### Does Austerity Really Kill?

Veronica Toffoluttia, b [[1]](#footnote-1)♣, Marc Suhrckec, d

Forthcoming in *Economics & Human Biology*

March 7, 2019

a ‘‘Carlo F. Dondena’’ Centre for Research on Social Dynamics and Public Policies, Bocconi University, Milan, Italy

b Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, United Kingdom

c Centre for Health Economics, University of York, York, United Kingdom

d Luxembourg Institute for Socio-Economic Research, Esch-sur-Alzette/Belval, Luxembourg

**Running head:** Austerity and health

**Keywords:** recession and health, socioeconomic determinants of health, austerity

ABSTRACT

A growing body of the literature has argued that austerity has been bad for health, though without directly measuring austerity. This paper explicitly distinguishes the association of mortality with macroeconomic fluctuations from that with fiscal policy measures, using data for 28 European Union (EU) countries covering the period 1991-2013. The main results present a nuanced, complex picture about the mortality impact of fiscal policies. We confirm the mortality decreasing (increasing) effect of recessions (booms), with the exception of suicide mortality, which shows the opposite effects. Austerity regimes are associated with an increase in all-cause mortality (0.7%). At the same time, fiscal stimuli tend to significantly increase death rates due to cirrhosis or chronic liver disease (3%) and those due to vehicle accidents (4.3%). Overall, the results appear to be sensitive to the set of countries included: when excluding the Baltics, Romania and Hungary, austerity policies turn out to significantly increase suicide-related mortality (2.8%), while the effect on all-cause mortality remains the same (0.7%).

Words: 4,969

RESEARCH HIGHLIGHTS

* We evaluate the association between measures of fiscal policy and mortality in the EU.
* We separate the recession-related mortality effects from those resulting from fiscal policy.
* Austerity is associated with an increase in all-cause mortality.
* Fiscal stimuli increase mortality due to cirrhosis and vehicle-accidents.
* The results are sensitive to the set of countries examined.

### INTRODUCTION

A growing body of research has examined the effects of the Great Recession on health, using either single country time series analysis ([De Vogli, Marmot et al. 2012](#_ENREF_11), [Antonakakis and Collins 2014](#_ENREF_3), [Regidor, Barrio et al. 2014](#_ENREF_23), [Crost and Friedson 2017](#_ENREF_10), [Kaplan, Collins et al. 2017](#_ENREF_18), [Toffolutti, McKee et al. 2018](#_ENREF_29)) or cross-country panel regressions (Stuckler, Basu et al. 2009; Chang, Stuckler et al. 2013,[Taylor-Robinson and Barr 2017](#_ENREF_28),[Pérez-Moreno, Blanco-Arana et al. 2016](#_ENREF_21), [Bilal, Cooper et al. 2017](#_ENREF_7), [Crost and Friedson 2017](#_ENREF_10)) . The large majority finds that mortality rates, with the exception of suicides, tend to be pro-cyclical, i.e. when unemployment rates increase mortality tends to decline ([Ruhm 2000](#_ENREF_24), [Gerdtham and Ruhm 2006](#_ENREF_14)). More recently, the association between the two seems to have weaken and for some age-groups and causes of mortality the association might have reversed ([Lam and Piérard 2017](#_ENREF_19)). As far as Europe is concerned, Tapia-Granados and Ionides investigated the relationship by using data for 27 European countries, finding robust evidence of pro-cyclicality ([Tapia Granados and Ionides 2017](#_ENREF_27)). However, little is known about the potential modification effect through policy.

In a widely regarded book, Stuckler and Basu ([2013](#_ENREF_25)) have suggested that some of the adverse health effects that appear to have resulted from the recession would be directly attributable to austerity. This widespread concern echoed outside academia, leading, for example, the former International Monetary Fund leader (Dominik Strauss-Khan) to ask “What about the human costs? This is the real tragedy” ([Guardian 2010](#_ENREF_17)). The evidence accumulated to date appears to be conflicting, with some papers claiming that the public health tragedy in Greece seems “overly exaggerated” ([Granados 2013](#_ENREF_15), [Granados and Rodriguez 2015](#_ENREF_16)), and arguing that the country was no exception to the main finding of the literature which sees countries improving population health in recessions (the “healthy recession paradox”) ([Granados 2013](#_ENREF_15)).

