The final version of this paper is published on Social Psychiatry & Psychiatric Epidemiology, and is available here:
https://link.springer.com/article/10.1007/s00127-018-1625-8
https://doi.org/10.1^07/s00127-018-1625-8

Impact of the economic crises on suicide in Italy: the moderating role of active labor market programs

Giorgio Mattei *, Barbara Pistoresi **, Roberto De Vogli ***

* Dr. Giorgio Mattei, M.D., Ph.D. Student, "Marco Biagi" Department of Economics & Marco Biagi Foundation, University of Modena and Reggio Emilia, Via J. Berengario, 51, 41121 Modena, Italy
Department of Biomedical, Metabolic and Neural Sciences, Section of Psychiatry, University of Modena and Reggio Emilia, via G. Campi, 287 – 41125 Modena (Italy)Modena, Italy E-mail: giorgio.mattei@unimore.it

** Prof. Barbara Pistoresi, Ph.D., Department of Economics, University of Modena and Reggio Emila, Italy
RECent, Center for Economic Research
Address: Viale Berengario 51 – 41121 Modena, Italy
E-mail: barbara.pistoresi@unimore.it *(Corresponding author)*

*** Prof. Roberto De Vogli, Ph.D., M.P.H., Department of Social Psychology and Development & Human Rights Centre, University of Padova, Via Venezia, 12 – 35131 Padova, Italy (email: roberto.devogli@unipd.it

MANUSCRIPT – SECOND REVISION, FINAL VERSION

Abstract

Purpose To analyze the association between unemployment and suicide in Italy during the years 1990-2014, with a peculiar focus on the Great Recession (GR) and the role played by social protection as buffering mechanism against the negative effect on health outcomes.

Methods Fixed effects panel regressions were used to assess the association between changes in unemployment rate and suicide rates. Additional models investigated the role of active labor market programs (ALMPs) as possible moderators of the association. Analyses were carried out for both males and females, stratified by age and region.

Results The negative time-trend displayed by suicide rate in Italy until 2007 was slowed down by changes in unemployment at the beginning of the GR, when this trend reversed and the rate of suicide started increasing. Male workers aged 25-64 and women aged 55-64 years were affected by both "normal" unemployment rate fluctuations as well as severe economic crises. Women aged 35-44 were only influenced by the latter. Men benefit from ALMPs mainly in Central Italy, while women did not benefit significantly from ALMPs.

Conclusions In Italy, economic downturns were associated with increased suicides mainly among men, while severe economic crises were associated with increased suicides among both men and women. ALMPs showed to be effective in moderating the association between unemployment and suicide among men aged 45-54 only in Central Italy. The overall small effectiveness of such programs may be due to lack of sufficient funding.

Keywords: *economic crisis; Italy; suicide; active labor market programs; fixed effects panel regression*

Introduction

In 2008 the world was hit by the Great Recession (GR), the worst economic crisis since the 1929 Great Depression [1]. The GR began in 2007 in the United States to then affect the global economy and European countries such as Italy, though its effect showed to vary according to the country considered [2, 3].

In a previous study, Stuckler et al. [4] measured the impact of governmental policies as possible buffering mechanisms for the negative health effect of economic crises. They focused on the role of welfare and social safety nets, indicating that the relationship between suicide and economic fluctuations may vary according to level of expenditure in social protection, with particular reference to active labor market programs (ALMPs). According to these authors, recessions do not hurt *per se*; rather, it is the governments' choice to implement economic policies of stimulus or austerity (favoring or reducing social safety nets) that matter the most for understanding the effect of economic downturns on population health. Specifically, austerity policies have a major detrimental effect on suicide, while public spending in ALMPs can be an effective buffering mechanism against negative health outcomes [5]. A case in point is Greece, where social and health indicators (all-cause mortality, cardiovascular mortality, homicides and crime, HIV and tuberculosis infections, anxiety and mood disorders, suicide, alcohol abuse, attendance of public healthcare services) worsened after the implementation of severe austerity measures [5].

