of this line of research emerges from the work of Wu (2021). He warns about the importance of being aware of the multidimensional and multilevel nature of social capital, as presented in Paragraph 1.1.2. In fact, as he shows referring to China, social capital has many different effects on Covid-19 spread and these effects depend on the specific facet under consideration. Specifically, he finds that the cognitive dimension, made up of norms and trust, has had a greater role in explaining the impact on infection diffusion compared to the structural dimension, made up of social networks. In addition, he contributes to further widening the perspective on the issue, stressing the role played by the context in the estimation of the impact. In China, for example, political trust has been more relevant than social trust, differently from democratic countries, where also social trust has mattered (see Wu et al. (2020) in Wu (2021). Indeed, diverse

[13] Guiso, L., Sapienza, P., & Zingales, L. (2011). Civic capital as the missing link. *Handbook of social economics*, *1*, 417-480.

[14] SIR models belong to the category of Compartmental models, where "the population is assigned to compartments with labels", "people may progress between compartments" and "the order of the labels usually shows the flow patterns between compartments". (available at: Compartmental models in epidemiology - Wikipedia)

environments can favour the activation of diverse dimensions of social capital which, in turn, may operate through diverse channels, finally leading to possible diverse outcomes.

Elgar et al. (2020), in a cross-country setting show that "social capital, in all its forms, is generally agnostic about whether it has a positive or negative influence on health". However, disentangling it in its component, different and opposite significant results appear. The dimensions of civic engagement and confidence in state institutions are proved to significantly reduce Covid mortality. On the other hand, group affiliation and trust turn out to increase it, differently from what Wu et al. (2020) find. Similar results, pointing to a negative impact of the same dimensions of social capital, are presented in Arachchi and Managi (2021), also in this case in a cross-country setting. Additionally, they enlarge to family bonds and security the dimensions contributing positively to the reduction of Covid-19 deaths.

One of the dimensions of social capital - social contacts - and human resilience
Two studies investigate the impact of social contacts, part of the structural dimension of social capital, on outcomes linked to human resilience. Koroleva et al. (2021), using SHARE data and narrowing to Latvia only, point out to a statistically significant relation between isolation and psychoemotional problems. The analysis is based on an isolation index, constructed including both direct personal contacts and indirect ones with phones and computers. The empirical analysis is grounded on multinomial logistic regressions. Atzendorf and Gruber (2021), relaying on SHARE too, but not narrowing to just one country but considering only individuals with more than 60 years, recognize a similar result. However, in their study the finding stays in place only for personal contacts; the electronic ones seem not to be relevant. Coherently, they also find that living alone has increased the risk of worsen mental health. The authors warn about the lack of causality of the relation estimated and interpret it as a simple correlation.

1.3 SOCIAL CAPITAL AND HUMAN RESILIENCE

The relation between social capital and human resilience has not been widely tackled in the literature. This is true for the shock provoked by Covid-19 (with the few exceptions, but only related to social contacts), but is also valid when we consider other shocks that had occurred in the past.

Findings from psychology
A remarkable contribution coming from psychology is Masten and Obradovic (2008), who summarise the different factors that have been found by scholars to impact on human

resilience. What interestingly emerges is the role played by social capital in fostering the human adaptive systems. In particular, attachment, self-efficacy beliefs, intelligence and the regulatory system for actions and emotions, which are the main elements of the human adaptive systems, are influenced by microsystems and community-level systems, which are related to different forms of social capital. Specifically, microsystems refer to family, peers, classmates, and work colleagues, and can thus be associated with the notion of bonding social capital presented previously. Instead, community-level systems refer to larger groups, like neighbourhoods or even wider aggregates and can be associated with the notion of bridging social capital. Social capital can thus be determinant in enhancing human psychological resources in case of shocks. In addition, Masten and Obradovic also propose a resilience framework for disaster planning, showing how these notions, including the ones related to the beneficial role of social capital, can be usefully put into practice.

Findings from political science on disasters

Other important insights come from political science, in particular from disasters research, which deals for example with natural extreme events, like hurricanes and earthquake, but also with human determined shocks, like wars. It consists mainly of case studies, with rare cases of empirical strategies dealing with endogeneity. Aldrich and Meyer (2015) summarise the many different contributions both by the authors themselves and by numerous other colleagues who investigate the relation between social capital and resilience in facing disasters. What emerges from the works presented is the crucial role that social capital has played. According to the many scholars quoted, it deserves at least as much attention as the one devoted to physical capital. This beneficial role is in place both for its different levels and for its different dimensions. Regarding the levels, they show it positively helps during shocks both at the individual level and at the community one. At the individual level, it enters mainly through social networks, providing financial, but also non-financial support, with for instance emotional closeness, but also search and rescue, childcare aid and information. At the community level, it operates primarily through trust and collective action. Concerning the dimensions, they show both bonding and bridging ones to be determinant. The authors explain that bonding social capital represents the first and most common form of social network available during crisis. Among the many cases illustrated, for example, it was determinant to face the recovery after hurricane Katrina (see Chamlee-Wright and Storr (2009) in Aldrich and Meyer (2015)). On the other hand, bridging social capital, thanks to the higher degree of diversity among its constituents, provides opportunities and information which allow to access novel resources helpful in long term recovery. In addition, ties to social organizations can help directly through institutional channels, for example with the money

collected through their activities, and with friendships with its members, likely to be with people from different socioeconomic background. The beneficial contribution of bridging social capital clearly appears, for example, in the context of reconstruction after World War II in Japan, where pre-war ties, through associations and non-profit organizations, are proved to have contributed to make the recovery more efficiently (see Kage (2011) in ibidem), or after Tokyo earthquake in 1923, where voter turnout and number of political gatherings at the community level are shown to have been better predictors of population growth than economic, population or damage indicators (see Aldrich (2012) in ibidem). Consequently, both the dimensions of social capital, besides both the levels, are decisive. Furthermore, other studies have stressed the importance of having in place both the dimensions of social capital at the same time. For instance, in a case study in New Orleans, bonding social capital alone is claimed to have been insufficient to face the recovery after Hurricane Katrina, since the lack of connectedness with people outside the affected area and with the richer ones inside have determined less support received (see Elliott et al. (2010) in ibidem).

Since the relevance discussed of social capital on resilience, considering the effects of disasters on the change in the stock of social capital is crucial, as Aldrich and Meyer emphasise. Literature shows that depending on the disaster the effects have been different. For example, after Exxon Valdez oil spill in Alaska the consequence was a deterioration (see Ritchie (2012) in ibidem), however it increased for instance after the earthquake in Japan, but only for whom damaged less (see Takeda et al. (2003) in ibidem).

In addition, the authors warn about the possible "dark side" that social capital can have, besides the presented positive ones. People excluded from it, in fact, can suffer more, as it happened after 2004 Indian Ocean tsunami, for Muslims and widows who were not considered by the caste councils responsible for aid distribution (see Aldrich (2011) in ibidem).

Finally, Aldrich and Meyer provide concrete policy recommendations, grounded on real positive experiences, in order to enhance social capital, keeping at the same time in mind the possible drawbacks. They prove this way that social capital is not a fixed and unchanged asset and that it can be modified not only by the external events, as discussed previously, but also intentionally through well planned projects.

Findings from psychology and economics on the financial crisis

Finally, other relevant works dealing with the relation of social capital and resilience come from both economics and psychology and refer to the shock provoked by the financial crisis of 2007-2008. Among these, notable is the contribution of Helliwell et al. (2014). They study,

in three different analyses, the relation between social fabric at the community level and the capacity to maintain and improve wellbeing.

First, focusing on the US, they find through a two-level regression that social capital had a direct effect in improving wellbeing. This is true both considering their broad measure, which includes mainly elements of social capital at the community level, like voting rates and share of the population volunteering, and for their close measure, which contains principally aspects at the individual level, related in general to social networks. In addition, they uncover an indirect effect too. Social capital, in particular its broad measure, turns out to have smoothed the negative impact of increased unemployment rates at the local level, as the interaction term between unemployment and social capital shows. This means that the deteriorating influence of regional unemployment has been weaker where social capital was higher. However, this is not true for the own unemployment status: higher levels of local social capital have not alleviated worsening in wellbeing provoked by the lack of job.

Second, they analyse the evolution of the national average happiness among OECD countries and, looking at South Korea, they hypothesise that social capital has played a role in explaining its trend. In fact, they classify the OECD countries in three groups according to the different evolution of social trust during the financial crisis and compare the South Korean trend to the ones of these three groups. They argue that its huge increase in wellbeing can be only partially attributed to the positive economic effects of the policies implemented. They suggest that these policies have hugely impacted also on social capital, and it is indeed through this channel that wellbeing has hugely improved.

Third, they offer an empirical test, in the European context, of the hypothesis that social capital has played a role in protecting during the financial crisis. In particular, with panel data and applying fixed effects at the country level, they find that social trust has impacted positively on the change in wellbeing determined by the crisis, while changes in GDP per capita has had only weak effects. Interestingly, they show that this result has to be imputed entirely to the transition countries, like Bulgaria, Croatia and Poland. Restricting the analysis to these states, social trust and not GDP per capita has exerted a positive influence on wellbeing. The opposite outcome is in place for the non-transition countries, where the economic variable is the one significant in the explanation of the evolution of wellbeing.

Other findings on the protective role of social capital facing the effects of the financial crisis are discussed in Frank et al. (2014), focusing on adults of two communities in rural Ontario which have experienced numerous job losses. The authors estimate a significant effect of social capital, both direct and indirect, on wellbeing. In this case, the indirect effect occurs

through the alleviation of the impact of personal financial strain and not of increased local unemployment rates, as before. The buffering effect of social capital was larger for people with worse economic suffering. Besides the different interaction factor, the authors, consider the impact also on physical health, extending to this outcome the results found for mental health, but only for the direct effect. In addition, the slightly different estimations obtained using different measures of psychological wellbeing, in particular the lack of significance got employing anxiety as the output variable assessing the indirect effect, underlines once again the importance of multiple measures of the variables of interest in order to capture different facets of a phenomenon. Specifically, in this case the authors suggest that social capital has had a buffering effect of financial strain only in the cognitive dimensions of wellbeing (the variable of anxiety is in fact more linked to somatic manifestations). Finally, they run the investigation also at the level of families, pointing out the importance of this level of analysis in the study of resilience. However, they warn about the possible bias of their results obtained. Despite, the possible weakness of these last estimates, the focus on family emerges to be crucial in further developments on the issue.

A similar research question is the one dealt by Economou et al. (2014). They refer to Greece and narrow the impacts to just the mental ones, depression and anxiety, and the dimensions of social capital to the cognitive one, considering interpersonal and institutional trust. They differentiate the results according to the degree of financial strain suffered by the individual. For people who have experienced low financial distress, trust has been a protective factor for depression, but not for anxiety, which also in this case results not to be influenced by social capital. For people with high financial distress, on the other hand, no association has been found between the measures of social capital and mental illnesses, a new result with respect of the previous analyses and that probably can be seen more in line with the insignificant effect on own unemployment status found by Helliwell et al. (2014). Consequently, the authors confirm the nonuniform effects on different mental problems and widen the perspective on results, stressing the relevance of taking into account the heterogeneity of individuals with respect to their financial strain.

Lindström and Giordano (2016), grounded on a panel dataset, carry out the analysis for the UK, considering social capital at the individual level, with generalised trust and social participation. Their empirical strategy allows them to study the effects of social capital on psychological wellbeing, but also the evolution over time of the stock of social capital itself. Specifically, they find that the cognitive dimension has depleted during the crisis and has impacted positively on wellbeing, buffering against worse psychological condition. On the

other hand, the structural dimension of social capital has increased in the same period and is found not significantly associated with mental health. However, the authors warn about drawing inferences from this last estimation because the measure of social participation has changed over time. Interestingly, in contrast with Economou et al. (2014), the significance of the effect of social capital is not influenced by individual perception of financial strain: controlling for it, the results remain in place. As the authors explain though, the different outcome may be due to the specific context of Greece, the one of the previous paper, and the fact that the analysis refers to 2011, after several years of harsh government austerity. In this environment, where the economic distress is likely to have been more chronical, social capital is reasonable to have not been able to exert a sufficiently strong influence capable of alleviating the suffering.

1.4 SOCIAL CAPITAL AND HEALTH

The last subfield of the literature on social capital that I am going to briefly illustrate deals with health. With respect to resilience, this issue has been more widely tackled by scholars. In addition, from my reading, there have been more attempts to manage the endogeneity issues, aiming at disclosing causal relations and not just simple correlations.

Early findings

The milestone in the issue is the book of Kawachi et al. (2008), which now is quite dated, but presents the main initial evidence. First of all, empirical works have dealt more with the impact of social capital on physical health with respect to mental one, as presented by Kim et al. in the eighth chapter. The findings overall converge to a proof of the relevance of social capital in this dimension of health. In addition, considering trust, the association is found stronger for self-reported health with respect to more objective indicators, like incidence of cardiovascular disease and for individual-level measures compared to area-level ones. Similar considerations on the different impacts at the two levels are valid for the structural dimension of associational membership: the regional one is weak. Furthermore, the positive relation between social capital and health appears to matter more in societies with higher economic inequalities. The authors of this finding, Islam et al. (2006), explain that a possible reason is that in egalitarian societies, with high spending on public goods and more solid safety nets, social capital becomes less salient.

Secondly, focusing on the sparse works on mental health, discussed in the ninth chapter by Almedon and Glandon, no strong empirical evidence is widespread in the results. Referring to adults, the main findings relate to the worse psychological condition of women versus men,

argued to be influenced by less social support received by this category. Concerning seniors, it is argued that both bonding and bridging social capital can usefully contribute to the interiorization of information diffused by health professionals, which in turn can be a transmission channel in the relation with wellbeing.

Thirdly, in the tenth chapter written by Lindström, he analyses the relation of social capital and health behaviours, considered as one of the channels that explain the positive impact of social capital on health. Specifically, he reports evidence on the beneficial influence on alcohol and drug use, smoking, physical activity, diet, and sexual behaviour.

More recent and stronger causal findings

Eriksson (2011) updates the literature on the issue and expands it with two studies conducted in her PhD research. In her literature review, a general agreement on the significant association between social capital and health emerges, but only considering social capital at the individual level. This way, the findings presented before of Kim et al. (2008) on physical health are extended to health in general. She reports the two main explanations supported by scholars on the inconclusive results on the collective measure: its inappropriateness for understanding contextual effects on health and lack of consistency in measurements and in how potential confounding is handled. Eriksson contributes to the further understanding on the issue with one of her studies, conducted in Umeå (Sweden). She compares the effects on health of two different aggregate measures of social capital, one related to trust and participation (the one more common in the literature), and the other one linked to neighbourhood relations. What she finds out is that for women, not for men, the second measure matters: living in very high social capital area according to neighbourhoods' relations is significantly associated to self-reporting good or fair health. This is not true, instead, with the most used indicator. The significant relation discovered is in place also controlling for sociodemographic factors and individual social capital. This evidence emphasizes the substantial role played by different conceptualizations in the estimation of the effects of collective social capital. In her second study, conducted in Umeå too, focusing on the individual level, she tackles the different effects caused by the two main dimensions of social capital. She finds stronger effects for the cognitive one with respect to the structural one, confirming the results illustrated by the same Kim et al. (2008).

Similar findings on the secondary role of collective social capital with respect to the individual one are the ones of Rocco and Suhrcke (2012). Their work is grounded on a strong empirical strategy, aimed at tackling endogeneity, through instrumental variable approach. They rely on three individual level instruments, same country of birth of parents and being a

victim of crime and four regional ones, population density, length of road network, share of residents without internet connection and share of residents with citizenship. They deal with both reverse causality and measurement errors, the first to do so. Looking at Europe and focusing on trust, they find that individual social capital matters for health, but just in regions with sufficiently high community social capital, measured as the average at the regional level. The community level measure does not play an autonomous role, but it contributes to the effect of the individual one. However, they argue that the instruments are not strong for the community measure.

Arezzo and Giudici (2017) extend the validity of the results referred to individual cognitive social capital to the structural dimension. Considering Europe, as the previous paper, and restricting to individuals aged 60 or more, they use SHARE dataset in order to study the relation between individual structural social capital, measured with charity done, volunteering, attendance to training course and participation in club and self-perceived health. Employing an instrumental variable method too, in order to tackle reverse causality, and using living in the country from birth and being a confident person as instruments, they find a positive effect of the structural dimension of social capital, and larger in values with respect to the OLS estimation.