To the best of our knowledge, the vast majority of existing studies that claim to assess the health-response to austerity have refrained from explicitly incorporating fiscal policy measures, with the notable exception of Bilal et al ([Bilal, Cooper et al. 2017](#_ENREF_7)). The authors analyze the impact of macroeconomic fluctuations on mortality, using data from 21 OECD countries covering the period 1980-2010. Their results confirm the pro-cyclicality of overall mortality. The association between economic fluctuations and mortality appears, however, to be moderated by social protection expenditures, in the sense that the link between macroeconomic fluctuations and mortality is weakened in countries which have increased social protection expenditures. Yet, social protection expenditures are just one dimension of the overall fiscal policy stance, failing to capture other dimensions, including tax rebates or governmental loans to firms. This paper attempts to fill this gap, by analysing, in particular, the association between very tight fiscal policies (i.e. austerity)/very loose (i.e. financial stimuli) and health – proxied by a wide range of mortality outcomes – for 28 EU countries over the period 1991-2013.

One simple measure of fiscal policy is the primary fiscal balance: i.e. the difference between total general government expenditure and revenues net of interest payments on consolidated general government liabilities (expressed as a share in GDP). Changes in the primary balance can arise passively, as revenues and expenditures rise and fall with economic activity, or actively, as governments make choices about tax, transfer and spending policies. However, the relative simplicity of the primary fiscal balance is more than outweighed by its limitations: First, “it ignores cyclically induced fluctuations in the primary deficit” (p. 213 in Alesina and Perotti, 1996). Second, it fails to capture the discretionary change in fiscal policy, which ideally is what would be needed when trying to assess the impact of fiscal policy on outcomes of interest. Hence, the primary fiscal balance would not serve as a particularly useful proxy of fiscal policy in the present case. Nonetheless, we employ this simple measure for illustration purposes as part of our robustness checks.

The macro-economic literature proposes three other main measures to capture the stance of fiscal policy (see ([Alesina and Perotti 1995](#_ENREF_2)) for an overview) i) the OECD measure, ii) the IMF measure, and iii) the Alesina-Ardagna Fiscal Index (AAFI) (also called ‘Blanchard Fiscal Index’) ([Blanchard 1993](#_ENREF_8)). The OECD measure operationalises the fiscal impulse as “the difference between the current primary deficit and the primary deficit that would have prevailed if expenditure in the previous year had grown with potential GDP, and revenues had grown with actual GDP” (p. 213 in Alesina and Perotti, 1996). This measure has the disadvantage of relying on “potentially questionable measures of potential outputs” (p. 9 in Alesina and Perotti, 1996). The OECD measure tends to overestimate (underestimate) systematically the discretionary component when the deficit falls (increases) ([Perotti 2005](#_ENREF_22)). The IMF measure differs from the OECD measure only in replacing the previous year with a different, arbitrarily selected year. The third measure (i.e. the AAFI) has the attractive feature to maintain simplicity and transparency, while also providing a cyclical correction for the unemployment rate (Alesina and Perotti, 1996). More specifically, it entails calculating what the government budget would be, had the unemployment rate not changed since the previous year (Alesina and Perotti, 1996). According to Alesina and Perotti, “this cyclical adjustment is an attempt at eliminating from the budget changes in taxes and transfer associated with changes in the unemployment rate” (p. 10 in Alesina and Perotti, 1996).

For the purpose of our analysis we opted for the AAFI (whose methodology is further explained below), based on its simplicity, its ability to adjust for cyclical fluctuations as well as its ability to capture discretionary fiscal policy changes. This is the relevant measure for us, as we are interested in understanding how large discretionary fiscal policy changes might affect population health, rather than focusing on the effect of cyclical fluctuations themselves. The AAFI has been widely used in the macroeconomic literature ([Alesina and Perotti 1995](#_ENREF_2), [Barro and Redlick 2011](#_ENREF_4), [Eggertsson and Krugman 2012](#_ENREF_13)), but, as far as we are aware, has hitherto not entered the health or health economic literature.

The AAFI is calculated as follows:

AA= (gi,t(Ui,t-1) –τi,t) –(gi, t-1-τi, t-1) (1)

where git measures the total current government expenditures as a percentage of GDP for country i at time t, U captures the unemployment rate and τ represents the total government revenues as a share of GDP.