Building on the existing literature, this study assesses the effect of ALMPs as moderator of the association between economic crises and suicide. No previous study we are aware of has yet investigated this relationship in Italy that, together with Greece, Portugal and Spain, was severely hit by the crisis, and experienced one of the fastest reductions in Gross Domestic Product (GDP) in Europe [6]. Notably, the GR hit the Italian economy during a period of long-term difficulties coupled with a climate of political instability ultimately resulting in the postponement of crucial structural reforms (e.g. concerning labor market and retirement system), that made the country particularly vulnerable to a sovereign debt crisis [7]. Some studies showed that in the first years of the economic crisis, Italy experienced increased suicides and attempted suicides due to financial problems [8-11]. Also, in the same period, the following were noticeable: increased ischemic heart diseases and cardiovascular mortality [10, 12], increased nicotine consumption [13, 14], decreased prescription of expensive drugs, increased prescription of cheap drugs [15]. As far as alcohol consumption in concerned, an increase in binge drinking may have occurred, accompanied by an overall reduction in expenditure for alcoholics, possibly due to budget constraint [10, 14], and consistently with international literature [16, 17].

Although research has already shown that, as happened in the majority of EU-member states [18-20], the GR exerted a negative health effect in Italy, particularly increased suicides and poor mental health outcomes [8-11, 21], little is known about the role of welfare policies as buffering mechanisms. In a research letter published in the BMJ, De Vogli showed that the association between unemployment and suicides becomes weaker a higher levels of investment in social services across Italian regions [8]. The aim of the present research is to assess the role of ALMPs as moderators for the adverse health effects of the crisis. Using

longitudinal secondary data concerning both males and females, stratified by age and region, we hypothesize that ALMPs are effective social buffering mechanisms able to mitigate the consequences of financial hardship on suicidal behavior.

We are aware that other indicators may be influenced by economic downturns, such as alcohol consumption, traffic fatalities, all-cause mortality and homicides [4, 22]; yet, in the present study we focus specifically on the relation between unemployment and suicide, and the possible moderating effect played by social protection, since suicide may be considered a gross indicator of mental health within a population. In fact, though suicide is a multifactorial phenomenon, severe mental illnesses account up to the 74% of the population attributable risk of suicide [23], and in psychological autopsy studies the median proportion of suicides attributable to mental disorders was 91% [24]. Also, evidence concerning the moderating effect of social protection are particularly sound with respect to the impact of unemployment on suicide [4].

Methods

Study design and data collection

Health and economic indicators were collected from the 'Health for All' (HFA) database (version: December 2017) powered by the Italian National Institute of Statistics (ISTAT), that can be freely downloaded at the following link: https://www.istat.it/it/archivio/14562. Since available data referred to years 1990-2014, the latter was considered as observation period of the study. Suicide rates obtained from HFA refer to the actual rates that are observed in the Italian population. In other words, they are not derived from a representative sample. Differently, unemployment rates are derived from a survey carried on quarterly by the Italian National Institute of Statistics, based on a sample made up of 250,000 families living in about 1,400 municipalities (corresponding to a sample size of about 600,000 people, representative of the Italian population). More information concerning the survey may be found here: https://www.istat.it/it/archivio/8263.

Expenditure for ALMPs (per head, at current prices and adjusted for purchasing power parity, in US Dollars) were found on the website of the Organization for Economic Co-operation and Development (https://data.oecd.org). ALMPs include "spending on public employment services and administration, labor market training, special programs for youth when in transition from school to work, labor market programs to provide or promote employment for unemployed and other people (excluding young and disabled people), and special programs for disabled people" [4].

The following Italian macro-regions were included in the analysis: North-East (Emilia-Romagna, Trentino, Veneto, Friuli Venezia-Giulia), North-West (Liguria, Lombardia, Piemonte, Valle d'Aosta), Central Italy (Lazio, Marche, Toscana e Umbria), South (Abruzzo, Basilicata, Calabria, Campania, Puglia, Molise), and Islands (Sicilia, Sardegna).

Data management and econometric framework

We estimated a panel regression with fixed effects by OLS. The specification is:

$$Y_{i,t} = \beta_1 X_t + \beta_2 X_{i,t} + \beta_3 time + \beta_4 crises + \beta_5 P_t + \alpha_i + u_{i,t}$$

where $i = 1, \dots, 20$ is the cross-sectional dimension of the panel representing the 20 Italian regions while $t = 1, \dots, 24$ is the time dimension of the panel that ranges from 1990 to 2014. $Y_{i,t}$ is the regional suicide rate for males and females, crude and age-standardized (i.e., 15-24, 25-34, 35-44, 45-54, 55-64, 65-74 years old). $X_{i,t}$ is the change in regional unemployment rate, X_t is the change in national unemployment rate. P_t represents the growth rate of national expenditure for ALMPs on annual basis. $\alpha_{i,t} = \alpha_1, \dots, \alpha_n$ are the *fixed effects* capturing unobservable regional heterogeneity. *Time* describes the trend in the suicide rate, while *crisis* is a dummy equal to 1 in the period of the GR (i.e., 2008-2014 and 2010-2014, depending on the model run) and 0 otherwise; $u_{i,t}$ are the residuals.