Taking into account the multidimensional nature of social capital

Other works in the literature have focused more on the complexity of social capital, looking at the impact on health of its many different dimensions, generally putting aside the attempt to find causal effects. Among these, the work of Poortinga (2012) deserves further attention. Referring to the UK, he attempts to test the impact not only of bonding social capital, but also of bridging and linking one, all at the individual level. First of all, the diversity among the different indicators emerges: they turn out in fact to be only weakly interrelated, showing the rich nature of the concept of social capital. Secondly, most of them are significantly associated with neighbourhood deprivation. Since he is dealing with associations and not casual effects, the relation is likely to be both-way. This implies that the context, for example with its deprivation, can influence social capital, impacting through this channel on health. Consequently, being aware of the possible impact of the environment on social capital is of absolute importance in better understanding the relation between the social fabric and health. Thirdly, controlling for neighbourhood deprivation, the variables of bonding and bridging social cohesion, heterogeneous socio-economic relationships, trust, political efficacy and civic participation, are significantly associated with self-reported health. He proves this way the relevance also of the bridging and linking dimensions of social capital for wellbeing.

However, from his analysis, he finds that these factors are not able to buffer against the detrimental impact of neighbourhood deprivation.

Another work dealing with this issue is Portela et al. (2013), this time considering Europe and the variables of happiness and satisfaction with life. With a factor analysis, they disentangle social capital in its most relevant factors which cover its three main components: networks, norms, and trust. The variables that result are institutional trust, social trust, civic-social engagement, political networks and social networks. Social networks, social trust and institutional trust are the ones that exhibit higher correlations with subjective wellbeing. In addition, the authors carry the analysis also including aggregate measures of social capital, which indicate if the individual belongs to a country with a high level of social capital, like for example Denmark, or medium, as for Spain, or low, like Hungary. They prove positive correlations also for this aggregate measure. Importantly, also in their analysis, the findings refer to correlations and not causal relations.

The last contribution I want to mention enriching these reflections is the one of Gannon and Roberts (2020). They have the main merit to warn about the possible dark side of social capital. Referring to older people in Europe and relying on the SHARE dataset, they employ a multidimensional analysis of social capital using PCA. According to their analysis, its latent main components are bonding and bridging social capital, religious affiliation and praying, trust and conflict, and close household ties. What emerges is that all the dimensions are significantly associated with the various measures of health and wellbeing considered, but unexpectedly not all positively. Close household ties turn out, in fact, to have a negative impact. This finding is crucial in developing a wider perspective on social capital, becoming aware also of its possible drawbacks on health. Furthermore, the evidence is confirmed also running the same estimations with instrumental variables, using local area level instruments (sufficient retail facilities, public transports and crime) and personal level one (number of years lived in the current accommodation). However, the authors inform of the various caveats in this last empirical strategy. Nevertheless, at least the validity of the instrument employed for close household ties seems in place, reinforcing the robustness of this new result and enlarging the list of the dark sides of social capital introduced before with Aldrich and Meyer (2015).

1.5 MY CONTRIBUTION TO THE LITERATURE

My thesis aims at studying the causal effect of social capital on human resilience during the crisis of Covid-19.

It contributes therefore to all the three subfields presented, integrating, in each one, elements coming from the other two.
It enriches the first subfield of the literature, “Social capital and Covid-related outcomes”, analysing the effect of social capital during the pandemic on human resilience, considering the cognitive dimension of social capital instead of the structural one and employing a design attempting at disclosing causal effects.
It amplifies the second scientific area, “Social capital and human resilience”, focusing on the same outcome, but referring to a new shock, the one provoked by the Covid-19 and with a strong empirical strategy.
Finally, it is connected to the third one, “Social capital and health”, for the similar attempt of dealing with endogeneity, but looking at the different outcome of resilience facing the Covid crisis.

In conclusion, my thesis refers to the context of the first subfield, considers the effect of social capital on human resilience, like the second one, and attempts at disclosing causal effects as the last area of the literature presented.

2. EMPIRICAL STRATEGY

The objective of this thesis, as presented before, is to study the causal effect of social capital on human resilience. In this Chapter I am going to present the empirical strategy followed in order to uncover this relation.

Firstly, it is useful to precise that the context of the analysis is Europe, and that the attention is put on its population aged more than 50 years. The details on the dataset are provided in Chapter 3.
Secondly, the focus is on the cognitive dimension of social capital - trust. This choice has been taken also by other scholars, like for example Rocco and Suhrcke (2012), already mentioned in Chapter 1 and, as themselves state, by numerous others since Putnam, Leonardi & Nanenetti (1993). This restriction, at the light of what emerged from the literature review, is a limitation of this analysis since the effect of the other different dimensions are not captured. However, it is motivated by the crucial role played by this dimension in the composition of social capital and by the empirical strategy that allows to implement. In fact, relying on trust has permitted me to look at the corresponding wide scientific literature in order to find a strong basis for an empirical strategy capable to deal with the endogeneity issues in place, with an instrumental variable approach, as I am going to illustrate more in detail in this Chapter.
Despite the focus on one dimension of social capital, I explore its relation with resilience at both its levels, the individual and the collective one.

Therefore, my empirical strategy allows to study the impact on human resilience of trust, measured both at the individual and at the aggregate level and both with an Ordinary Least Square (OLS) and with an Instrumental Variable (IV) approach.

Here, I am going to present the different specifications I have estimated, describing the variables involved and explaining the interpretation. I start with personal trust and then I continue with collective trust, applying first OLS methodology and after, with the aggregate measure, extending the analysis with IV approach too.
The detailed discussion on variables construction is provided in Chapter 3.

2.1 OLS ESTIMATION

2.1.1 Individual trust

The first specification, related to individual trust and estimated with OLS, is the following:

$$resilience_{irc} = \alpha + \beta\ ind\ trust_{irc} + \gamma' X'_{irc} + \delta'\ Y'_{rc} + \ \varepsilon'\ Z'_{c} + u_{irc} \quad (1)$$

where *i* indicates the individual to whom the variables refer, *r* and *c* respectively the region and the country where he lives.

The main two variables of interest, referred to individual *i* living in region *r* of country *c*, are $resilience_{irc}$ and $ind\ trust_{irc}$. The first one is a dummy variable being 1 if the individual has shown resilience during the pandemic, 0 otherwise. The second one represents individual trust in other people in a scale from 0 to 10. Consequently, the main coefficient of interest is β, which indicates the impact of individual trust on resilience. More precisely, it represents the variation in the outcome variable determined by the change in this explanatory variable.

X_{irc} and Y_{rc}[15] are two vectors of variables describing respectively individual characteristics and regional ones. They are included in order to try to isolate the causal effect of individual trust on personal resilience. They are in fact factors that are likely to be correlated with both the outcome and the main explanatory variable of interest. Not controlling for them would imply that the estimated coefficient β does not represent the influence of the sole individual trust on resilience, but also of the other elements linked to both the main variables. Looking at the change in the dependent variable determined by the change in individual trust would include the effect of the other variables that change with individual trust and influence resilience, determining the so called omitted variable bias. However, controlling for all the variables with these characteristics is almost impossible, consequently the corresponding results have to be looked taking into account this consideration.

The last crucial elements of this specification are the country fixed effects, represented in the specification by Z_c[16]. It is a vector of the indicator variables of all the countries *c* included in the final dataset except for one, in order to avoid multiple collinearity. Therefore, their inclusion implies that within country variability is going to be used in the estimation. This means that the coefficient of interest β is estimated through the variation in individual trust among compatriots. The reason behind the addition of country fixed effects is similar to the one presented before for the individual and regional controls. The attempt is to control for all

[15] In the specification they are transposed because they are horizontal vectors. Similarly, their corresponding coefficients are transposed since they are vertical vectors.

[16] The above consideration is valid

the national level variables which, being correlated with both the main factors, might affect the estimation of β. There can be in fact features of the countries, like for instance public social spending, which impact at the same time on the dependent and on the independent variable of interest. Not considering them would imply that the crucial coefficient is biased, since for example countries with higher social spending are likely to report higher levels of both individual trust and resilience, upwardly biasing the estimations. In fact, the β estimated would be larger, but not for the large causal impact of individual trust on own resilience, but simply for the higher public spending in the country where the interviewees lives. In addition, in the estimation of β, comparing individuals of the same country likely helps in being more precise. In fact, their institutional context and the consequent restrictions imposed, especially in the first Covid wave which is the one in analysis, have been almost the same. This way, the shock provoked by the pandemic has been homogeneous for the compared individuals in this investigation, guaranteeing a good setting in order to assess human resilience.

Finally, α is a constant and u_{irc} represents the error term that is going to result in the estimation.

The last consideration concerning this specification and that is valid also for the following ones is that these models can be classified as Linear Probability models. This means that the coefficients can be interpreted as variations in the probability of having experienced resilience. Therefore, β indicates the variation in the probability that the individual *i* has experienced resilience during the pandemic thanks to a higher level of trust in other people. Furthermore, the Linear Probability model implies heteroskedasticity of the error terms by construction. Therefore, robust standard errors are considered in the estimation of all the specifications.

2.1.2 Regional trust

The second specification refers to collective trust, the regressor of interest from now on, but it is still estimated with OLS.

$$resilience_{irc} = \alpha + \beta \ reg\ trust_{rc} + \gamma' X'_{irc} + \delta' Y'_{rc} + \varepsilon' Z'_{c} + u_{irc} \quad (2)$$

$resilience_{irc}$ is measured as before, while $reg\ trust_{rc}$ stands for regional trust and captures the collective level of this dimension. In particular, it is computed as the average of trust in the region *r* of country *c*, where the regions of reference are the largest European subnational aggregates, following the official nomenclature. Therefore, this time the focus is on the

impact on resilience of the average level of trust widespread in the area where the interviewee lives.

Z_c, as before, imposes to rely on within country variability of the explanatory variable of interest in the estimation of β and α and u_{irc} have the same interpretation seen previously.

The individual variables in the vector X_{irc} are not likely anymore, with respect to specification (1), to be omitted variables if not included. In fact, they are not correlated with regional trust, since they are individual level variables, therefore not capable to influence the regional level ones, like the main regressor. Actually, they have an influence on it, but it is infinitely small since they constitute just one component of the average computed among all the inhabitants (more correctly, a sample) of their region of residence. Nevertheless, the inclusion of these controls can be useful in order to more precisely estimate β and for comparability with the other specifications. Therefore, the aggregate measure of trust is likely to improve the reliability of the estimates, making irrelevant for their unbiasedness and consistency the individual omitted variables.

Regional controls in the vector Y_{rc}, on the other hand, are included because they still present the features of possible omitted variables if excluded from the model. In fact, there are regional level controls which, like for example the public social spending discussed before, correlate with both the dependent and main independent variables.

Therefore, this time the interpretation of β is the following: what is the impact of trust widespread in the region where the individual lives on the probability of having shown resilience, comparing individuals of the same country with the same relevant individual characteristics and taking into account the local features which are likely to influence the results.

2.2 IV ESTIMATION

The following last three specifications are the basis for the IV estimation of the relation of interest, referred to regional trust and with all the controls described previously.

The intention behind the application of this methodology is to tackle the endogeneity problem caused by omitted variables that is responsible of biased and inconsistent estimations. Endogeneity refers to the fact that there is at least one variable correlated with the error term. Therefore, changes in this variable are not exogenous to the model, but since they partially go together with variations of the error term, are in a sense internal to it.

In the case of omitted variables, the endogeneity is determined by the fact that in the error term there are factors that not only explain the outcome, but also, are correlated with the

explanatory variable and therefore the correlation between the independent variable and the whole error is not null.

The situation described is likely to be in place in specification (2). In fact, despite the inclusion of both individual and, in particular, regional factors, it is almost impossible to control for all the relevant elements which correlate with both resilience and regional trust. Therefore, estimations are likely to be biased and inconsistent.

Fortunately, in this setting, reverse causality or simultaneity is not another endogeneity cause, differently from what illustrated in the literature dealing with social capital and health. Indeed, regional trust is measured before the occurrence of the pandemic, therefore it cannot have been influenced by it. On the contrary, considering health, both health and the measure of social capital were assessed at the same point in time and consequently, also the other verse of the relation, from health to social capital, was likely to be in place.

The main idea of the Instrumental Variable estimator, here applied, is to consider instead of the endogenous variable an exogenous one, the so-called instrument. A variable in order to be considered an instrumental variable has to satisfy two conditions. The first one is the *first stage condition*. It consists in the proof of its correlation with the endogenous variable. It is verified in the so called "First Stage", that I am going to present after in detail, which explains where the name comes from. If this condition is satisfied, the instrument is defined relevant or informative. The second one is the *exclusion restriction* and if it is met, the instrument is said to be valid. It consists in the lack of correlation with the error term of the specification where the endogenous variable is included among the explanatory variables. In particular, it has two consequences. The former one is that this instrument must not affect directly the outcome, in fact if it did, this variable would be included in the error term of this specification and therefore the correlation with it would be necessarily not null. The latter is that it must not correlate with any of the omitted variables, because also in this case the correlation with the error term, which comprehended these controls would be different from zero. These two conditions, as it will be clear with the explanation of the following specifications, are required since they guarantee the estimation through IV.

The instrument that has been chosen for this analysis is the share of foreign population over the total in the European regions *r*. This choice is grounded on the work of Alesina and La Ferrara (2002) who discovered a negative statistically significant relation between trust in other people and racial fragmentation in the US context. They measure it through their index that represents the "probability that two randomly drawn individuals in an MSA/PMSA belong to different races", where MSA and PMSA are their sampling areas and races are Whites, Black, American Indian, Eskimo, Aleutian, Asian and Pacific Islander and Other. In

my analysis, due to the different European context and data availability I rely on a slightly different measure: the share of foreigners in the total population of regions *r* and I limit the final sample to only people born in the country of the interview.

The instrument chosen justifies the choice of the regional measure of trust instead of the individual one, in fact the First Stage is likely to be stronger.

This instrument has been selected because it seems to well satisfy the conditions exposed before. Firstly, it is relevant. In fact, the relation suggested by the literature, with the adaptation described, has been found also in this analysis applied to the European context. In particular, the strong results of the Kleibergen and Paap Test, propose later in Chapter 4, prove the satisfaction of this requirement. Secondly, concerning validity, although it is more difficult to prove and no test has been run, it is reasonable to be respected. It is likely that the share of foreigners has not impacted on resilience neither directly, first implication of the exclusion restriction, nor indirectly through omitted factors, second implication. In fact, dealing with the first implication, it is difficult to imagine a direct impact of the higher presence of foreign people on the personal capacity to react at the shock of the Covid-19. If an effect was in place, it would mean that comparing two individuals with the same individual characteristics and living in similar regions, except for the proportion of foreigners in the total population, this only difference would be responsible for increasing the probability of being more resilient. Although this direct effect is reasonable not to be in place, the indirect ones are more difficultly excluded. Nevertheless, two important regional features, that might be correlated with both the instrument and the outcome are controlled for with the regional controls. They concern the richness of the area and its unemployment rate. Indeed, positive outcomes of these indicators can favour on the one hand immigration, negatively impacting on trust and therefore on individual resilience but, at the same time, they can also provide a better environment facing a crisis, reducing the personal damage. Therefore, higher presence of foreign people cannot only impact resilience through trust, but can be correlated with these regional variables relevant for human resilience, confounding the estimation. Adding these controls allows to reduce the probability of possible omitted variables also for the instrument.

In addition to validity, the instrument must show within country variability in order to identify the causal effect of interest taking into consideration country fixed effects.