Following Alesina and Perotti ([1995](#_ENREF_2)), we implement the AAFI by regressing for each country in the sample the current expenditure on a linear time trend and on the unemployment rate. We then estimate what would be the expenditure level in each year t if the unemployment rate was the same as in the previous year (i.e. using the fitted values), which gives us gi,t(Ui,t-1). The AAFI is, then, constructed by subtracting the primary deficit of the previous year from the unemployment-adjusted measure of the primary deficit. According to Alesina and Perotti (1995), a ‘very tight’ fiscal policy is defined as a decline in the AAFI variable by more than 1.5 percentage points and is taken as a proxy of austerity. By contrast, a ‘very loose’ fiscal adjustment is defined as an increase in the fiscal impulse variable by more than 1.5 percentage points. A merely ‘tight’ (‘loose’) fiscal adjustment is assigned to a change in the AAFI of between -1.5 to -0.5 (0.5 to 1.5). If the fiscal impulse varies between -0.5 and 0.5 percentage points, this is considered as ‘neutral’ fiscal policy.

In order to integrate our fiscal policy measures into our overall regression framework we add two dummies ˗ capturing a very tight (A) and very loose (FS) fiscal policy stance ˗ as regressors in the standard country-time specific model proposed by Gerdtham and Ruhm ([2006](#_ENREF_14)). More specifically, we estimate the following model:

(2)

where M represents either the overall or the specific mortality rate for country i at year t, Xrefers to % of males aged less than 65 years, U represent the unemployment rate – the standard proxy for macroeconomic conditions. C represents country dummies, represents a country-specific linear time-trend. ε it is assumed to be a mean zero error term, uncorrelated with the other observables (i.e. E()=0). We are interested in the sign and the magnitude of both and . It is important to emphasise though that the ‘effect’ we are estimating cannot literally be understood as a true causal one, since we cannot exclude the potential influence of time-varying unobservable factors.

### 2. THE DATA

We use data from 28 EU countries (see Web Appendix Table AI for the full list) covering the period 1991-2013 from The [European Health for All Database (HFA-DB)](http://data.euro.who.int/hfadb) and Eurostat. HFA-DB provides demographic, socio-economic, business cycle and health and lifestyle indicators, and Eurostat contains data on (among others) general government expenditure and revenues as percentage of GDP used to derive the AAFI. Our primary analysis is restricted to those aged below 65, as they were the groupmost sensitive (health-wise) to macroeconomic fluctuations. [Tapia Granados and Ionides (2017](#_ENREF_27)), for instance, have shown that as for Europe, the working-age population – in particular those aged 30-44 – was the one most responsive to macroeconomic changes (i.e. the coefficient associated with the unemployment rate was the largest one in terms of magnitude for this specific age-band). Moreover, the main proxy used in the literature to capture macro-economic fluctuations is the unemployment rate, which is defined on individuals aged 65 or below. Results focusing on people aged 65 and above are available in the Web Appendix and the results are discussed in section 4 (‘Robustness Checks’).

Figure 1 highlights the decreasing trend in overall-mortality in all the European countries included in our analysis. Three former Soviet Union countries – Estonia, Latvia and Lithuania (henceforth referred to as ‘the Baltics’) – as well as Hungary and Romania stand out as those experiencing the highest trajectories of mortality rates (all highlighted in the dashed lines) and as diverging from the otherwise mostly linear trend observed across countries. This very different pattern suggests considerable caution in interpreting linear regression results that include the Baltics, Hungary and Romania. For this reason we present our results with and without those five countries.

[Figure 1 around here]

In keeping with the previous literature ([Ruhm 2000](#_ENREF_24)) we use several mortality indicators (for those aged below 65) as health proxies, in particular: (i) the overall standardized mortality, as well as the standardized mortality rates for seven major causes of mortality, i.e. ii) malignant-neoplasms, iii) cardiovascular diseases (CVDs), iv) accidents, v) suicides, vi) vehicle accidents, vii) cirrhosis and chronic liver diseases (CCLs), and viii) parasitic and infection diseases.