Ethics

All data were anonymous and aggregated at the origin, therefore Ethics Committee approval was not necessary. The guidelines governing research from the Declaration of Helsinki were followed.

Results

Our analysis confirmed the well-known relation between economic crises and suicides, and pointed out a significant, though small effect of ALMPs on mental health outcomes, confined to Central Italy.

In particular, Table 1 shows a decreasing trend in the past decades for the regional suicide rates (until 2007), indicated by the negative and significant coefficient of the time trend in all the specifications. This trend was slowed down by the unemployment changes, in particular during economic crises. The fixed effect models with the national unemployment rate were more robust than pooled regressions with regional unemployment rates (columns 1-2 vs. column 5, males and females), suggesting that for the suicide behavior the national dimension of the labor market may be more relevant than the local one. Every 1% rise in unemployment rate changes was associated with a 0.05% rise in suicide rate (column 2). The dummy crisis 2008-2014 was not statistically significant in the male specification, while it describes the same negative time-trend among females at the 5% significance level (column 2, males and females). The link between the changes in the national unemployment and suicides rates becomes not significant when the dummy crisis 2010-2014 is included (columns 3-4, males and females). Note that this dummy shows a positive and highly significant relation with suicide rates (1% significance level). This suggests that the GR induced with some lags an

increase in the Italian suicide rate around the 0.16% for males and around 0.047% for females. At this level of aggregation of the data, the main negative effects on the suicide rates of the financial crisis and deep recession are confined in the period 2010-2014.

[Please display Table 1 about here]

Table 2 shows the effects of rises in unemployment rate on suicides by age group and sex. Unemployment affects people of working age population, who are more directly affected by labor market dynamics, than retired people and the young. Working age men were more affected by the crisis 2010-2014 than women (columns 3-5, males and females). A 1% rise in male unemployment at ages 35-44 years was associated with a 0.19% rise in suicide rate, at ages 45-54 with a 0.25% rise and finally at ages 54-65 with a 0.31% rise (columns 3-5, males). For females, at age 33-44 the marginal effect was 0.10%, while at age 54-65 is 0.12% (columns 3 and 5, females). The 24-35 age group and the 45-55 age group in male population were also affected by business cycle fluctuations in normal time, in other words unemployment rate changes induced suicide rate changes in the same direction. In particular, a 1% increase in unemployment rate induced a 0.05% rise in the suicide rate.

[Please display Table 2 about here]

Table 3 shows in which Italian macro-regions the investment in ALMPs reduced the effects of unemployment and crisis on suicides. In Central Italy, a 1% increase in the expenditure for ALMPs was associated with a 0.45% decrease in suicide rate among men aged 45-54. Notably, females did not benefit significantly from ALMPs (columns 1-6, females)

[Please display Table 3 about here]

Discussion

Following the GR, suicide rate started increasing in Italy, possibly due to insufficient public expenditure in social protection. In fact, while an average expenditure of 190 USD per head in ALMPs is able to mitigate the relation between unemployment and suicide [4], between 1990 and 2013 the average expenditure in Italy for such programs was 125 USD. Our results vary according to regional differences however, consistently with available literature [25, 26]. In particular, we found that ALMPs are able to exert their buffering mechanisms against the negative health effects of the crisis in Central Italy, but not in the rest of the country. This regional heterogeneity may be explained by large regional differences in terms of the proportion of unemployed people who attend Job Centers, higher in the South than in the North-East of the country (79.7% of long-term

unemployed vs 67.2%, respectively [25]). In Central Italy, where ALMPs proved to be effective mechanisms against the negative mental health outcomes of the crises, up to the 73.1% of long-term unemployed attend Job Centers [25]. Furthermore, although austerity measures were implemented after the onset of the GR in all regions, the reduction in social expenditure per capita from 2000 to 2014 was lower in Central Italy (-12.7%), when compared to the Northern (-33.7%) and the Southern (-26.7) Italian regions [26].