Figure 1. Kernel density of the instrument demeaned and of the residuals

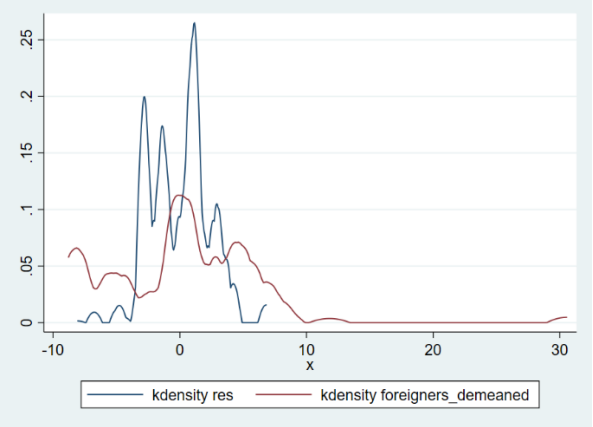
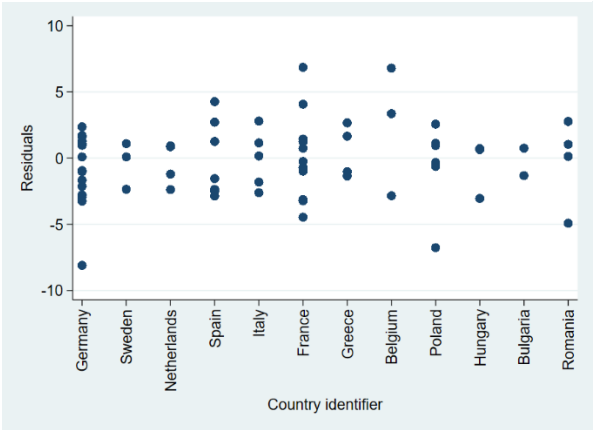


Figure 2. Scatter plot of the residuals by country



The graph on the left reports the Kernel density of the instrument demeaned ("foreigners_demeaned") and of the residuals obtained regressing the instrument on the regional controls and on the country fixed effects ("res"). The idea is to verify if controlling for the country and the regional features, some variability in foreign share remains unexplained, going into the error term. It is indeed the variability that emerges among the residuals which is going to be employed in the IV estimation. The figure shows that the variability of foreign share in regions *r* is not all captured by the country itself and the region characteristics included and therefore this unexplained variation in the instrument can be employed in the IV estimation. In fact, although the blue distribution is shrunk with respect to the red one, it still displays a certain degree of variability. From the OLS estimation the unexplained variability of the instrument is at around more than 15%.

The graph on the right represents the residuals discussed, this time by country, showing the variability within country that is going to be used in IV estimation.

2.2.1 First Stage

The first specification at the basis of IV estimation is the so-called First Stage.

$$reg\ trust_{rc} = \alpha + \beta\ foreigners_{rc} + \gamma' X'_{irc} + \delta'\ Y'_{rc} + \ \varepsilon'\ Z'_{c} + u_{irc} \quad (3)$$

It is called First Stage because it constitutes the first step in the Two Stage Least Squares (2SLS) methodology followed here in the IV estimation. It is estimated through OLS, as the name of the methodology suggests.

The First Stage consists in the regression of the endogenous variable, here $reg\ trust_{rc}$, on the instrument, labelled $foreigners_{rc}$, and on all the other controls, X_{irc}, Y_{rc} and Z_c.

This stage is at the basis of the proof of the relevance of the instrument, as anticipated before. It allows in fact to verify the significance of β, which captures if a statistically significant relation between the foreign share and regional trust is in place, and to run the mentioned Kleibergen and Paap test. In addition, the exclusion restriction legitimizes the use of OLS. In fact, the absence of correlation with any omitted variables implied by this condition, guarantees that also the correlation with this error term is null because it comprehends the same potential source of bias.

Furthermore, the β estimated is going to contribute to the final IV estimation, providing the denominator of the ratio computed for the coefficient of interest.

2.2.2 Reduced Form

The second specification is the so-called Reduced Form.

$$resilience_{irc} = \alpha + \beta\ foreigners_{rc} + \gamma' X'_{irc} + \delta'\ Y'_{rc} + \ \varepsilon'\ Z'_{c} + u_{irc}$$

(4)

The Reduced Form is a regression where the independent variables are all exogenous except for the error term. This is the case in the above specification thanks to the exclusion restriction that guarantees the exogeneity also for the instrument. In particular, it guarantees that it is not correlated with any possible omitted variable. To be precisely, according to this definition, also the First Stage in (3), is a Reduced Form, for the same reason. Indeed, according to some definitions, the reduced form refers to the whole system of all endogenous variables expressed as functions of exogenous variables and of the error term.

In this regression the coefficient β captures the effect of the proportion of foreigners in the region *r* of country *c* where the individual *i* lives on his own resilience. Assuming no direct effect of the instrument on the outcome of interest, but a statistically significant relation with the endogenous variable, the idea behind is that this coefficient is going to absorb the causal effect of regional trust. In fact, with these assumptions, it is not the variation of the instrument itself that determines a statistically significant change in the dependent variable, but the variation in the endogenous variable that correlates with it.

In addition, the coefficient β estimated is going to be the other element at the basis of IV methodology, providing the numerator of the ratio that has to be calculated.

2.2.3 Second Stage

Finally, the last specification is the so-called Second Stage or IV regression.

$$resilience_{irc} = \alpha + \beta\ \widehat{reg\ trust}_{rc} + \gamma' X'_{irc} + \delta'\ Y'_{rc} + \ \varepsilon'\ Z'_{c} + u_{irc}$$

(5)

It is exactly like specification (2), but it involves the IV estimation and not the OLS one. Therefore, the same considerations concerning X_{irc}, Y_{rc} and Z_c are still valid, but β is computed differently. In particular, as anticipated, it can be calculated dividing the β coefficient obtained in the Reduced Form, specification (4), with the one of the First Stage, specification (3). It is here evident the essential role played by both the two assumptions required for the instrumental variable. On the one hand, relevance guarantees a non-null denominator and, on the other, exclusion allows to apply OLS in both the estimations.

In conclusion, this specification, which is going to be the baseline model in my thesis, aims at studying the causal relation of regional trust on human resilience. In order to deal with the endogeneity of the main element under investigation, it grounds on an Instrumental Variable approach, using in the estimation of the coefficient of interest the variation of foreign shares correlated with regional trust. It takes into account individual features and, more importantly for the causal interpretation of the β obtained, regional characteristics and country fixed effects, which allow to isolate the impact of regional trust.

3. DATA

3.1 SOURCES

The data I use come from three sources. First, I use the Survey of Health, Ageing and Retirement in Europe (SHARE). It provides panel data on adults aged 50+ in 27 European countries and Israel. Since 2004, SHARE has so far collected 9 waves of data, using a Computer Assisted Personal Interview (CAPI) mode. It provides information that spans from health, to economic and employment situation, to demographics and social networks. Furthermore, there have been two retrospective waves, the Third and the Seventh one, which add knowledge on the life histories of the interviewees. With its 140,000 people interviewed it is the largest European social science panel study in the field of public health and socio-economic living conditions.[17] The longitudinal nature of the dataset allows to enrich the already wide set of data provided in each wave with the information collected in the previous ones.

In March 2020, the outbreak of Covid-19 pandemic has interrupted the in-person interview process of the Eight Wave, with roughly 70% of the sample interviewed across all countries. From June to August 2020 a new wave was run in order to study the effects of the first Covid wave, the SHARE-COVID survey. Due to the restrictions imposed by the pandemic, the interview was carried out using a Computer Assisted Telephone Interview (CATI) mode. All the individual-level information used in the analysis comes from SHARE.

Second, for the regional controls and for the instrument I use data from Eurostat, the statistical office of the European Union.

Finally, data on regional trust come from the European Social Survey (ESS). This survey is conducted face-to-face every two years on the European population aged more than 15 and investigates attitudes, beliefs and behaviours[18].

[17] Information available at: The Survey of Health, Ageing and Retirement in Europe (SHARE): Home (share-project.org)
[18] Information available at: About ESS | European Social Survey (ESS)

3.2 VARIABLES DESCRIPTION AND CONSTRUCTION

In this section I present the variables used in the specifications presented in Chapter 2. Subscript *i* indicates the individual interviewed in the SHARE-COVID survey, *r* refers to the NUTS 1 region where the interviewee *i* lives. NUTS stands for Nomenclature of Territorial Units for Statistics and it is the official European classification for country members of geographical units. The broader Unit, the one at NUTS 0, corresponds to the country level, and going from NUTS 1 to NUTS 3 the precision of the area represented increases[19]. In my analysis I rely on regions at NUTS 1 level because it provides a good compromise between the detail of the area of reference and the availability and quality of the corresponding data. Finally, *c* indicates the country where the person lives.

I first introduce the outcome variable ($resilience_{irc}$) and the measures of trust, the main regressor of interest, at the individual ($ind\ trust_{irc}$) and regional ($reg\ trust_{rc}$) levels. Then, I present the instrument ($foreigners_{rc}$) and finally the controls, at the individual, regional and country level, X_{irc}, Y_{rc} and Z_c. For each of them I present the descriptive statistics and maps based on the final dataset used in the analyses. I describe how I have obtained the sample on which I have based my analyses in Paragraph 3.3.

3.2.1 Outcome variable ($resilience_{irc}$)

Resilience ($resilience_{irc}$) is measured considering mental health questions contained in the SHARE Covid questionnaire. I use questions CAMH002 and CAMH802. CAMH002 is "In the last month, have you been sad or depressed?" with possible answers: "1. Yes" and "5. No". The second question, CAMH802, which is addressed only to whom replies "1. Yes" to CAMH002, inquires: "Has that been more so, less so, or about the same as before the outbreak of Corona?" with "1. More so", "2. Less so" and "3. About the same". Specifically, $resilience_{irc}$ is equal to 1 if the interviewee has shown resilience and it happens under three different circumstances. The first one takes place if the individual has not been sad or depressed at all in the last month (CAMH002==5). The second one if he has been sad or depressed (CAMH002==1), but he has not worsened his mental status with respect to before the outbreak of Corona (CAMH802==3). The third and last one occurs if he has even healed the previous mental health (CAMH802==2). The first and the second case corresponds to the "resistance" presented in Paragraph 1.1.1, while the third one to the labelled "positive transformation". The first two cases might also include the "normal recovery" case for the

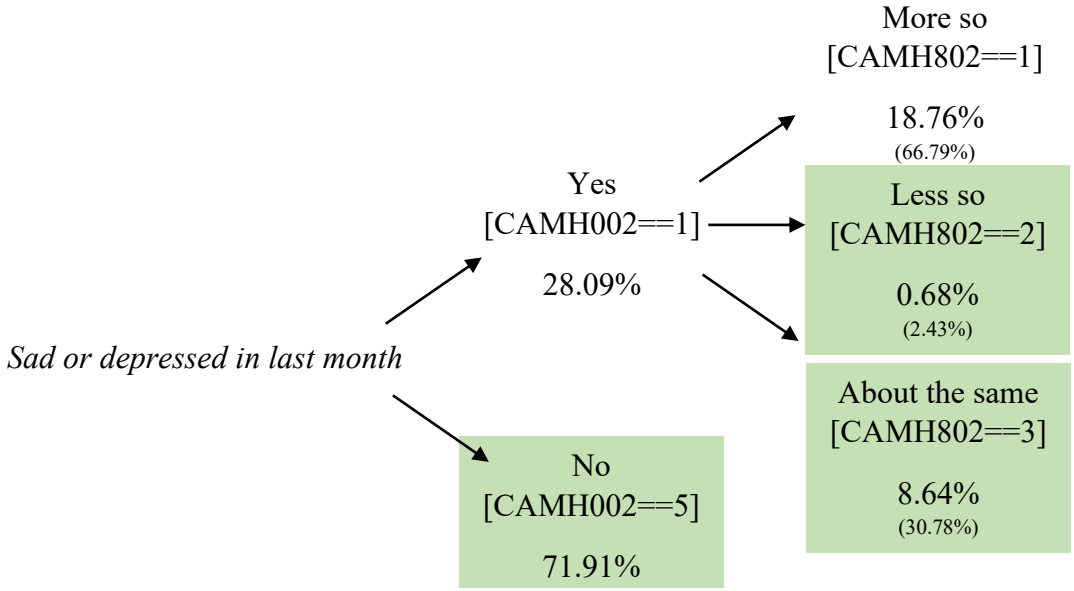
[19] Further information available at: Background - NUTS - Nomenclature of territorial units for statistics - Eurostat (europa.eu)

individuals who have initially been affected by the pandemic, but who have already recovered at the time of the interview. On the other hand, $resilience_{irc}$ is 0 when the interviewee has not shown resilience, reporting to have been sadder or more depressed in the last month with respect to before the outbreak of Corona (CAMH802==1).

Looking at the final sample, $resilience_{irc}$ has a mean of 0.81. It means that 81% of the adults and seniors considered have shown resilience.

Specifically, as it emerges from *Figure 3*, this 81% is made up of around 72% of people who have not been sad or depressed at all and, for the remaining 9%, of people who have been sad or depressed, but not worsening their condition or, in very few cases (less than 1% of the sample), even improving it. Therefore, almost one third of the sample have experienced bad mental health in the last month before the interview and the figure reveals that, among these people, the great majority has worsened their condition compared to before the pandemic. This last case includes both people who have become sad or depressed due to the widespread of Covid-19 and people who had already mental problems, but that have been exacerbated by the virus.

Figure 3. $resilience_{irc}$ *in the sample*



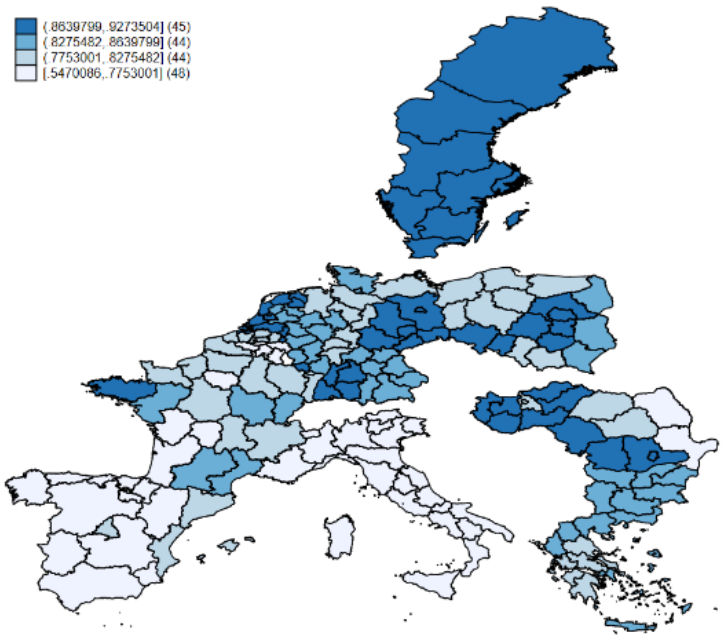
In round brackets I report the percentages with respect to the subgroup of people who state to have been sad or depressed in the last month (CAMH002==1).

The following map reports the average $resilience_{irc}$ in my sample at NUTS1 level. The finer regions indicated are the NUTS 2 areas and the colours are more intense for higher levels of resilience in the region *r*.

The figure shows that Italy, Spain, France and Belgium are the countries most affected by the first wave of Covid-19 in terms of mental health of their citizens aged between 50 and 85. On

the other hand, Netherlands, Germany and Sweden are on average the countries with the best performances, together with Hungary and Bulgaria. Poland, Romania and Greece display instead an intermediate condition.

Figure 4. Map of $resilience_{irc}$



In parenthesis the interval of resilience represented by the corresponding colour followed by the number of NUTS 2 regions included in each bracket.

3.2.2 Measures of trust ($ind\ trust_{irc}, reg\ trust_{rc}$)

The individual level variable of trust ($ind\ trust_{irc}$) measures in an increasing scale from 0 to 10 how people trust others, where 0 means that "you can't be too careful in dealing with people" and 10 that "most people can be trusted". The information comes from the "EX026" question of the SHARE questionnaire, which is asked the first time an individual is interviewed, starting from wave 2.

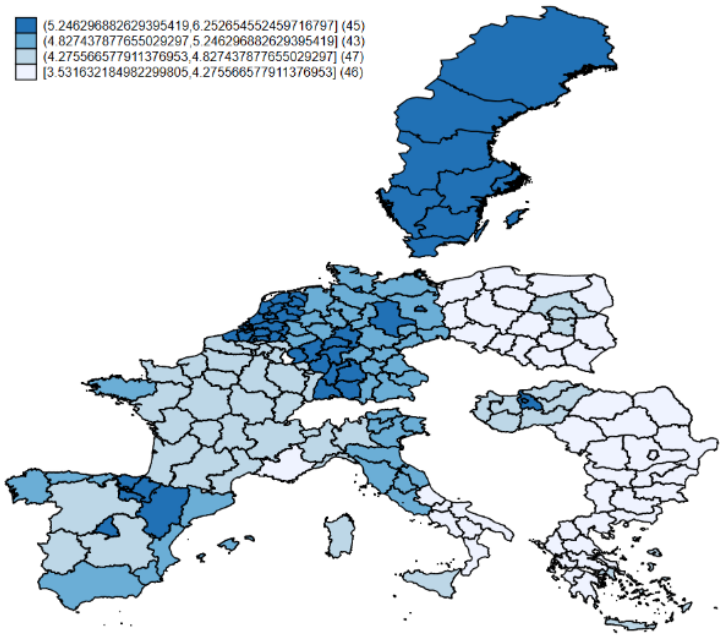
The regional level variable of trust ($reg\ trust_{rc}$) is based on a very similar question collected in the ESS. I have employed the information coming from this different dataset because it is not restricted to adults and senior individuals. This way it provides a better proxy of the variable of interest for the whole population in region *r*. Specifically, $reg\ trust_{rc}$ consists in the weighted average by NUTS 1 of "ppltrst" which has the same scale of "EX026". The weight used is the "anweight" included in the dataset, which as explained in Kaminska (2020) "corrects for differential selection probabilities within each country as specified by sample design, for nonresponse, for noncoverage, and for sampling error related to the four post-stratification variables, and takes into account differences in population size across countries."