To illustrate how our quantitative fiscal measure aligns with more qualitative accounts of fiscal policy, Ireland may serve as a useful example. Bergin, Gerald et al. ([Bergin, Gerald et al. 2011](#_ENREF_6)) aptly describe the Irish Fiscal Crisis from the 1970s until 2011. Between the late 1990s and 2007, Ireland had the highest economic growth rate among the OECD countries (with an employment rate of more than 60 per cent and an unemployment rate of only 3%in 2007). With the Great Recession starting from 2008, the GDP fell and both asset values (with focus on the housing market) and the banking markets collapsed, producing a fiscal deficit. From the late 2008/beginning of 2009 the government put in place severe austerity measures with focus on an increment in the taxation and a cut in public expenditures. In 2009, with the ‘Emergency’ Budget, the rates for the income levy more than doubled (from 2 to 6% of the gross income), the universal Early Childcare Supplement for children under 6 and the supplement for newly-unemployed under 21 were abolished and, but surprisingly the social transfer were increased on average by 3%. The 2010 budget announced a nominal cut in social welfare support by about 4%; the categories more affected were the working age population (no measures on the pensioners were taken). More specifically, the unemployment benefits were severely reduced for people aged between 21 and 25 and child benefits were cut by 10%. In the 2011 Budget, further cuts were implemented for the working age population. Our data confirm the implementation of fiscal stimuli policies up to 2008 and then a rapid decline. More specifically our fiscal indicator shows an increase in the fiscal stance by more than 1.5 percentage points in 1996, 1998, 1999, 2001, 2007 and 2008. In 2009 it shows a decrease in the fiscal stance by 4.08 percentage points. Tables AV in the Web Appendix provide the quantitative results for all countries.

### 3. RESULTS

Table I presents the regression results using as the main explanatory variable of interest the unemployment rate – interpreted as a proxy for the macro-economic cycle – first *without* the austerity (A) and fiscal stimulus (FS) dummies and then *with* them. In line with the previous literature, our results show that mortality rates, with the exception of suicides, are pro-cyclical. No significant effects have been found for malignant neoplasms and infectious diseases. More precisely, a one percentage point increase in the unemployment rate is associated with a 0.4% decline in overall mortality. As for cause-specific mortality, a one percentage point unemployment rate increase is associated with a decrease in CVDs-, accident-, vehicle-accident-and CCL-attributable mortality by 0.5%, 1.8%, 2.4% and 1.2%, respectively. The magnitudes of our coefficients are broadly in line with those reported by Ruhm (2000), with the exception of CCLs and suicides. Our estimated effect for CCLs is almost double the one reported in Ruhm (2000) – a difference that might be due to the different sample we are looking at. As regards the association between unemployment rate and suicide rates, our estimated coefficients are smaller than those found by Ruhm (2000), but in line with those by Tapia-Granados and Ionides (2017) using 27 European countries for the period 1995-2015.

The inclusion of the fiscal measure leads to an increase in absolute magnitude of the association between the unemployment rate and both overall accident- (from -1.8% to 1.7%) and vehicle accident-attributable mortality (from -2.4% to -2.2%), and to a decrease in suicides (from 0.9% to 0.6%) and overall mortality (from -0.4% to -0.5%). The magnitude of the associations between the unemployment rate and mortality attributable to CVDs and to CCLs are not affected by the inclusion of the fiscal measures.

Examining the specific role played by fiscal measures, our results show that the implementation of austerity measures is associated with an increase by 2.7% and 0.7% in CCLs and overall mortality, respectively. The coefficients are significant at the 10% level only. Conversely, the implementation of fiscal stimuli is associated with an increase by about 4.3% and 3% in the mortality rates due to vehicle accidents and CCLs.

It is important to note that drawing a direct comparison between the size of the unemployment rate and the fiscal measure coefficients is difficult as the former is continuous while the latter is binary, and because they tend to move at different speed. However, a recession (expansion) typically implies an increase (decrease) of several percentage points in the unemployment rate. Greece, for instance was an extreme case, as it saw the unemployment rate increase by more than 15 percentage points during the Great Recession. Hence, the overall mortality effect of macroeconomic fluctuations tends to exceed the fiscal policy effect in overall magnitude.