Our findings have important public policy implications. They suggest the need to increase public spending for ALMPs up to 190 USD per head per year, paying specific attention to regional inequalities. Stronger investment in ALMPs may positively affect mental health outcomes and, since they include vocational rehabilitation programs (VRPs), they may also facilitate recovery from psychiatric disorders.

Certainly, we do not think that sufficient funding in ALMPs and VRPs alone can be sufficient to prevent suicides and mental health disorders due to financial crises. In order to improve the effectiveness and efficiency of VRPs, it may be helpful to strengthen the liaison between psychiatric services and occupational health professionals [27-29]. Moreover, specific clinical interventions such as psychoeducation group interventions may be also needed to provide users and families with information about psychiatric disorders, available treatments, access to psychiatric services, and coping strategies against workplace stress [29].

The present research helped identify vulnerable groups. In particular, women seem more vulnerable to severe economic downturns, while men may be affected by both financial cycle fluctuations as well as severe economic crises, with differences according to age [21, 30]. One strength of our study is the fact that it includes data concerning the GR and the following years of severe economic crisis, therefore representing an attempt to complete the epidemiological analysis provided by other research [4, 31]. Other strengths are represented by the methodology adopted, as well as having included data on social protection, namely ALMPs. Also, we collected regional suicide rates.

Despite this, the present study has several limitations. First, for its observational nature, no conclusion can be drawn with respect to causality. Also, given its ecological design, the fact that some associations were noticeable at population level does not necessary mean that the same associations are present at individual level. Yet, our findings are consistent with available literature pointing out an association between economic hardship and health outcomes, moderated by social protection. Second, since data were already collected and aggregated at the origin, their quality was not assessable. Yet, we believe that having derived them from two major agencies, the Italian Institute of Statistics and the Organization for Economic Co-operation and Development, reliably guarantee their quality. The observational period of our study represents a third limit. In fact, having considered data for years 1990-2014 may reduce the generalizability of our findings to longer periods. Yet, we collected all available data in a panel dataset that made it possible to increase the degrees of freedom of our analysis. A fourth limitation is that only the ‘Italian case’ was addressed; in other words, the present study lacks a European perspective. Yet, other studies are available in literature, providing such perspective [4, 11, 32]. Also, since differences exist in Mediterranean countries and North-Europe countries, concerning welfare, epidemiology of psychiatric disorders (namely suicidal behavior) and welfare, it is possible that an aggregated perspective fails to recognize such differences, that we tried to highlight with our

analysis. Fifth, it was pointed out that the variables in levels (e.g suicide rates, unemployment rates) may be non-stationary unit root processes, making them unfit for the regression analysis with ordinary least square methods [31]. To reduce this problem we used in the regressions stationary variables, i.e I(0), that is the changes in unemployment rate and the first difference of the expenditure in ALMPs (i.e., the growth rate of the variables). Moreover, we regressed the suicide rate on a time trend because this variable is possibly trend stationary.

Conclusions

In Italy, periods of economic fluctuations are associated with increased suicides among men, while severe economic downturns are associated with increased suicides among both men and women. Such association is moderated by social protection measures, namely ALMPs, that display macro-regional differences and a different protective potential. In particular, in Central Italy ALMPs were able to moderate the association between unemployment and suicide among men aged 45-54. The overall small effectiveness of such programs may be due to lack of sufficient funding.

References

1. Wessel D (2010) Did 'Great Recession' live up to the name? Wall Str J http://online.wsj.com/news/articles/SB100014240527 02303591204575169693166352882 (Last accessed: 30 April, 2018)

2. Blanchard O, Amighini A, Gavazzi F (2010) Macroeconomics. A European perspective. Financial Times, Upper Saddle River, New Jersey

3. World Health Organization (2011) Impact of economic crises on mental health. http://www.euro.who.int/en/what-we-do/healthtopics/noncommunicable-diseases/mental-health/publications/2011/ impact-of-economic-crises-on-mental-health (Last accessed: 30 April, 2018)

4. Stuckler D, Basu S, Suhrcke M, et al. (2009) The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. Lancet 374:315-323

5. Stuckler D, Basu S (2013) The body economic. Allen Lane, London

6. O'Brien M (2014) Italy's triple-dip recession has wiped out all its growth since 2000. Washington Post. https://www.washingtonpost.com/news/wonk/wp/2014/08/07/italys-triple-dip-recession-has-wiped-out-all-its-growth-since-2000/ (Last accessed online: February 21, 2018)

7. Fubini F (2014) Recessione Italia. Come usciamo dalla crisi più lunga della storia. Editori Laterza, Roma-Bari (in Italian)

8. De Vogli R (2013). Unemployment and suicides during the recession in Italy. BMJ 347, f4908

9. De Vogli R, Marmot M, Stuckler D (2013) Excess suicides and attempted suicides in Italy attributable to the great recession. J Epidemiol Community Health 67(4):378-9. doi: 10.1136/jech-2012-201607. Epub 2012 Aug 2.