This variable has motivated the choice of the NUTS 1 level regions in my analysis. In fact, on the one hand, this level permits a more precise measure of aggregate trust with respect to the national level one and, on the other hand, it guarantees more representative samples compared to the ones obtained with finer NUTS. It is important to underline that, despite data are weighted in order to be representative at the country level for age, education and region, there is no guarantee they are representative at the regional level too. However, they are the best information available at NUTS 1, as argued also by other authors, like the already quoted Barrios (2021) who relies on my same measure of aggregate trust. [20]

Looking at the descriptives of these variables, individual level one has a higher mean and a higher variability with respect to the aggregate level one. Indeed, $ind\ trust_{irc}$ has a mean of 5.61 and a standard deviation of 2.37 versus $reg\ trust_{rc}$ which is characterized by an average of 4.74 and a standard deviation of 0.74. In addition, it ranges in a smaller interval between a minimum of 3.53 and a maximum of 6.25.

The map reported in *Figure 5,* shows that Sweden, Netherlands, Belgium and Germany have the highest values in regional trust, while the countries of Eastern Europe, especially Poland, Romania and Bulgaria have the lowest ones. France, Spain and Italy display an intermediate pattern.

Figure 5. Map of $reg\ trust_{rc}$



[20] For all the countries included in my final sample, excluding Romania and Greece, I have used the last Wave available, the Ninth one, which includes "anweight" and refers to a period that spans from 2018 to 2020. Importantly, the last interviews ended in January 2020, therefore before the outbreak of Covid-19 pandemic, avoiding reverse causality, as discussed in Chapter 2. For Romania and Greece, I use the last wave available, the fourth and the fifth respectively. For these two Waves "anweight" is not directly available, but I have computed it with the procedure explained in Kaminska (2020). Furthermore, I have updated the NUTS classification for Romania, Greece, and Poland in order to correctly merge the individuals with the data of their region of residence.

3.2.3 Instrument ($foreigners_{rc}$)

The instrument $foreigners_{rc}$ represents the share of people in region *r* born outside the country *c* where they live at the time of the census. It is constructed with the data provided by the census of 2011 conducted by Eurostat. Although the data refer to a period of almost ten years before the Covid broke out, they provide good quality information because they refer to a persistent variable. Specifically, $foreigners_{rc}$ is the ratio between the number of people born outside the country *c* in region *r* and the total population of *r*, multiplied by 100 for easing the interpretation. This way, in fact, an increase by 1 in $foreigners_{rc}$ is interpreted as the addition of 1 person born outside the country *c* over 100 people living in region *r*.

For the construction of this variable, I have used directly the data available at NUTS 1 level for all the countries except for France, Greece and Poland. For these nations, instead, I have derived myself the aggregate measure at NUTS 1 starting from data at NUTS 2. This procedure is aimed at updating the NUTS classification in order to correctly impute the NUTS 1 value to the region *r*.

Analysing this variable in my sample, it has an average of 9.40 and a standard deviation of 5.84, meaning that in European regions at NUTS 1 level on average around 9 people over 100 were born in a different country with respect to one of residence. This value spans from less than one reached in a Romanian region to the 40 of one Belgian region. *Figure 6* shows the average $foreigners_{rc}$ and its standard deviation by country (the segments above the bars). It makes evident the difference between Western and Eastern States in terms of the share of population inside the regions *r* born outside the country. This diverse pattern emerges also in the map of *Figure 7.*

Figure 6. Average $foreigners_{rc}$ and corresponding standard deviation by country with

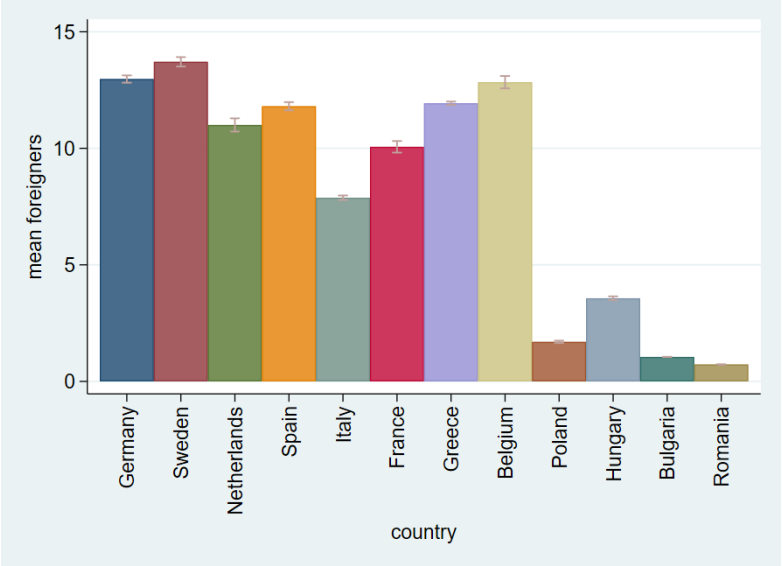


Figure 7. Map of $foreigners_{rc}$

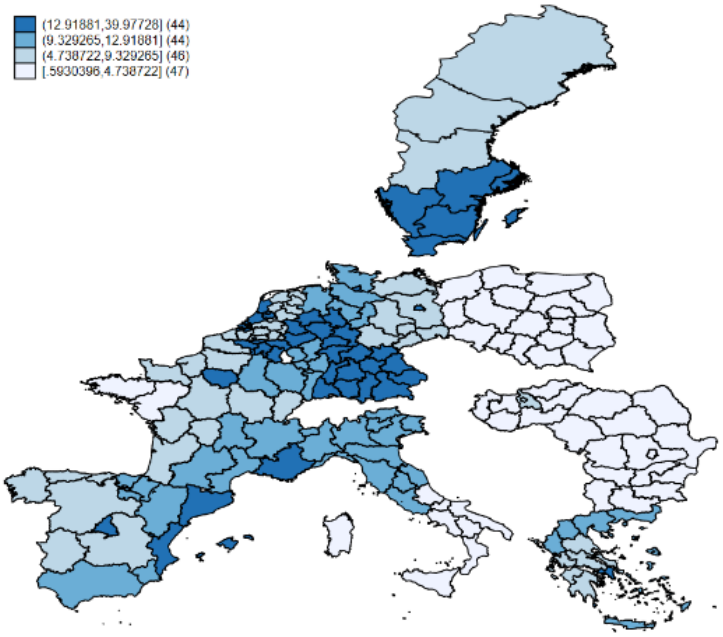


Table 1. Descriptive statistics for the main variables of interest

Variable	Mean	Std. dev.	Min	Max
$resilience_{irc}$	0.81	0.39	0	1
$ind\ trust_{irc}$	5.61	2.37	0	10
$reg\ trust_{rc}$	4.74	0.74	3.53	6.25
$foreigners_{rc}$	9.40	5.84	0.59	39.98

3.2.4 Controls (X_{irc}, Y_{rc}, Z_c)

Among the individual level controls X_{irc} I have included variables on age, gender, partner, employment status, education and type of area of residence. In addition, for the specification (1) I have added a control indicating the Wave where the interviewee answers the question on trust. This extension allows to take into account the average differences in stated trust across different points in time. In fact, although trust is generally claimed to be time-invariant as recalled previously, this control helps in increasing precision in the estimation. The variables age, gender, partner and employment status come from the SHARE-COVID Wave while the type of residence area and education are derived from the previous SHARE Waves. All the variables are corrected in order to impute all the irrelevant categories (don't know, refusal or other) to missing values.

age_{irc} is constructed with the information of "yrbirth" and it is included in the models as a second order polynomial.

Information on gender is added to all the specifications as a dummy, $female_{irc}$, which is 1 if the individual is female, 0 if male.

The dummy indicating if the interviewee has a partner, $partner_{irc}$, is generated using "mergeidp8" (a variable which univocally identifies the respondent's partner if present): if "mergeidp8" is non missing, the dummy is equal to 1.

The employment status is considered with the variable "caep805" which indicates if the individual was employed or self-employed when Covid-19 broke out. It is transformed in a dummy variable, $employed_{irc}$, being 1 if the individual was employed, 0 otherwise.

The area of residence is classified according to question "iv009", which includes among its categories "a big city", "the suburbs or outskirts of a big city", "a large town", "a small town" and "a rural area or village". These data are not provided by the SHARE-COVID Survey, therefore they are taken from all the previous Waves, going from the more recent to the oldest ones. For Waves 3 the variable is "sl_iv011". In addition, the responses of the partners of the interviewee not answering this question are used to substitute their missing values. This variable is named $building\ area_{irc}$ and it is included in the model as a set of dummies.

The last individual level control, $education_{irc}$, is provided by all the Waves before the Covid one, except the Third one. The variable employed is "isced1997_r", which represents the education attainment according to the ISCED-97 coding[21]. It is made up of seven categories, in ascending order from "none", to "ISCED-97 code 6" and as the previous variable, it is added as a set of dummies.

Table 2 shows that on average in the sample the age is about 70, around 70% of them have a partner, only one fifth is employed and around 60% are women. In addition, *Table 3* indicates that more than half of the sample answer the question on "trust in others" in the Fifth Wave, the same proportion have the building where they live located in "a small town" or in "a rural

[21] ISCED (International Standard Classification of Education) is the statistical framework developed by the UNESCO to compare education levels across different institutional contexts. The 1997 version here used comprises the following levels:
Level 0 – Pre-primary education
Level 1 – Primary education or first stage of basic education
Level 2 – Lower secondary education or second stage of basic education
Level 3 – Upper secondary education
Level 4 – Post-secondary non-tertiary education
Level 5 – First stage of tertiary education
Level 6 – Second stage of tertiary education
(Available at: International Standard Classification of Education - Wikipedia)

area or village" and around three quarters have an educational attainment corresponding to ISCED-97 code 3, which stands for the Upper Secondary education.

Table 2. Descriptive statistics for the individual controls X_{irc}

Variable	Mean	Std. dev.	Min	Max
age_{irc}	69.42	7.94	50	85
$female_{irc}$	0.57	0.50	0	1
$partner_{irc}$	0.73	0.45	0	1
$employed_{irc}$	0.19	0.40	0	1

Table 3. Table for $Wave\ ex026_{irc}$, $building\ area_{irc}$ and $education_{irc}$

Variable	Category	Freq.	Percent	Cum.
$Wave\ ex026_{irc}$	2	2,358	11.17	11.17
	4	1,211	5.74	16.91
	5	11,485	54.41	71.31
	6	3,256	15.42	86.74
	7	175	0.83	87.57
	8	2,625	12.43	100.00
$building\ area_{irc}$	1. A big city	4,688	22.21	22.21
	2. The suburbs/outskirts of a big city	1,861	8.82	31.02
	3. A large town	3,314	15.70	46.72
	4. A small town	4,893	23.18	69.90
	5.A rural area or village	6,354	30.10	100.00
$education_{irc}$	0. None	758	3.59	3.59
	1. ISCED-97 code 1	3,827	18.13	21.72
	2. ISCED-97 code 2	3,910	18.52	40.24
	3. ISCED-97 code 3	7,205	34.13	74.37
	4. ISCED-97 code 4	664	3.15	77.52
	5. ISCED-97 code 5	4,573	21.66	99.18
	6. ISCED-97 code 6	173	0.82	100.00

The regional level variables Y_{rc} are GDP per capita and unemployment rate. They are both provided by Eurostat and they refer to the year 2015.

GDP per capita is converted to Purchasing Power Standards (PPS, EU27 from 2020).

The unemployment rate refers to the age class from 15 to 64.

Table 4 reports the corresponding descriptive statistics.

Table 4. Descriptive statistics for the regional controls Y_{rc}

Variable	Mean	Std. dev.	Min	Max
$GDPpc_{rc}$	25464.58	9073.77	9900	59500
$unemployment_{rc}$	12.30	7.73	2.9	30.6

Finally, the country fixed effects included with the vector Z_c are constructed with the information provided by the variable "country" of the coverscreen module of the SHARE-COVID Survey.

Table 5 displays all the categories of the variable $country_c$ therefore indicating all the European nations included in the final sample.

Table 5. Table for $country_c$

Variable	Category	Freq.	Percent
$country_c$	12. Germany	2,292	10.86
	13. Sweden	1,093	5.18
	14. Netherlands	619	2.93
	15. Spain	1,679	7.95
	16. Italy	3,234	15.32
	17. France	1,580	7.48
	19. Greece	3,169	15.01
	23. Belgium	3,132	14.84
	29. Poland	1,748	8.28
	32. Hungary	936	4.43
	51. Bulgaria	615	2.91
	61. Romania	1,013	4.80

3.3 FINAL DATASET

In *Table 6* I describe how I have obtained the final dataset on which I have based the analyses of my thesis.

Since variability within country is necessary in order to identify the relation of interest, I had to exclude all the individuals of states in which only one NUTS 1 region was available with data. In fact, the variation used in the identification is among NUTS 1 regions and therefore at least two are required.

In addition, I restrict the final sample to individuals ageing between 50 and 85 years old and to natives in country *c*.

The remaining reduction of the sample is motivated by the lack of information in one or more variables.

Table 6. Final dataset

Initial sample	**54,567**
Individuals from countries:	
Non-European (Israel)	-318
With only one NUTS 1 region (Croatia, Cyprus, Czech Republic, Denmark, Estonia, Latvia, Lithuania, Luxemburg, Malta, Slovakia, Slovenia, Switzerland)	-22,013
With only one NUTS 1 region in the dataset (Finland)	-1,386
With $reg\ trust_{irc}$ only available for one NUTS 1 region (Portugal)	-1,134
Individuals with no information on the region of residence *r*	-3,502
Individuals with no information on $resilience_{irc}$	-90
Individuals with no information on $ind\ trust_{irc}$	-2,026
Individuals not born in the country *c* of the interview	-1,249
Individuals aged less than 50 or more than 85	-1,679
Individuals with no information in one individual level control X_{irc}	-(13+47)
Final sample	**=21,110**

Note: Austria is not included in the initial sample since it is in a different SHARE dataset because the interview took place in a different period with respect to the other countries

4. RESULTS

In this Chapter I discuss the results obtained estimating with STATA the specifications presented in Chapter 2. The results are visible from *Table 7* and the number of the column corresponds to the number of the model.

Table 7. Results of the specifications (1)-(5)

	(1)	(2)	(3)	(4)	(5)
Method	OLS	OLS	OLS	OLS	IV
Dependent variable	$resilience_{irc}$	$resilience_{irc}$	$reg\ trust_{rc}$	$resilience_{irc}$	$resilience_{irc}$
$ind\ trust_{irc}$	0.00771***				
	(0.00120)				
$reg\ trust_{rc}$		0.0324***			0.0990***
		(0.0112)			(0.0268)
$foreigners_{rc}$			-0.0428***	-0.00424***	
			(0.000673)	(0.00115)	
X_{irc}	Yes	Yes	Yes	Yes	Yes
Y_{rc}	Yes	Yes	Yes	Yes	Yes
Z_c	Yes	Yes	Yes	Yes	Yes
Observations	21,110	21,110	21,110	21,110	21,110
Kleibergen-Paap F statistic			4044		

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01*
In the Appendix in Table 13 I provide the complete output with all the regression coefficients.

From the estimation of specification (1) in the first column, individual trust turns out to correlate with human resilience to the shock of the Covid-19 pandemic significantly and positively. Specifically, an increase in trust of 1, among individuals with comparable features and living in regions with similar characteristics, is associated with an increase of almost 1% in the probability of showing resilience. People with high levels of trust in others, ranging from 8 to 10 are 6 percentage points[22] more likely of not being mentally affected by the virus with respect to the ones reporting the lowest levels between 0 and 2. Importantly, as explained in Chapter 2, these results regard simple correlations among the variables of interest and not causal effects. It is in fact difficult to claim the absence of omitted variables.

Considering the aggregate measure of trust, column (2) shows that also regional trust correlates with the dependent variable significantly and positively. The coefficient estimated is higher with respect to the previous one, more than 4 times. Moving from a region to another with similar values in the controls considered and differing exclusively for an in increase by 1 in average trust is associated with an increase in the probability of being resilient of more than 3%. Furthermore, comparing adults and seniors living in the region with the lowest level of trust with their counterparts in the region with the highest one, the sole fact of living in the second area increases the probabilities to be resilient at the Covid-19 by 9 percentage points[23]. In this second specification too, the causality of the results must be interpreted cautiously. With respect to model (1), the individual level omitted variables are not in place anymore, but the regional ones still are.

To get around this issue, I move to the IV analysis, where I instrument trust with ethnic composition. The results of the First Stage reported in column (3) prove the relevance of the instrument chosen. In fact, the coefficient estimated is statistically significant, demonstrating a strong effect of $foreigners_{rc}$ on $reg\ trust_{rc}$. Therefore, a stronger presence in a region of people born outside the country significantly affects regional trust. In addition, in this case, the effect can be interpreted as a causal one for the reasons discussed in Chapter 2. Specifically, increasing by 1 the percentage of people who live in region *r* of country *c* but were not born in country *c* implies a decrease in the average trust of region *r* of around 0.04 points. Comparing the region with the highest value in $foreigners_{rc}$ with the one with the lowest, the estimated difference in regional trust determined by the instrument is of about 1.7[24], not a small difference.

[22] Based on my own calculations: (9*0.00771) - (1*0.00771)
[23] Based on my own calculations: (6.25*0.0324) - (3.53*0.0324)
[24] Based on my own calculations: (39.98*-0.0428) - (0.59*-0.0428)

In addition, the first stage condition is further confirmed with the Kleibergen and Paap test, reported in the last row of *Table* 7. It consists in the F statistic testing the null hypothesis of the jointly irrelevance of all the instruments. For confirming the first stage condition, therefore, the null has to be rejected. I have employed the robust Kleibergen-Paap Wald rk F statistic which takes into consideration the absence of i.i.d. errors, here determined by the lack of the assumption of identical distribution due to heteroskedasticity. The statistic is 4044 and, being greater than 10, implies the rejection of the null hypothesis and the proof of the relevance of the instrument chosen.

In the Reduced Form of model (4) the coefficient of interest turns out to be statistically significant and negative. Increasing $foreigners_{rc}$ by one implies a change in resilience of around 0.4%. From the comparison, like before, of the two regions with extreme values in the instrument, the estimated difference imputed to this factor is of around 17 percentage points[25]. It means that the change in $foreigners_{rc}$ in these two areas determines a variation in regional trust that is responsible for a 17-percentage points reduction in the probabilities of showing resilience for the individuals living in the area with the highest value. In this model too the effect has to be interpreted as a causal one for the reasons indicated in Chapter 2.

Finally, column (5) reports the main results of my thesis, representing the outcome of the baseline model.
IV estimation turns out to determine a statistically significant coefficient of the variable of interest $reg\ trust_{rc}$. The coefficient is positive and with a magnitude of three times the one obtained with OLS methodology, disclosing a downward bias in the estimation of column (2). A higher level of 1 in regional trust has the causal effect of increasing the probability of resilience of almost 10%. It means that comparing adults and seniors of the same country with similar individual characteristics and living in similar regions except for a higher level of widespread trust by one, the ones with the higher regional trust have on average 10% more probabilities of having been resilient to the Covid-19 shock. The individuals of the area with the highest level in average trust in my sample are 27 percentage points[26] more likely of being resilient with respect to the inhabitants of the area with the lowest value. Importantly, in this last model, differently from the second one, the claim of causality of the effect estimated is stronger, as motivated in Chapter 2.

[25] Based on my own calculations: (39.98*-0.00424) - (0.59*-0.00424)
[26] Based on my own calculations: (6.25*0.0990) - (3.53*0.0990)

5. ROBUSTNESS

In this Chapter I discuss the robustness of my results proposing three different tests. First, I estimate the baseline model (specification (5)) adopting a cluster-robust variance-covariance estimator, given the aggregate nature of the independent variable and of the instrument. Second, I verify that the main effect remains in place when I adopt a different definition of the dependent variable. Finally, I check if the estimated coefficient of interest is driven by the relation in place in just one region *r*. The first two tests are displayed in *Table 8* while the third one in *Figure 9*.

Table 8. Two robustness tests

	(1)	(2)	(3)	(4)
Method	IV	IV	IV	IV
Dependent variable	$resilience_{irc}$	$resilience_{irc}$	$resilience2_{irc}$	$resilience2_{irc}$
$reg\ trust_{rc}$	0.0990***	0.0990*	0.0908***	0.0908
	(0.0268)	(0.0513)	(0.0287)	(0.0563)
Clusters	No	Yes	No	Yes
Observations	21,110	21,110	21,094	21,094
Kleibergen-Paap F statistic	4044	9.415	4042	9.414

*Note: Robust standard errors in parentheses. They are robust to heteroskedasticity only if there are no clusters, if there are clusters, they are also robust to clustering. *** p<0.01, ** p<0.05, * p<0.10*
In the Appendix in Table 14 I provide the complete output with all the regression coefficients.

5.1 FIRST TEST

The first test consists in estimating the baseline model, specification (5), not with robust standard errors, as done before, but with cluster-robust ones. Clusters refer to the regions *r,* with a total of 70 clusters. The idea is to take into account in this way the possible correlation

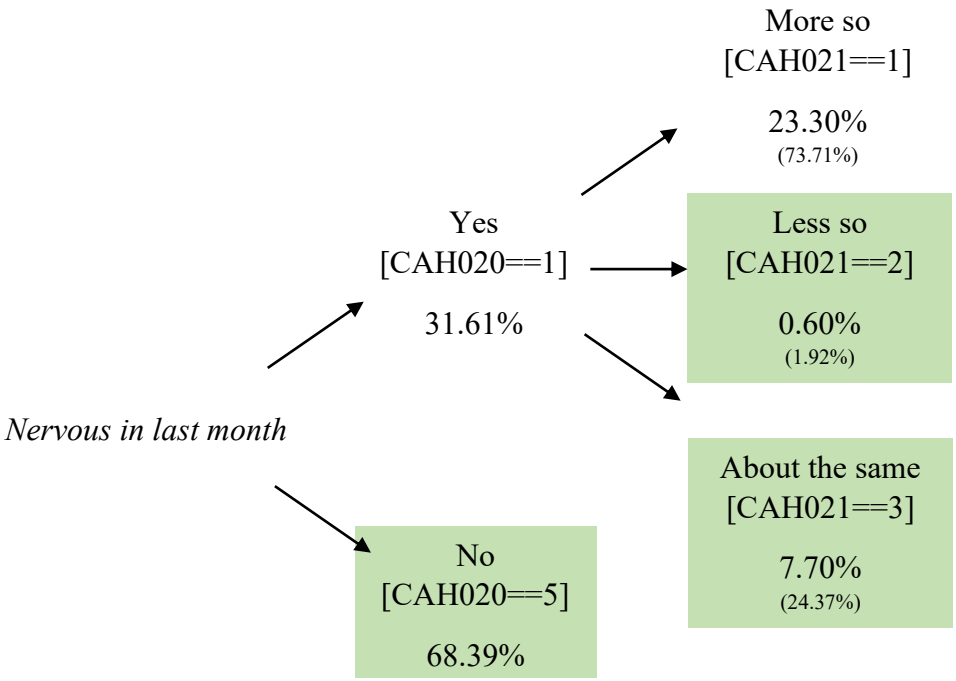
between the error terms of individuals living in the same region. In fact, if this correlation is in place, the coefficients estimated before in Chapter 4 are still the same, but the correct standard errors are different, implying different inference on their significance. The standard errors computed before are robust to the violation of the identical distribution assumptions of the errors (being them heteroskedastic), but not of the independence one. Therefore, if also the independence assumption of the errors is not respected, inference can misleadingly lead to reject the null hypothesis of a zero coefficient when there is not enough evidence to do so. The standard error reported in parentheses in column (2) takes into account both heteroskedasticity and clustering in the errors.

The coefficient of $reg\ trust_{rc}$ estimated this way is the same as in the baseline model reported in column (1), as expected by the theory, but the standard error is higher. The new standard error is almost twice the previous one and this leads to increase the p-value from 0.000 to 0.054. Despite the higher p-value, the coefficient is still significant at the 10%, specifically at the 5.4%. Therefore, the relation found before in Chapter 4 seems to be robust to the consideration of clusters too. Furthermore, the Kleibergen and Paap F statistic is here 9.41, much less than in the baseline model, but very close to the bound of 10 necessary for the proof of the First Stage condition. Considering that this is a just-identified IV model, this is not a major concern.

5.1 SECOND TEST

The second test consists in estimating the baseline model, but with a different dependent variable. The dependent variable, named $resilience2_{irc}$, is constructed similarly with respect to the outcome $resilience_{irc}$, but considers another dimension of mental health, nervousness and anxiety. I use questions CAH020 and CAH021 for its construction. CAH020 asks to the interviewee if in the last month he has felt nervous, anxious or on edge with possible answers: "1. Yes" and "5. No". CAH021 asks to whom has stated "1. Yes" if that has been more so, less so or about the same as before the outbreak of Corona, with "1. More so", "2. Less so" and "3. About the same". The variable $resilience2_{irc}$ is a dummy variable being 1 if the individual has shown resilience, 0 otherwise. It is equal to 1 when the individual has not been nervous, anxious or edge in the last month (CAH020==5), or if he has been so (CAH020==1), but as (CAH021==3) or less than prior to the pandemic (CAH021==2). *Figure 8* shows responses to these questions in the sample.

Figure 8. $resilience2_{irc}$ in the sample



In round brackets I report the percentages with respect to the subgroup of people who state to have been nervous in the last month (CAH020==1).

The results displayed in column (3) are similar to the ones of the baseline model, with a coefficient of around 0.09 and a Kleibergen and Paap test of 4042. This outcome provides additional evidence of the robustness of the relation between regional trust and human resilience to the Covid crisis. Indeed, relying on a different measure of resilience which considers a different aspect of mental health, the effect of interest is still in place and statistically significant.

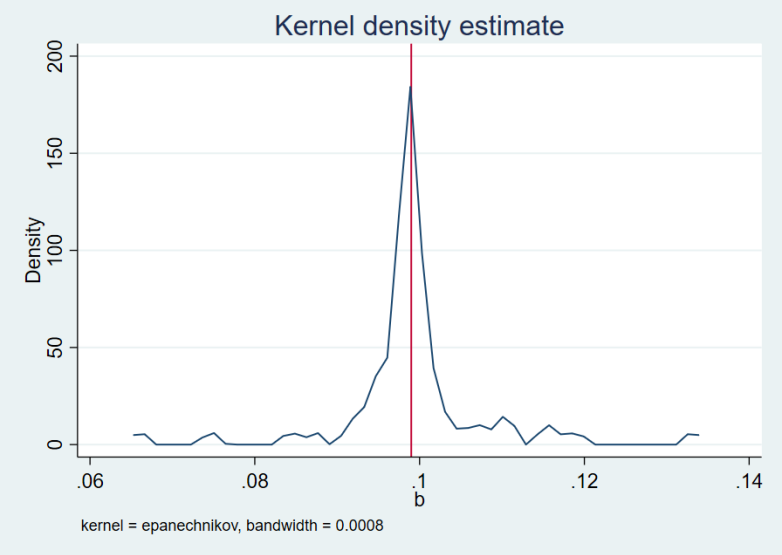
Furthermore, column (4) reports the outcomes of model in column (3), but with clusters. Considerations are similar to the ones discussed for column (2), however in this case the test statistic is lower, equal to 1.61 and marginally lower than the threshold of significance at 10%.

5.3 THIRD TEST

The third and last test is performed estimating the coefficient of interest dropping one region *r* at the time from the sample and analysing the correspondent probability distribution. *Figure 9* displays the Kernel density of the resulting estimated coefficient β. The distribution is centred on the coefficient β estimated in the baseline model, indicated in the graph with the red line, and it looks quite symmetrical. In no case the estimated effect is of negative sign. This means

that the effect of regional trust on resilience estimated in the IV regression is generally robust to dropping one region at the time.

Figure 9. Kernel density of the estimated β of the baseline model dropping one region at the time



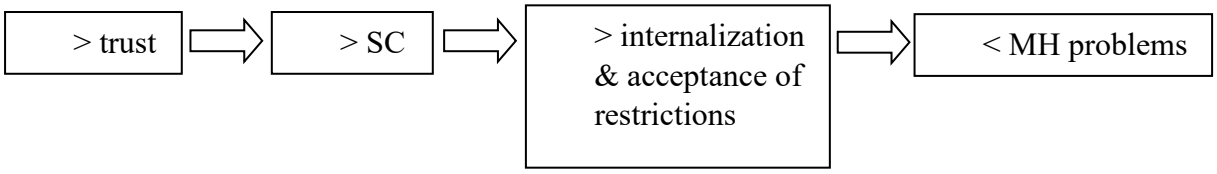
6. CHANNELS OF TRANSMISSION

After having assessed the robustness of the results, in this Chapter I discuss and test potential channels of transmission that might explain the impact of regional trust on resilience. Namely, plausible mechanisms which can motivate the relation found.
I first present two potential channels of transmission, then I propose a test for one of them and the corresponding results.

6.1 POTENTIAL CHANNELS

The first hypothesis is that, in regions with higher widespread trust, social capital is higher, and so is the probability of internalizing the restrictions imposed or recommended. In fact, individuals living in areas with more social capital are more willing to limit themselves for benefiting the whole community. Probably, they feel more strongly the importance of their contribution to the control of the virus diffusion, in order to alleviate the pressure in hospitals and to accelerate the end of lockdowns which hugely impact the economic system. By sharing the motivation behind the restrictions and considering these limitations as useful, these subjects enjoy a lower negative impact of the pandemic on mental health. This first hypothesis deals with the cognitive dimension of social capital. In *Figure 10* I report this reasoning scheme.

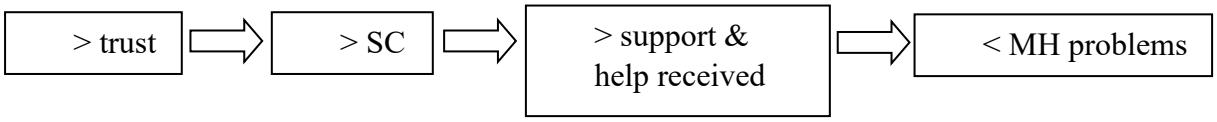
Figure 10. Scheme of the first possible channel of transmission



The second hypothesis is that living in areas with higher average trust, and social capital in general, makes people more likely to be helped and supported in times of crisis. Indeed, informal organizations, like volunteering associations, are more probably widespread, as the reciprocal aid among neighbours. Consequently, the feeling of loneliness in facing economic and psychological difficulties is alleviated, and the worsening in mental health buffered. This

second hypothesis deals with the structural dimension of social capital. In *Figure 11* I report this reasoning scheme.

Figure 11. Scheme of the second possible channel of transmission



6.2 TESTING THE FIRST HYPOTHESIS

The SHARE questionnaire offers the possibility to provide evidence in favour of the first hypothesis. The idea behind the test is that if the first hypothesis is true, people in regions with higher levels of trust in others will respect Covid restrictions more, compared to similar people living in similar areas, except for a lower level of widespread trust. Specifically, I have considered mobility and hygiene changes induced by recommendations and obligations put forward to fight against the Covid diffusion.

6.2.1 Construction of the tests

To assess compliance with the limitations in mobility I have relied on three measures: frequency of meetings with more than five people outside the household, frequency of distance kept to others in public and an index based on these two variables.

The first measure is provided by questions CAH010 and CAH011_3. CAH010 asks if since the outbreak of Corona, the interviewee has ever left his home, where 1 indicates "Yes" and 5 "No". For whom answers 1, CAH011_3 asks how often with respect to before, they have done meeting with more than five people from outside the household, with possible relevant[27] answers: "1. Not any more, 2. Less often, 3. About the same, 4. More often". The variable constructed, $social\ isolation_{irc}$, is a dummy being 1 if the respondent has never left home (CAH010==5) or if he has (CAH010==1), but not meeting more than five people outside the household anymore (CAH011_3==1). It is 0 if the interviewee has done these meetings, whether less often (CAH011_3==2), about the same (CAH011_3==3) or more frequently (CAH011_3==4) than prior to the pandemic.