10. Mattei G, Ferrari S, Pingani L, Rigatelli M (2014) Short-term effects of the 2008 Great Recession on the health of the Italian population: an ecological study. Soc Psychiatry Psychiatr Epidemiol 49:851-858.

11. König D, Fellinger M, Pruckner N, Hinterbuchinger B, Dorffner G, Gleiss A, Vyssoki S, Vyssoki B (2018) Availability and use of mental health services in European countries: Influence on national suicide rates. J Affect Disord 15;239:66-71.

12. Torbica A, Maggioni AP, Ghislandi S (2015) The Economic Crisis and Acute Myocardial Infarction: New Evidence Using Hospital-Level Data. PLoS ONE 10(11): e0142810. doi:10.1371/journal.pone.0142810

13. Gallus S, Tramacere I, Pacifici R, et al (2011) Smoking in Italy 2008–2009: A rise in prevalence related to the economic crisis? Prev Med 52:182–183

14. Mattei G, De Vogli R, Ferrari S, et al (2017) Impact of the economic crisis on health-related behaviors in Italy. Int J Soc Psychiatry 63: 649-656

15. Zuccato E, Castiglioni S, Tettamanti, et al (2011) Changes in illicit drug consumption patterns in 2009 detected by wastewater analysis. Drug Alcohol Depend 118, 464–469

16. Bor J, Basu S, Coutts A, et al (2013) Alcohol use during the great recession of 2008-2009. Alcohol 48(3):343-8. doi: 10.1093/alcalc/agt002. Epub 2013 Jan 29

17. de Goeij MC, Suhrcke M, Toffolutti V, et al (2015) How economic crises affect alcohol consumption and alcohol-related health problems: a realist systematic review. Soc Sci Med 131:131-46. doi: 10.1016/j.socscimed.2015.02.025. Epub 2015 Feb 18

18. Dom G, Samochowiec J, Evans-Lacko S, et al (2016) The impact of the 2008 economic crisis on substance use patterns in the countries of the European Union. Int J Environ Res Public Health 13:122 doi:10.3390/ ijerph13010122

19. Margerison-Zilko C, Goldman-Mellor S, Falconi A, et al (2016) Health Impacts of the Great Recession: a Critical Review. Curr Epidemiol Rep doi 10.1007/s40471-016-0068-6

20. Martin-Carrasco M, Evans-Lacko S, Dom G, et al (2016). EPA guidance on mental health and economic crises in Europe. Eur Arch Psychiatry Clin Neurosci 266:89–124 doi:10.1007/s00406016-0681-x

21. Odone A, Landriscina T, Amerio A, Costa G (2017) The impact of the current economic crisis on mental health in Italy: evidence from two representative national surveys. Eur J Public Health doi: 10.1093/eurpub/ckx220. [Epub ahead of print]

22. Uutela A (2010) Economic crises and mental health. Curr Opin Psychiatry 23(2):127-30

23. Swanson JW, Bonnie RJ, Appelbaum, PS (2015) Getting Serious About Reducing Suicide: More 'How' and Less 'Why'. JAMA 314:2229–2230

24. Cavanagh JT, Carson AJ, Sharpe M, Lawrie SM (2003) Psychological autopsy studies of suicide: a systematic review. Psychol Med 33(3):395-405

25. Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori (2016) Rapporto di monitoraggio sui servizi per il lavoro 2015 [Report on the monitoring of job service]. Roma, Isfol. (Last accessed: 30 April, 2018; in Italian)

26. Ufficio Studi Confcommercio (2016) La spesa pubblica locale [Local public expenditure]. (http://www.confcommercio.it/documents/10180/9356497/La+spesa+pubblica+locale.pdf/e77fcdd6-5387-4d71-9546-825cf40cd026 (Last accessed: May 19, 2018; in Italian)

27. Visentini C, Mattei G, Gobba F, et al. Impact of the economic crisis on mental health: report of a multidisciplinary seminar held in Sassuolo (Modena), June 17th, 2016. Med Lav 2017;108(3):237–8.