For the second measure I use CAH010 and CAH013. CAH013 questions: "How often did you keep distance to others when you went outside your home? 1. Always, 2. Often, 3. Sometimes, 4. Never". The corresponding variable, $distance_{irc}$ is 1 if the interviewee has

[27] Where "relevant", like before in Chapter 3, refers to the exclusion of the categories "Does not apply, Don't know, Refusal" which are treated as missing values.

never left home (CAH010==5) or he has (CAH010==1), but always keeping distance with others (CAH013==1). $distance_{irc}$ is equal to 0, instead, in the remaining relevant[28] cases: if he has kept distance only often (CAH013==2), sometimes (CAH013==2) or never (CAH013==2).

Finally, the last variable, $less\ mobility_{irc}$, consists in an index constructed with the STATA command "polychoricpca" of the variables $social\ isolation_{irc}$ and $distance_{irc}$.

In order to verify the compliance also with hygiene recommendations, I have constructed a variable, $more\ hygiene_{irc}$, which indicates if the interviewee has used more often than before a hand sanitizer. Specifically, I rely on question CAH015 which inquires: "Did you use special hand sanitizer or disinfection fluids more frequently than usual?", with possible answers: "1. Yes, 5. No". $more\ hygiene_{irc}$ is a dummy variable which is equal to 1 if the respondent answers "Yes", 0 otherwise, excluding the missing values.

6.2.2 Results

In Table 9 I report the results of the tests. Column (1) displays the outcome testing the relation between regional trust and the index of mobility, columns (2) and (3) consider as dependent variables its corresponding two components and finally, column (4) shows the impact of the cognitive dimension of social capital on hygiene behaviours.

Table 9. Testing the first channel of transmission

	(1)	(2)	(3)	(4)
Method	IV	IV	IV	IV
Dependent variable	$less\ mobility_{irc}$	$social\ isolation_{irc}$	$distance_{irc}$	$more\ hygiene_{irc}$
$reg\ trust_{rc}$	0.128**	0.0614*	0.0479*	0.0679***
	(0.0527)	(0.0317)	(0.0253)	(0.0255)
Observations	20,693	20,708	21,092	21,104
Kleibergen-Paap F statistic	4030	4036	4042	4038

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.10*
In the Appendix in Table 15 I provide the complete output with all the regression coefficients.

[28] Same interpretation as above, excluding here "Don't know and refusal"

The effects of trust on mobility and hygiene are positive and statistically significant.

Specifically, increasing $reg\ trust_{rc}$ by 1, the index $less\ mobility_{irc}$ increases too at 5% level of significance. In addition, the probability that the interviewee has avoided meetings or has kept distance to others in public, with the same increase in regional trust, is higher respectively of about 6% and 5%. Also hygiene behaviours are statistically significantly impacted by regional trust, with a level of significance at the 1%. Each additional point in trust determines an increase in the probability of using hand sanitizer more often of around 7%.

Therefore, these tests provide evidence that the level of trust widespread in a region influences positively the compliance with Covid-19 related obligations and recommendations. Consequently, the first channel of transmission discussed might be among the ones linking the cognitive dimension of social capital to resilience to the Covid-19 crisis.

7. HETEROGENEITY

In this Chapter I present the results of the baseline model considering different subgroups in the sample. I first report the different effect of interest among individuals with or without partner and second, between rural and urban residents. I then propose possible explanations for the heterogeneity found and tests for them. I have explored heterogeneity also with respect to the other individual level controls (age_{irc}, $female_{irc}$, $employed_{irc}$, $education_{irc}$), but the most interesting results concern the variable $partner_{irc}$ and $building\ area_{irc}$.

7.1 RESULTS

Results are displayed in *Table 10.*

Table 10. Table of results for different subgroups in the sample

	(1)	(2)	(3)	(4)	(5)
Method	IV	IV	IV	IV	IV
Dependent variable	$resilience_{irc}$	$resilience_{irc}$	$resilience_{irc}$	$resilience_{irc}$	$resilience_{irc}$
$reg\ trust_{rc}$	0.0990***	0.157***	0.0658**	0.179***	0.0159
	(0.0268)	(0.0537)	(0.0309)	(0.0406)	(0.0344)
Restriction	none	$partner_{irc}$==0	$partner_{irc}$==1	$rural_{irc}$==1	$rural_{irc}$==0
Observations	21,110	5,752	15,358	11,247	9,863
Kleibergen-Paap F statistic	4044	1108	2824	1668	2941

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.10*
In the Appendix in Table 16 I provide the complete output with all the regression coefficients.

7.1.1 Singles VS couples

The first comparison shows that people without partner at the time of the interview ($partner_{irc} = 0$) have a more significant and higher effect of regional trust on resilience with respect to the ones with ($partner_{irc} = 1$). For adults and seniors with no partner, an increase in regional trust of 1 determines almost 16% more probabilities of not being more depressed after the Covid first wave, as visible in column (2). It is more than twice the effect for adults and seniors with partner for whom it is of almost 7%, as estimated in column (3).

Therefore, it seems that others, and in particular trust in them, matter more in preserving mental health for people who cannot rely on a partner.

7.1.2 Rural dwellers VS urban ones

Looking at the second heterogeneity, as it emerges from column (4) and (5), the different effect across the two subcategories is very large. Before discussing the result, I explain how I have obtained these two subsamples. I have generated a dichotomous variable, named $rural_{irc}$, using $building\ area_{irc}$ and with the attention of creating two groups with similar numerosity. $rural_{irc}$ is equal to 1 if the individual lives in a rural area, defined as "4. A small town" or "5. A rural area or village". It is equal to 0 otherwise, namely if the building is located in "1. a big city" or in "2. The suburbs or outskirts of a big city" or even in "3. A large town".

Interestingly, what turns out from the estimation is that regional trust has a casual effect on resilience only for individuals living in rural regions. For them, a regressor of interest higher of 1 is responsible for additional probabilities in being resilient of almost 18%. It is almost twice the coefficient estimated in the baseline model, reported in column (1), and ten times the insignificant coefficient found for urban dwellers.

7.2 TENTATIVE INTERPRETATIONS

7.2.1 Singles VS couples

One possible explanation for this heterogeneity is that the partner can provide the material and psychological support that for singles is totally reliant on others, including people outside the household. In other words, for the subgroup in column (3), the second channel of transmission presented in Chapter 6 can operate not only through regional trust, but also from the partner himself. A tentative support of this hypothesis comes from *Table 11.* It refers to question CAS020 of the SHARE questionnaire and compare responses for individuals with or without

partner. CAS020 asks if since the outbreak of Corona, the interviewee was helped by others from outside home to obtain necessities (e.g. food, medications or emergency household repairs).

Table 11. Shares of singles and coupled for question CAS020

$partner_{irc}$ \ CAS020	1. Yes (*help received*)	5. No (*no help received*)
0 (*single*)	36.31%	63.69%
1 (*coupled*)	20.08%	79.92%

What emerges is that singles receive more often support from outside the household, almost twice than coupled individuals. It might be therefore that adults and seniors with partner are less dependent on external support and therefore the channel discussed is weaker and the consequent effect on resilience too.

7.2.2 Rural dwellers VS urban ones

Regarding the second heterogeneity, I propose two different possible explanations, each one connected to one of the channels of transmission presented in Chapter 6.

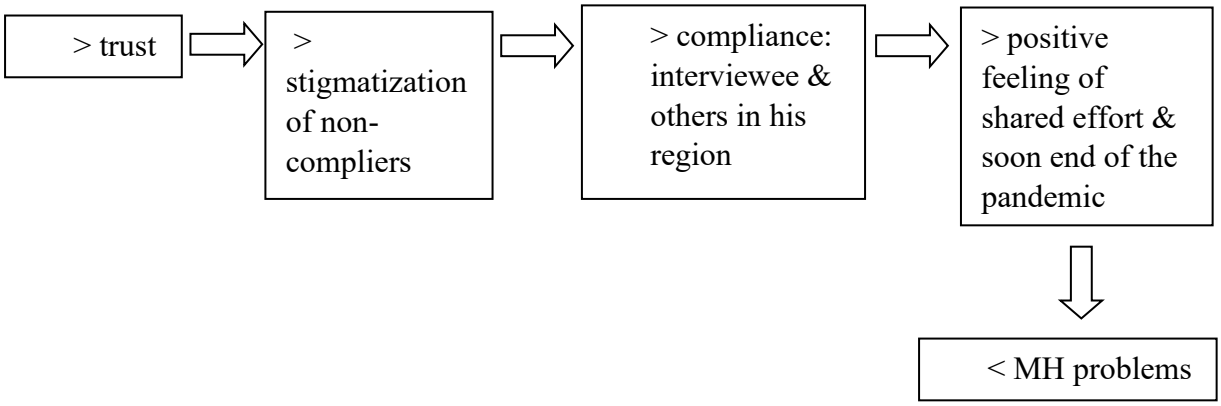
The first explanation is linked to the second channel, the one related to social support. It might be that the most relevant providers of aid during the pandemic are different for rural and urban dwellers. It could be that in rural areas the adult and senior population rely more on the local community, while in urban regions they rely on the partner and the household in general. Hence, the interpersonal relationships with the community of reference for finding help facing the shock could be stronger in rural regions with respect to urban ones. If this is the case, changes in regional trust will be irrelevant for the resilience of the inhabitants of urban regions. Indeed, they would rely mainly on the narrower social group of their household and would therefore be less sensitive to the changes in support provided by the local community, which is related to the level of trust in the region.

A provisional proof of this hypothesis comes from the estimated coefficient of the variable $partner_{irc}$ in the two subgroups. As visible from the complete STATA output reported in the Appendix in *Table 14,* the coefficient turns out to be statistically insignificant for the rural subsample, while significant for the urban one. Consequently, it provides evidence in favour of the argumentation that the relevant community for resilience is the broad one at the regional level for rural dwellers, while for urban ones it consists of the household, and the partner in particular.

The second possible explanation deals with the acceptance of the restrictions. The idea is that this channel is in place only in rural regions, where compliance with Covid related rules goes together with average trust. A possible reason for this could be that in rural areas social monitoring is in place and higher levels of widespread trust are associated with more stigmatization of non-compliers. The population is smaller in rural villages, and it is more likely that people know each other, and social monitoring is in place. Therefore, non-compliers are less anonymous and the impact for their reputation is relevant. Consequently, rural dwellers in regions with higher widespread trust more likely respect the restrictions for avoiding the stigma. In addition, knowing that this social monitoring is in place also for all the other inhabitants of the region, increasing their compliance too, might have beneficial effects for mental health. In fact, it can contribute to the positive feeling of an effort shared with others and of a soon end in the restrictions, thanks to the virus containment. In conclusion, higher regional trust in rural regions is associated with more resilience, as seen in *Table 10,* probably because in these areas compliance is higher and it increases hope that the pandemic and the consequent limitations will finish shortly.

On the other hand, this effect of average trust on resilience is not likely to be in place in urban regions. In fact, the bigger population makes it more difficult that the deterrent role of social monitoring and the consequent stigmatization are in place. Therefore, the absence of impact of higher regional trust on compliance and on the consequent positive feelings is reasonable.

Figure 12. Scheme of reasoning of the second possible justification of the heterogeneity between rural and urban dwellers



Note: the scheme is applied to rural regions

In order to test this second possible explanation, I have verified if in rural regions higher levels of trust determine more compliance with Covid restrictions. In fact, if it is the case, it could be that social monitoring is actually in place and it can therefore motivate the positive impact of regional trust on mental health following the reasoning summarized in *Figure 12*.

I have run the same regressions of *Table 9,* but separately for the two different subsamples and focusing on mobility measures. Results are shown in *Table 12.*

Table 12. Heterogeneity in the first channel of transmission for rural and urban dwellers

	(1)	(2)	(3)	(4)	(5)	(6)
Method	IV	IV	IV	IV	IV	IV
Dependent variable	$less\ mobility_{irc}$	$less\ mobility_{irc}$	$social\ isolation_{irc}$	$social\ isolation_{irc}$	$distance_{irc}$	$distance_{irc}$
$reg\ trust_{rc}$	0.258***	0.0415	0.0937*	0.0530	0.116***	-0.0132
	(0.0831)	(0.0666)	(0.0496)	(0.0402)	(0.0408)	(0.0316)
$rural_{irc}$==1	Yes	No	Yes	No	Yes	No
Observations	11,024	9,669	11,032	9,676	11,236	9,856
Kleibergen-Paap F statistic	1672	2938	1674	2940	1668	2940

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.10*
In the Appendix in Table 17 I provide the complete output with all the regression coefficients.

The coefficient of $reg\ trust_{rc}$ turns out to be statistically significant for all the measures of reduction in mobility, but only for rural dwellers. It means that this dimension of social capital influences the respect of mobility restrictions only for inhabitants of rural areas. On the contrary, for urban dwellers it seems that compliance with Covid rules is not affected by regional trust. Therefore, the coefficients found in *Table 9* are likely to be driven only by the relation in place in rural areas. In fact, restricting the sample to them, the magnitude of the coefficient estimated increases with respect to the comprehensive sample for all the three dependent variables, as visible from column (1), (3), (5). These results seem to confirm the hypothesis that in rural regions, average trust influences compliance. Consequently, they can provide evidence that the channel of compliance is in place, justifying the significance of the relation between regional trust and resilience for rural dwellers.

CONCLUSIONS

In my thesis, I have tried to provide empirical evidence on the hypothesis that social capital has increased human resilience to the Covid shock. My results confirm this hypothesis. European adults and seniors living in regions with higher interpersonal trust have more probabilities of not worsening their mental health. Specifically, an increase of 1 in average regional trust determines a corresponding increase of 10 percentage points in the probabilities of not being psychologically damaged by the pandemic.

I have proposed two potential channels of transmission of this relation. The first one, which has also been successfully tested, is connected to the cognitive dimension of social capital and regards the internalization of the restrictions. The second one, linked to the structural dimension of social capital, is related to the support provided by the local community.

Furthermore, looking at the heterogeneity in the effect of interest, I have found that it is stronger for single individuals with respect to the ones with partner and it is in place only for rural dwellers. I have tentatively hypothesised the reasons behind these empirical findings and tested them. A possible motivation for the first heterogeneity, also supported by data, is that the partner provides part of the aid that for singles is totally reliant on others. The second heterogeneity, on the other hand, could be motivated by a larger community of reference in rural areas with respect to urban ones or by the social monitoring in place in smaller regions only. I have obtained evidence in favour to the second hypothesis.

In this work, I have attempted to disclose causal relations and not just simple correlations and the IV methodology applied has helped pursuing this objective. In addition, the panel nature of the SHARE dataset has allowed me to control for many relevant individual characteristics, increasing precision in the estimates. Finally, these results are based on a large sample, and they are robust to different tests, from the usage of a cluster robust variance covariance estimator, to the adoption of a different dependent variable definition and the estimation dropping one region at the time. Hence, their validity is further strengthened.

At the same time, I want to remark some limitations of the conclusions reached. First, I am here considering just one component of social capital, trust, therefore overlooking the remaining ones. Second, the sample only includes European countries and is restricted to people older than 50. Third, although I have relied on the best quality data available, there is

no complete guarantee of representativeness at NUTS 1 level for the final sample and for the measure of regional trust. In addition, I implicitly assume that the relation of interest is linear, but it might not to be the case. Lastly, the choice of an instrument is always a critical task, since the exclusion restriction cannot be tested, but just argued.

On top of these critical points, I want to stress two additional ones, related more generally to the methodology here followed.

First, econometrics does not guarantee that the effects estimated will persist in the future. Applied to my case, the results discussed are proved valid for the shock of Covid-19, but there is no assurance they will be the same under future shocks. This criticism recalls the "invariance problem" discussed by Keynes criticizing Jan Timbergen's work of 1939 (see Keynes (1939) in Boumans and Davis (2016))[29].

Second, the rigorousness of econometrics does not avoid some discretion of the researcher, which has an impact on the final results. In fact, the construction of variables or the inclusion or not of some controls, for example, are not indicated directly by data, but are scholar's choices. Of course, in general they are not arbitrary decisions and they are informed by theory and by the literature, nevertheless they deeply influence what data can say. This crucial aspect emerges emblematically from the experiment run by Mary Morgan and Jan Magnus in the 1990s, warning about the absence of absolute objectivity in the final findings. They asked to different teams of researchers the same tasks using the same dataset and the outcomes obtained were different for all of them (see Magnus and Morgan (1999) in ibidem)[30].

Taking into account these limitations, my work still provides additional evidence in favour of a causal effect of social capital on human resilience. Specifically, it contributes to the related branch of the literature with, according to my knowledge, the first causal analysis in the context of the Covid-19 shock.

Further studies could enrich this emerging field of research, analysing the impact of other dimensions of social capital and considering the effects for younger individuals and for non-Europeans. In addition, longer term resilience could be evaluated using data on the following Covid waves and the reaction to them, and variation in the level of widespread trust could be assessed, as done for example by Lindström and Giordano (2016) for the financial crisis.

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[29] Complete references: Keynes, John Maynard (1939) "Professor Tinbergen's Method", *The Economic Journal* 49: 558-68.
Boumans, M., & Davis, J. B. (2016). *Economic methodology: Understanding economics as a science*. *Second edition.* Macmillan International Higher Education, pag. 38

[30] Complete references: Magnus, J. R., & Morgan, M. S. (1999). Methodology and tacit knowledge: Two experiments in econometrics.
Ibidem, pag. 39

Finally, the results of this thesis strengthen the claim of other scholars to invest in social capital. In fact, this form of capital, as shown in my work and in the preceding ones, can enhance human and societal capacity to react to shocks. Indeed, it can provide additional resources with respect to the ones offered by the financial and the physical capital. Moreover, considering the continuous increase in number and intensity of the extreme events caused by climate change, this investment turns out to be particularly urgent and crucial. Furthermore, the work, among the others, of Aldrich and Meyer (2015) shows that investing in social capital is feasible and he presents the ways that have already been proven by scholars to be effective.

Thus, in conclusion, building social capital could be fruitful for the always more relevant human resilience and research already provided good practices easing the required action.

REFERENCES

Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American behavioral scientist*, *59*(2), 254-269.

Alesina, A., & La Ferrara, E. (2002). Who trusts others?. *Journal of public economics*, *85*(2), 207-234.

Almedom, A. M., & Glandon, D. (2008). Social capital and mental health. In *Social capital and health* (pp. 191-214). Springer, New York, NY.

Arachchi, J. I., & Managi, S. (2021). The role of social capital in COVID-19 deaths. *BMC public health*, *21*(1), 1-9.

Arezzo, M. F., & Giudici, C. (2017). The effect of social capital on health among European older adults: an instrumental variable approach. *Social Indicators Research*, *134*(1), 153-166.

Atzendorf, J., & Gruber, S. (2021). SHARE Working Paper Series 63-2021: The mental well-being of older adults after the first wave of COVID-19.

Barrios, J. M., Benmelech, E., Hochberg, Y. V., Sapienza, P., & Zingales, L. (2021). Civic capital and social distancing during the Covid-19 pandemic☆. *Journal of Public Economics*, *193*, 104310.

Borgonovi, F., & Andrieu, E. (2020). Bowling together by bowling alone: Social capital and Covid-19. *Social science & medicine*, *265*, 113501.

Durante, R., Guiso, L., & Gulino, G. (2021). Asocial capital: Civic culture and social distancing during COVID-19. *Journal of Public Economics*, *194*, 104342.

Economou, C., Kaitelidou, D., Katsikas, D., Siskou, O., & Zafiropoulou, M. (2014). Impacts of the economic crisis on access to healthcare services in Greece with a focus on the vulnerable groups of the population1. *Social Cohesion and Development*, *9*(2), 99-115.

Elgar, F. J., Stefaniak, A., & Wohl, M. J. (2020). The trouble with trust: Time-series analysis of social capital, income inequality, and COVID-19 deaths in 84 countries. *Social Science & Medicine*, *263*, 113365.

Eriksson, M. (2011). Social capital and health–implications for health promotion. *Global health action*, *4*(1), 5611.

Frank, C., Davis, C. G., & Elgar, F. J. (2014). Financial strain, social capital, and perceived health during economic recession: a longitudinal survey in rural Canada. *Anxiety, Stress, & Coping*, *27*(4), 422-438.

Gannon, B., & Roberts, J. (2020). Social capital: exploring the theory and empirical divide. *Empirical Economics*, *58*(3), 899-919.

Helliwell, J. F., Huang, H., & Wang, S. (2014). Social capital and well-being in times of crisis. *Journal of Happiness Studies*, *15*(1), 145-162.

Kim, D., Subramanian, S. V., & Kawachi, I. (2008). Social capital and physical health. In *Social capital and health* (pp. 139-190). Springer, New York, NY.

Koroļeva, I., Sniķere, S., Aleksandrovs, A., Reine, I., Trapencieris, M., & Ivanovs, A. (2021, May). EFFECTS OF SOCIAL ISOLATION ON MENTAL HEALTH DURING COVID-19 IN THE CONTEXT OF AGEING. In *SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference* (Vol. 6, pp. 118-132).

Lindström, M. (2008). Social capital and health-related behaviors. In *Social capital and health* (pp. 215-238). Springer, New York, NY.

Lindström, M., & Giordano, G. N. (2016). The 2008 financial crisis: Changes in social capital and its association with psychological wellbeing in the United Kingdom–A panel study. *Social Science & Medicine*, *153*, 71-80.

Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and society*, *13*(1).

Poortinga, W. (2012). Community resilience and health: The role of bonding, bridging, and linking aspects of social capital. *Health & place*, *18*(2), 286-295.

Portela, M., Neira, I., & del Mar Salinas-Jiménez, M. (2013). Social capital and subjective wellbeing in Europe: A new approach on social capital. *Social Indicators Research*, *114*(2), 493-511.

Rocco, L., & Suhrcke, M. (2012). *Is social capital good for health?: a European perspective* (p. 16). Copenhagen: WHO Regional Office for Europe.

Wu, C. (2021). Social capital and COVID-19: a multidimensional and multilevel approach. *Chinese Sociological Review*, *53*(1), 27-54.

DATA

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 1*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w1.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 2*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w2.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 3 – SHARELIFE*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w3.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 4*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w4.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w5.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w6.710.

Börsch-Supan, A. (2020). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 7*. Release version: 7.1.1. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w7.711.

Börsch-Supan, A. (2021). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8*. Release version: 1.0.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w8.100.

Börsch-Supan, A. (2021). *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 8. COVID-19 Survey 1*. Release version: 1.0.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w8ca.100.

Börsch-Supan, A., M. Brandt, C. Hunkler, T. Kneip, J. Korbmacher, F. Malter, B. Schaan, S. Stuck, S. Zuber (2013). *Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)*. International Journal of Epidemiology. DOI: 10.1093/ije/dyt088.

ESS Round 4: European Social Survey Round 4 Data (2008). Data file edition 4.5. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS4-2008.

ESS Round 5: European Social Survey Round 5 Data (2010). Data file edition 3.4. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS5-2010.

ESS Round 9: European Social Survey Round 9 Data (2018). Data file edition 3.1. NSD - Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS9-2018.

Kaminska, O. (2020). Guide to using weights and sample design indicators with ESS data. *European Social Survey*.

Eurostat: Gross domestic product (GDP) at current market prices by NUTS 2 regions [NAMA_10R_2GDP]. Statistics | Eurostat (europa.eu)

Eurostat: Population by group of country of birth, current activity status and NUTS 2 region [CENS_11COBA_R2]. Eurostat - Data Explorer (europa.eu)

Eurostat: Unemployment rates by sex, age, country of birth and NUTS 2 regions [LFST_R_LFUR2GAC]. Statistics | Eurostat (europa.eu)

APPENDIX

Table 13. Complete STATA output of the results

	(1)	(2)	(3)	(4)	(5)
VARIABLES	resilience	resilience	reg_trust	resilience	resilience
ind_trust	0.00771***				
	(0.00120)				
4.Wave_ex026	-0.0344				
	(0.0257)				
5.Wave_ex026	-0.0454***				
	(0.0134)				
6.Wave_ex026	-0.0495***				
	(0.0112)				
7.Wave_ex026	0.00571				
	(0.0284)				
8.Wave_ex026	-0.0209				
	(0.0175)				
age	0.00924	0.0136**	-0.000263	0.0136**	0.0136**
	(0.00593)	(0.00580)	(0.00318)	(0.00580)	(0.00579)
c.age#c.age	-7.57e-05*	-0.000105**	5.28e-06	-0.000105**	-0.000105**
	(4.21e-05)	(4.13e-05)	(2.26e-05)	(4.13e-05)	(4.13e-05)
female	-0.104***	-0.103***	7.03e-05	-0.103***	-0.103***
	(0.00537)	(0.00536)	(0.00307)	(0.00536)	(0.00536)
partner	0.0242***	0.0261***	-0.000901	0.0258***	0.0259***
	(0.00644)	(0.00644)	(0.00347)	(0.00644)	(0.00644)
1.education	-0.00230	8.15e-05	-5.83e-05	0.000558	0.000564
	(0.0172)	(0.0172)	(0.00874)	(0.0172)	(0.0172)
2.education	0.0189	0.0224	-0.0197**	0.0226	0.0245
	(0.0172)	(0.0172)	(0.00893)	(0.0173)	(0.0172)
3.education	0.0229	0.0280*	-0.0153*	0.0282*	0.0297*
	(0.0169)	(0.0170)	(0.00875)	(0.0170)	(0.0170)
4.education	0.0133	0.0236	-0.0192	0.0240	0.0259
	(0.0218)	(0.0218)	(0.0124)	(0.0218)	(0.0219)
5.education	0.0234	0.0320*	-0.0207**	0.0326*	0.0347**
	(0.0173)	(0.0173)	(0.00896)	(0.0173)	(0.0173)
6.education	0.0249	0.0373	-0.0249	0.0388	0.0413
	(0.0327)	(0.0327)	(0.0160)	(0.0326)	(0.0326)
2.building_area	-0.00669	-0.00544	0.0106*	-0.00600	-0.00705
	(0.0109)	(0.0109)	(0.00556)	(0.0109)	(0.0109)
3.building_area	0.000615	0.00380	-0.00958*	0.00377	0.00471
	(0.00905)	(0.00906)	(0.00489)	(0.00906)	(0.00907)
4.building_area	0.00185	0.00321	-0.00315	0.00230	0.00261
	(0.00855)	(0.00855)	(0.00502)	(0.00855)	(0.00856)

5.building_area	0.0184**	0.0206**	-0.0239***	0.0209**	0.0233***
	(0.00818)	(0.00819)	(0.00500)	(0.00818)	(0.00824)
employed	0.0134*	0.0152**	0.0129***	0.0158**	0.0145*
	(0.00777)	(0.00777)	(0.00454)	(0.00777)	(0.00777)
13.country	0.0101	-0.0137	1.101***	0.0178	-0.0912***
	(0.0131)	(0.0183)	(0.00733)	(0.0129)	(0.0336)
14.country	0.00424	-0.0158	0.800***	-0.00248	-0.0816***
	(0.0158)	(0.0192)	(0.00915)	(0.0164)	(0.0306)
15.country	-0.0671***	-0.0933***	0.851***	-0.0801***	-0.164***
	(0.0219)	(0.0249)	(0.0123)	(0.0225)	(0.0356)
16.country	-0.101***	-0.0978***	-0.118***	-0.116***	-0.104***
	(0.0137)	(0.0134)	(0.0100)	(0.0145)	(0.0136)
17.country	-0.0494***	-0.0392***	-0.336***	-0.0570***	-0.0237
	(0.0133)	(0.0135)	(0.00869)	(0.0135)	(0.0146)
19.country	-0.000708	0.0152	0.0634***	0.00790	0.00163
	(0.0240)	(0.0217)	(0.0132)	(0.0219)	(0.0223)
23.country	-0.0589***	-0.0591***	0.0585***	-0.0604***	-0.0662***
	(0.0108)	(0.0107)	(0.00743)	(0.0107)	(0.0111)
29.country	-0.0539***	0.00454	-1.044***	-0.0415***	0.0619**
	(0.0192)	(0.0164)	(0.00772)	(0.0143)	(0.0264)
32.country	0.0208	0.0360**	-0.285***	0.0220	0.0502***
	(0.0274)	(0.0155)	(0.0110)	(0.0152)	(0.0163)
51.country	-0.0308	0.0446**	-1.251***	-0.00287	0.121***
	(0.0270)	(0.0225)	(0.0104)	(0.0187)	(0.0356)
61.country	-0.0642**	0.00546	-1.113***	-0.0394**	0.0708**
	(0.0253)	(0.0194)	(0.0124)	(0.0165)	(0.0298)
GDPpc_r	-1.71e-07	-4.29e-07	3.56e-05***	2.36e-06***	-1.17e-06*
	(5.11e-07)	(5.28e-07)	(5.49e-07)	(8.08e-07)	(6.07e-07)
unemployment_r	-0.00172*	0.000143	-0.0422***	0.000218	0.00440**
	(0.00103)	(0.00127)	(0.000656)	(0.00118)	(0.00199)
reg_trust		0.0324***			0.0990***
		(0.0112)			(0.0268)
foreigners			-0.0428***	-0.00424***	
			(0.000673)	(0.00115)	
Observations	21,110	21,110	21,110	21,110	21,110
R-squared	0.041	0.039		0.039	0.037
widstat	.	.	.	.	4044

Note: Robust standard errors to heteroskedasticity in parentheses. p<0.10, ** p<0.05, *** p<0.01.*
c.age#c.age is the STATA way of indicating age^2 and widstat corresponds to the Kleibergen-Paap F statistic.

Table 14. Complete STATA output of the two robustness tests

	(1)	(2)	(3)	(4)
VARIABLES	resilience	resilience	resilience2	resilience2
reg_trust	0.0990***	0.0990*	0.0908***	0.0908
	(0.0268)	(0.0513)	(0.0287)	(0.0563)
13.country	-0.0912***	-0.0912	-0.102***	-0.102
	(0.0336)	(0.0643)	(0.0358)	(0.0708)

14.country	-0.0816***	-0.0816	-0.0728**	-0.0728
	(0.0306)	(0.0542)	(0.0325)	(0.0608)
15.country	-0.164***	-0.164**	-0.220***	-0.220**
	(0.0356)	(0.0815)	(0.0380)	(0.0903)
16.country	-0.104***	-0.104***	-0.123***	-0.123***
	(0.0136)	(0.0260)	(0.0145)	(0.0324)
17.country	-0.0237	-0.0237	-0.0566***	-0.0566**
	(0.0146)	(0.0188)	(0.0159)	(0.0229)
19.country	0.00163	0.00163	-0.107***	-0.107**
	(0.0223)	(0.0383)	(0.0240)	(0.0514)
23.country	-0.0662***	-0.0662***	-0.104***	-0.104***
	(0.0111)	(0.0136)	(0.0120)	(0.0210)
29.country	0.0619**	0.0619	0.0951***	0.0951*
	(0.0264)	(0.0493)	(0.0282)	(0.0531)
32.country	0.0502***	0.0502	0.0659***	0.0659
	(0.0163)	(0.0458)	(0.0171)	(0.0452)
51.country	0.121***	0.121*	0.0984**	0.0984
	(0.0356)	(0.0645)	(0.0384)	(0.0700)
61.country	0.0708**	0.0708	0.0817**	0.0817
	(0.0298)	(0.0750)	(0.0319)	(0.0820)
age	0.0136**	0.0136*	0.0137**	0.0137*
	(0.00579)	(0.00777)	(0.00634)	(0.00792)
c.age#c.age	-0.000105**	-0.000105*	-9.82e-05**	-9.82e-05*
	(4.13e-05)	(5.42e-05)	(4.50e-05)	(5.47e-05)
female	-0.103***	-0.103***	-0.0973***	-0.0973***
	(0.00536)	(0.00642)	(0.00588)	(0.00580)
partner	0.0259***	0.0259***	0.00783	0.00783
	(0.00644)	(0.00845)	(0.00683)	(0.00716)
employed	0.0145*	0.0145	-0.00501	-0.00501
	(0.00777)	(0.00896)	(0.00874)	(0.00787)
1.education	0.000564	0.000564	0.0149	0.0149
	(0.0172)	(0.0237)	(0.0184)	(0.0236)
2.education	0.0245	0.0245	0.0375**	0.0375
	(0.0172)	(0.0274)	(0.0185)	(0.0278)
3.education	0.0297*	0.0297	0.0448**	0.0448*
	(0.0170)	(0.0242)	(0.0182)	(0.0262)
4.education	0.0259	0.0259	0.0199	0.0199
	(0.0219)	(0.0305)	(0.0237)	(0.0306)
5.education	0.0347**	0.0347	0.0478**	0.0478*
	(0.0173)	(0.0246)	(0.0186)	(0.0265)
6.education	0.0413	0.0413	-0.00212	-0.00212
	(0.0326)	(0.0457)	(0.0384)	(0.0332)
2.building_area	-0.00705	-0.00705	-0.00377	-0.00377
	(0.0109)	(0.0123)	(0.0119)	(0.0119)
3.building_area	0.00471	0.00471	-0.00424	-0.00424
	(0.00907)	(0.0132)	(0.0100)	(0.0143)
4.building_area	0.00261	0.00261	0.00166	0.00166
	(0.00856)	(0.0102)	(0.00934)	(0.0117)
5.building_area	0.0233***	0.0233**	0.0239***	0.0239*
	(0.00824)	(0.0110)	(0.00901)	(0.0145)
GDPpc_r	-1.17e-06*	-1.17e-06*	-4.17e-07	-4.17e-07
	(6.07e-07)	(7.04e-07)	(6.49e-07)	(1.03e-06)

unemployment_r	0.00440**	0.00440	0.00567***	0.00567
	(0.00199)	(0.00440)	(0.00212)	(0.00493)
Observations	21,110	21,110	21,094	21,094
R-squared	0.037	0.037	0.036	0.036
widstat	4044	9.415	4042	9.414