28. Tassinari G, Modenese A, Mungai F, et al. Psychic discomfort in the workplace: report of a multidisciplinary conference occurred in Modena in 25 October 2017. Med Lav 2018;109(3):236-8

29. Mattei G., Sacchi V., Alfieri A., et al. Stakeholders' views on vocational rehabilitation programs: a call for collaboration with Occupational Health Physicians. Med Lav 2018; 109(3): 201-209.

30. Starace F, Mungai F, Sarti E, Addabbo T (2017) Self-reported unemployment status and recession: An analysis on the Italian population with and without mental health problems. PLoS One 12:7-10

31. Ceccherini-Nelli A, Piebe S (2011) Economic factors and suicide rates: associations over time in four countries. Soc Psychiatry Psychiatr Epidemiol 46(10): 975-982

32. Toffolutti V, Suhrcke M (2014) Assessing the short term health impact of the Great Recession in the European Union: A cross-country panel analysis. Prev Med 64: 54–62

Table 1 - Suicide rate, unemployment and economic crisis. Fixed effects and pooled estimation (OLS).
Dependent variable: regional suicide rates for males and females.

	M					F				
	(1)	(2)	(3)	(4)	(5) Pooled OLS	(1)	(2)	(3)	(4)	(5) Pooled OLS
Constant	-1.441*** (0.134)	1,433*** (0,045	1.481*** (0057)	1,485*** (0,056)	1.48*** (0.14)	0.439*** (0.011)	0.431*** (0.028)	0.451*** (0.013)	0.452*** (0.014)	0.45*** (0.034)
time	-0.014*** (0.003)	−0,014*** (0,0031)	-0.019*** (0.004)	−0,019*** (0,005)	-0.019*** (0.004)	-0.006*** (0.000)	-0.005*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)	-0.008*** (0.001)
Crisis 2008-2014		-0.040 (0.046)					-0.042** (0.019)			
Crisis 2010-2014			0.160*** (0.038)	0,174*** (0,033)	0.162*** (0.033)			0.047** (0.020)	0.048** (0.018)	0.044** (0.018)
Δ national unemployment rate	0.047*** (0.010)	0.055*** (0.013)	0.019 (0.013)			0.010 (0.006)	0.019*** (0.005)	0.002 (0.007)		
Δ regional unemployment rate				0.009 (0.0053)	0.019** (0.007)				0.002 (0.002)	0.005 (0.003)
LSDV R-squared	0.794	0.795	0.801	0.801	0.051	0.567	0.083	0.573	0.574	0.083

Notes: Number of observations= 480; (.) robust standard errors, HAC; ** and *** denote 5% and 1% significance level. Fixed effects estimation in columns 1-4, pooled estimation column 5. The null hypothesis: the groups have a common intercept, i.e. fixed effects equal to zero, is always rejected with p-values = 0

Table 2 - Suicide rate, unemployment and economic crisis. Fixed effects and pooled estimation (OLS)
Dependent variable: regional suicide rates by age group and sex.

Notes: Number of observations= 480; (.) robust standard errors, HAC; ** and *** denote 5% and 1% significance level.. The null hypothesis: the groups have a common intercept, i.e. fixed effects equal to zero, is always rejected with p-values = 0

	M						F					
Age group and sex	15-24	25-34	35-44	45-54	55-64	65-74	15-24	25-34	35-44	45-54	55-64	65-74
Constant	0.918*** (0.063)	1.266*** (0.043)	1.362*** (0.109)	1.518*** (0.098)	2.057*** (0.069)	2.723 (0.136)	0.200*** (0.0124)	0.323*** (0.020)	0.396*** (0.020)	0.450*** (0.032)	0.726*** (0.021)	0.791*** (0.034)
Time	-0.020*** (0.018)	-0.019*** (0.003)	-0.019** (0.008)	-0.014 (0.007)	-0.037*** (0.005)	-0.050 (0.011)	-0.003*** (0.000)	-0.006*** (0.001)	-0.005*** (0.001)	-0.001 (0.002)	-0.017*** (0.001)	-0.017*** (0.003)
Crisis 2010-2014	0.118 (0.085)	0.119 (0.094)	0.194** (0.091)	0.254*** (0.068)	0.315*** (0.075)	0.189 (0.125)	0.025 (0.027)	-0.016 (0.029)	0.102** (0.044)	0.051 (0.040)	0.124** (0.049)	0.090 (0.114)
Δ national unemployment rate	-0.000 (0.018)	0.0467 (0.024)	0.021 (0.029)	0.058** (0.023)	0.044 (0.028)	0.005 (0.042)	0.009 (0.010)	0.006 (0.008)	-0.018 (0.017)	0.014 (0.018)	0.004 (0.022)	0.000 (0.033)
LSDV R-squared	0.327	0.315	0.438	0.463	0.541	0.512	0.062	0.157	0.177	0.219	0.208	0.186