*Note: Robust standard errors in parentheses. They are robust to heteroskedasticity only if there are no clusters (columns (1) and (3)), if there are clusters (columns (2) and (4)), they are also robust to clustering. *** p<0.01, ** p<0.05, * p<0.10*

Table 15. Complete STATA output of the test for the first channel of transmission

	(1)	(2)	(3)	(4)
VARIABLES	less_mobility	social_isolation	distance	more_hygiene
reg_trust	0.128**	0.0614*	0.0479*	0.0679***
	(0.0527)	(0.0317)	(0.0253)	(0.0255)
13.country	-0.509***	-0.311***	-0.123***	0.0327
	(0.0685)	(0.0410)	(0.0332)	(0.0333)
14.country	-0.246***	-0.0880**	-0.119***	-0.0263
	(0.0647)	(0.0387)	(0.0317)	(0.0319)
15.country	0.0591	-0.00919	0.0487	0.199***
	(0.0663)	(0.0413)	(0.0302)	(0.0320)
16.country	0.430***	0.262***	0.103***	0.174***
	(0.0249)	(0.0155)	(0.0117)	(0.0130)
17.country	-0.0146	0.0543***	-0.0598***	0.159***
	(0.0320)	(0.0188)	(0.0157)	(0.0150)
19.country	-0.227***	0.0134	-0.196***	0.138***
	(0.0407)	(0.0245)	(0.0190)	(0.0201)
23.country	0.185***	0.146***	0.0123	0.0883***
	(0.0234)	(0.0143)	(0.0113)	(0.0123)
29.country	0.125**	0.109***	-0.000686	0.197***
	(0.0551)	(0.0329)	(0.0267)	(0.0260)
32.country	0.0291	0.0125	0.00971	0.106***
	(0.0373)	(0.0223)	(0.0173)	(0.0184)
51.country	0.205***	0.0933**	0.0791**	0.0887**
	(0.0735)	(0.0444)	(0.0355)	(0.0365)
61.country	0.523***	0.317***	0.128***	0.149***
	(0.0623)	(0.0370)	(0.0298)	(0.0303)
age	-0.0205*	-0.0136**	-0.00304	0.0241***
	(0.0119)	(0.00683)	(0.00579)	(0.00561)
c.age#c.age	0.000233***	0.000150***	4.16e-05	-0.000198***
	(8.37e-05)	(4.83e-05)	(4.08e-05)	(4.02e-05)
female	0.134***	0.0573***	0.0547***	0.0379***
	(0.0115)	(0.00667)	(0.00559)	(0.00548)
partner	0.0340***	0.0145*	0.0136**	0.0414***
	(0.0128)	(0.00744)	(0.00623)	(0.00634)
1.education	-0.0887***	-0.0408**	-0.0341**	0.00920
	(0.0294)	(0.0171)	(0.0137)	(0.0157)

2.education	-0.0528*	-0.0350**	-0.0115	0.0393**
	(0.0300)	(0.0175)	(0.0139)	(0.0157)
3.education	-0.0936***	-0.0682***	-0.0122	0.0646***
	(0.0301)	(0.0175)	(0.0140)	(0.0156)
4.education	-0.129***	-0.0815***	-0.0285	0.0527**
	(0.0423)	(0.0242)	(0.0203)	(0.0212)
5.education	-0.152***	-0.109***	-0.0219	0.0769***
	(0.0312)	(0.0181)	(0.0146)	(0.0159)
6.education	-0.0522	-0.0800**	0.0341	0.102***
	(0.0657)	(0.0402)	(0.0318)	(0.0285)
2.building_area	-0.0258	-0.00668	-0.0146	-0.00465
	(0.0224)	(0.0129)	(0.0109)	(0.0103)
3.building_area	0.00250	-0.00939	0.0113	0.000553
	(0.0190)	(0.0111)	(0.00926)	(0.00852)
4.building_area	-0.0134	-0.0118	0.000452	-0.00206
	(0.0173)	(0.0102)	(0.00828)	(0.00807)
5.building_area	-0.0379**	-0.0257**	-0.00715	-0.0306***
	(0.0175)	(0.0102)	(0.00851)	(0.00839)
employed	-0.177***	-0.109***	-0.0424***	0.0330***
	(0.0178)	(0.0103)	(0.00879)	(0.00761)
GDPpc_r	-8.12e-07	1.86e-08	-7.78e-07	-6.74e-07
	(1.15e-06)	(6.75e-07)	(5.61e-07)	(5.89e-07)
unemployment_r	0.00584	0.00261	0.00244	0.00199
	(0.00373)	(0.00226)	(0.00173)	(0.00177)
Observations	20,693	20,708	21,092	21,104
R-squared	0.120	0.110	0.071	0.043
widstat	4030	4036	4042	4038

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

Table 16. Complete STATA output for the different subgroups in the sample

	(1)	(2)	(3)	(4)	(5)
VARIABLES	resilience	resilience	resilience	resilience	resilience
reg_trust	0.0990***	0.157***	0.0658**	0.179***	0.0159
	(0.0268)	(0.0537)	(0.0309)	(0.0406)	(0.0344)
13.country	-0.0912***	-0.171**	-0.0511	-0.216***	0.0238
	(0.0336)	(0.0684)	(0.0385)	(0.0518)	(0.0437)
14.country	-0.0816***	-0.209***	-0.0248	-0.189***	0.0107
	(0.0306)	(0.0629)	(0.0348)	(0.0497)	(0.0395)
15.country	-0.164***	-0.192**	-0.153***	-0.308***	-0.0593
	(0.0356)	(0.0750)	(0.0405)	(0.0562)	(0.0471)
16.country	-0.104***	-0.0923***	-0.110***	-0.113***	-0.104***
	(0.0136)	(0.0278)	(0.0156)	(0.0185)	(0.0215)
17.country	-0.0237	-0.0463*	-0.0200	-0.0130	-0.0272
	(0.0146)	(0.0281)	(0.0171)	(0.0186)	(0.0256)

19.country	0.00163	-0.0407	0.00706	-0.0178	0.0206
	(0.0223)	(0.0459)	(0.0255)	(0.0329)	(0.0320)
23.country	-0.0662***	-0.118***	-0.0438***	-0.0713***	-0.0588***
	(0.0111)	(0.0219)	(0.0129)	(0.0141)	(0.0184)
29.country	0.0619**	0.0944*	0.0420	0.153***	-0.00576
	(0.0264)	(0.0545)	(0.0301)	(0.0399)	(0.0363)
32.country	0.0502***	0.0269	0.0571***	0.108***	0.0346
	(0.0163)	(0.0332)	(0.0185)	(0.0264)	(0.0228)
51.country	0.121***	0.181**	0.0827**	0.253***	0.00139
	(0.0356)	(0.0710)	(0.0410)	(0.0535)	(0.0519)
61.country	0.0708**	0.105*	0.0481	0.179***	0.0262
	(0.0298)	(0.0607)	(0.0340)	(0.0444)	(0.0542)
age	0.0136**	0.0142	0.0166**	0.0133*	0.0147*
	(0.00579)	(0.0130)	(0.00663)	(0.00770)	(0.00885)
c.age#c.age	-0.000105**	-0.000101	-0.000130***	-0.000105*	-0.000110*
	(4.13e-05)	(9.05e-05)	(4.76e-05)	(5.50e-05)	(6.29e-05)
female	-0.103***	-0.102***	-0.104***	-0.0977***	-0.108***
	(0.00536)	(0.0113)	(0.00617)	(0.00729)	(0.00793)
partner	0.0259***			**0.00758**	**0.0416*** **
	(0.00644)			(0.00891)	(0.00937)
1.education	0.000564	0.0275	-0.0144	-0.00444	0.00588
	(0.0172)	(0.0308)	(0.0206)	(0.0232)	(0.0259)
2.education	0.0245	0.0619*	0.00636	0.0377	0.00899
	(0.0172)	(0.0317)	(0.0205)	(0.0231)	(0.0263)
3.education	0.0297*	0.0806***	0.00493	0.0415*	0.0195
	(0.0170)	(0.0310)	(0.0202)	(0.0229)	(0.0257)
4.education	0.0259	0.0645	0.00666	0.00794	0.0414
	(0.0219)	(0.0438)	(0.0253)	(0.0318)	(0.0308)
5.education	0.0347**	0.0744**	0.0134	0.0520**	0.0209
	(0.0173)	(0.0320)	(0.0206)	(0.0236)	(0.0260)
6.education	0.0413	0.164***	-0.00668	0.0770*	0.0132
	(0.0326)	(0.0604)	(0.0383)	(0.0454)	(0.0464)
2.building_area	-0.00705	-0.00859	-0.00672		-0.00584
	(0.0109)	(0.0224)	(0.0123)		(0.0111)
3.building_area	0.00471	0.000321	0.00617		-0.00174
	(0.00907)	(0.0185)	(0.0103)		(0.00929)
4.building_area	0.00261	0.0108	-0.00102		
	(0.00856)	(0.0171)	(0.00984)		
5.building_area	0.0233***	0.0430***	0.0151	0.0252***	
	(0.00824)	(0.0166)	(0.00946)	(0.00807)	
employed	0.0145*	0.00638	0.0167*	0.0186*	0.0105
	(0.00777)	(0.0179)	(0.00862)	(0.0107)	(0.0113)
GDPpc_r	-1.17e-06*	-2.27e-06**	-2.96e-07	4.55e-07	-7.98e-07
	(6.07e-07)	(1.12e-06)	(7.14e-07)	(1.09e-06)	(7.52e-07)
unemployment_r	0.00440**	0.00728*	0.00327	0.0129***	-0.00134
	(0.00199)	(0.00412)	(0.00226)	(0.00318)	(0.00261)
Observations	21,110	5,752	15,358	11,247	9,863

R-squared	0.037	0.029	0.040	0.033	0.041
widstat	4044	1108	2824	1668	2941

*Note: Robust standard errors to heteroskedasticity in parentheses. * p<0.10, ** p<0.05, *** p<0.01.*

Table 17. Complete STATA output for the heterogeneity in the first channel of transmission for rural and urban dwellers

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	less_mobility	less_mobility	social_isolation	social_isolation	distance	distance
reg_trust	0.258***	0.0415	0.0937*	0.0530	0.116***	-0.0132
	(0.0831)	(0.0666)	(0.0496)	(0.0402)	(0.0408)	(0.0316)
13.country	-0.726***	-0.342***	-0.401***	-0.252***	-0.208***	-0.0447
	(0.107)	(0.0894)	(0.0636)	(0.0538)	(0.0529)	(0.0428)
14.country	-0.438***	-0.112	-0.116*	-0.0642	-0.245***	-0.0341
	(0.111)	(0.0827)	(0.0640)	(0.0502)	(0.0556)	(0.0398)
15.country	-0.0596	0.159*	-0.0356	0.0107	-0.0173	0.107***
	(0.104)	(0.0881)	(0.0644)	(0.0554)	(0.0480)	(0.0397)
16.country	0.407***	0.476***	0.251***	0.286***	0.0953***	0.116***
	(0.0340)	(0.0386)	(0.0208)	(0.0248)	(0.0158)	(0.0183)
17.country	0.00715	-0.000917	0.0551**	0.0724**	-0.0445**	-0.0655**
	(0.0412)	(0.0545)	(0.0243)	(0.0323)	(0.0201)	(0.0271)
19.country	-0.130**	-0.208***	0.0513	0.0212	-0.155***	-0.190***
	(0.0632)	(0.0585)	(0.0367)	(0.0362)	(0.0300)	(0.0271)
23.country	0.155***	0.238***	0.131***	0.172***	0.00254	0.0304
	(0.0298)	(0.0383)	(0.0181)	(0.0236)	(0.0145)	(0.0185)
29.country	0.161*	0.185**	0.0880*	0.176***	0.0466	-0.0158
	(0.0845)	(0.0735)	(0.0503)	(0.0441)	(0.0412)	(0.0359)
32.country	0.0971	0.0216	0.0418	-0.000877	0.0376	0.0162
	(0.0601)	(0.0519)	(0.0348)	(0.0321)	(0.0283)	(0.0239)
51.country	0.364***	0.135	0.126*	0.0944	0.176***	0.0176
	(0.112)	(0.103)	(0.0673)	(0.0628)	(0.0544)	(0.0501)
61.country	0.647***	0.552***	0.338***	0.347***	0.207***	0.124***
	(0.0947)	(0.102)	(0.0561)	(0.0648)	(0.0459)	(0.0459)
age	0.00720	-0.0544***	-0.00806	-0.0203**	0.0133*	-0.0235***
	(0.0157)	(0.0181)	(0.00915)	(0.0103)	(0.00766)	(0.00884)
c.age#c.age	4.14e-05	0.000467***	0.000113*	0.000196***	-7.22e-05	0.000184***
	(0.000111)	(0.000128)	(6.47e-05)	(7.29e-05)	(5.41e-05)	(6.22e-05)
female	0.123***	0.150***	0.0496***	0.0662***	0.0524***	0.0585***
	(0.0154)	(0.0172)	(0.00901)	(0.00992)	(0.00743)	(0.00846)
partner	0.0192	0.0477**	0.00799	0.0216**	0.00755	0.0183**
	(0.0174)	(0.0188)	(0.0102)	(0.0109)	(0.00842)	(0.00924)

1.education	-0.0653*	-0.114**	-0.0301	-0.0540**	-0.0230	-0.0438**
	(0.0393)	(0.0448)	(0.0233)	(0.0254)	(0.0178)	(0.0213)
2.education	-0.00487	-0.0887*	-0.0149	-0.0532**	0.0107	-0.0258
	(0.0399)	(0.0459)	(0.0238)	(0.0263)	(0.0181)	(0.0216)
3.education	-0.0334	-0.148***	-0.0481**	-0.0877***	0.0187	-0.0386*
	(0.0405)	(0.0453)	(0.0240)	(0.0258)	(0.0186)	(0.0215)
4.education	-0.0209	-0.217***	-0.0461	-0.109***	0.0266	-0.0740**
	(0.0574)	(0.0618)	(0.0340)	(0.0344)	(0.0274)	(0.0298)
5.education	-0.0998**	-0.194***	-0.0874***	-0.129***	0.000756	-0.0389*
	(0.0429)	(0.0461)	(0.0253)	(0.0263)	(0.0198)	(0.0219)
6.education	-0.0965	-0.0290	-0.120**	-0.0577	0.0385	0.0294
	(0.0967)	(0.0896)	(0.0604)	(0.0539)	(0.0488)	(0.0423)
2.building_area		-0.0334		-0.0122		-0.0160
		(0.0229)		(0.0133)		(0.0112)
3.building_area		-0.0120		-0.0177		0.00685
		(0.0193)		(0.0112)		(0.00939)
4.building_area						
5.building_area	-0.0101		-0.00847		-0.00112	
	(0.0166)		(0.00971)		(0.00796)	
employed	-0.153***	-0.204***	-0.101***	-0.117***	-0.0309***	-0.0559***
	(0.0240)	(0.0264)	(0.0141)	(0.0151)	(0.0118)	(0.0132)
GDPpc_r	-1.12e-06	1.42e-07	-4.15e-07	2.39e-07	-2.58e-07	-3.31e-07
	(2.42e-06)	(1.36e-06)	(1.38e-06)	(8.20e-07)	(1.19e-06)	(6.62e-07)
unemployment_r	0.0154**	3.68e-05	0.00455	0.00211	0.00827***	-0.00179
	(0.00608)	(0.00482)	(0.00365)	(0.00296)	(0.00285)	(0.00221)
Observations	11,024	9,669	11,032	9,676	11,236	9,856
R-squared	0.115	0.127	0.117	0.104	0.052	0.089
widstat	1672	2938	1674	2940	1668	2940

*Note: Robust standard errors to heteroskedasticity in parentheses. *** p<0.01, ** p<0.05, * p<0.10*

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