Table 3

Table 3 - Suicide rate, unemployment rate and expenditure for Active Labor Market Programs (ALMPs). Fixed effects and pooled estimation (OLS). Dependent variable: regional suicide rates by age group and sex.

Notes: Number of observations= 480; (.) robust standard errors, HAC; **, *** denote 5% andw 1% significance level. The null hypothesis: the groups have a common intercept, i.e. fixed effects equal to zero, is always rejected with p-values = 0

	M						F					
Age group by sex	15-24	25-34	35-44	45-54	55-64	65-74	15-24	25-34	35-44	45-54	55-64	65-74
Constant	0.835*** (0.050)	1.21*** (0.057)	1.308*** (0.104)	1.523*** (0.102)	1.995*** (0.057)	2.680*** (0.103)	0.207*** (0.021)	0.309*** (0.023)	0.389*** (0.027)	0.437*** (0.034)	1.995*** (0.057)	0.758*** (0.040)
Δ national unemployment rate	0.014 (0.022)	0.057** (0.023)	0.031 (0.029)	0.057** (0.025)	0.056*** (0.025)	0.013 (0.040)	0.009 (0.011)	0.009 (0.009)	−0.017 (0.016)	0.016 (0.017)	0.056** (0.025)	0.006 (0.032)
Crisis 2010-2014	0.071 (0.077)	0.088 (0.088)	0.163 (0.087)	0.257*** (0.072)	0.280*** (0.067)	0.165 (0.096)	0.029 (0.031)	−0.025 (0.033)	0.099** (0.041)	0.044 (0.040)	0.279*** (0.067)	0.071 (0.111)
Time	−0.015*** (0.015)	−0.016*** (0.004)	−0.016 (0.008)	−0.015 (0.008)	−0.033*** (0.005)	−0.048*** (0.008)	−0.004** (0.001)	−0.005** (0.002)	−0.005** (0.002)	−0.001 (0.003)	−0.033*** (0.005)	−0.015*** (0.003)
Δlog ALMPs – North-East	0.267** (0.099)	0.300 (0.234)	0.243 (0.302)	−0.038 (0.191)	0.671 (0.551)	0.722 (0.367)	−0.017 (0.072)	−0.001 (0.089)	−0.041 (0.069)	−0.028 (0.107)	0.671 (0.549)	0.549 (0.269)
Δlog ALMPs – North-West	1.309 (1.07)	0.881 (0.474)	1.100 (0.776)	0.593 (0.479)	0.456 (0.42)	2.282 (1.498)	−0.171 (0.174)	0.175 (0.122)	0.164 (0.230)	−0.146 (0.137)	0.456 (0.418)	0.315 (0.297)
Δlog ALMPs – Central Italy	−0.168 (0.155)	−0.073 (0.178)	0.313 (0.282)	**−0.449** (0.172)**	0.274 (0.384)	−0.422 (0.326)	−0.014 (0.15)	0.021 (0.095)	0.037 (0.131)	0.227 (0.125)	0.274 (0.389)	−0.085 (0.166)
Δlog ALMPs – South	0.39 (0.28)	0.298** (0.138)	−0.142 (0.229)	−0.126 (0.200)	0.408 (0.375)	−1.15** (0.538)	−0.006 (0.102)	0.063 (0.087)	−0.023 (0.072)	0.112 (0.123)	0.408 (0.291)	0.053 (0.207)
Δlog ALMPs – Islands	0.303** (0.11)	−0.139 (0.081)	−0.034 (0.159)	−0.102 (0.350)	−0.723 (0.455)	0.590 (0.614)	0.095** (0.037)	0.179 (0.073)	0.088 (0.087)	0.246*** (0.048)	−0.72 (0.131)	0.044 (0.083)
LSDV R – squared	0.36	0.32	0.45	0.47	0.55	0.54	0.06	0.16	0.18	0.22	0.55	0.20