[Table I around here]

The picture does change somewhat once we exclude the Baltics, Hungary and Romania from the analysis, on the grounds that they display a non-linear mortality pattern over time – a pattern that is not adequately captured by the linearity assumptions embedded in the applied regression model. Upon excluding those countries, as Table II shows, the association between mortality rates and unemployment rate – decreases in magnitude in absolute terms. More specifically, our results show that a one percentage point increase in the unemployment rate is associated with a decrease in overall, CVDs, accident-, vehicle accident- and CCLs -related mortality by, respectively, 0.1%, 0.4% , 1.4%, 1.8% and 0.5%. (In the previous results including all countries – see Table I – the coefficients were 0.4%, 0.5%, 1.8%, 2.4%, 1.2%, respectively). The association between unemployment rate and CCLs is significant at 10% level only.

The counter-cyclical association between suicides and unemployment is confirmed also for the sub-sample excluding the Baltics, Hungary and Romania: In this case, a one percentage point increase in the unemployment rate leads to an increase of 0.8% in the suicide mortality rate.

Again, also for the sample without the Baltics, Hungary and Romania, the picture changes somewhat with the inclusion of the fiscal impulse measure (see the right panel of Table II). As far as CCL-attributable mortality and suicides are concerned, the relationships turn out to be not statistically different from zero. The association between the unemployment rate and vehicle-related mortality slightly decreases in absolute magnitude: now a one percentage point increase in the unemployment rate is associated with a decrease in vehicle-related mortality from 1.8% to 1.6%. Conversely, the association between the unemployment rate and overall mortality slightly increases in terms of absolute magnitude, from 0.1% to 0.2% for each one percentage point increase in the unemployment rate.

The inclusion of the fiscal measure does not affect the magnitude of the association between the unemployment rate on one hand and CVD- or accident-related mortality on the other hand. Looking specifically at the fiscal policy effects, we found that austerity policies are now associated with a significant increase both in overall mortality (by 0.7%) and in suicide mortality (by 2.8%, significant at 10% level only). As in Table I, very loose fiscal policies appear to be positively related with mortality rates due to CCLs and due to vehicle accidents, by 3.2 % and 3.1 % (significant at 10% level only), respectively.

[Table II around here]

### 4. ROBUSTNESS CHECKS

To explore the robustness of our results, we run a series of sensitivity checks, results of which are presented in Tables III to V.

First, we test in Table III whether our results are affected by the exclusion of the former Eastern European bloc, i.e. either those countries that were part of Yugoslavia or of the Soviet bloc. Those countries had undergone a sudden structural shift from centrally planned economy to market economy ([Taylor-Robinson and Barr 2017](#_ENREF_28)). It is worth noting that when excluding the (quite large) sample from our analysis, only accident- and vehicle-accident-attributable mortality tend to be significantly associated with unemployment rate variations. More precisely, a one percentage point increase in the unemployment rate is associated with a 3% decrease in both mortality rates.

Using this new sample, we partly confirm the claim that austerity has detrimental effects on health. Austerity measures tend to increase overall mortality, suicide-related mortality, and – if to a lesser extent – fiscal stimuli tend to increase CCLs mortality. In contrast to our main results, we found that austerity measures tend to be associated with an increase in both overall accident- and vehicle-accident-attributable mortality. The exclusion of such a sizeable part of the sample leads to an almost doubling of the coefficient size associated with overall (from 0.7% to 1.2%) and suicide-related (from 2.8% to 4.3%) mortality, compared to those presented in Table II. Our austerity measure is now associated with an increase in overall, vehicle accident, accidental and suicide-related mortality by 1.2%, 3.2% (significant at 10% level only), 5% (significant at 10% level only) and 4.3%, respectively. Conversely, the implementation of fiscal stimuli is associated with an increase in mortality due to CCLs by 3.2% (significant at 10% level only).

Second, we test the robustness of our results to the inclusion of other non-EU countries: we use a sample of all the European countries that that are OECD members (i.e. we added to our EU sample Iceland, Norway and Switzerland). Doing so also confirms the claim that austerity has detrimental effects on some of the health indicators we use. The results (presented in Table IV) are broadly in line with the results found using our original sample, both in sign and magnitude. Austerity periods are associated with increments in overall mortality and CCLs by about 0.6% and by 4%, respectively; at the same time, fiscal stimuli are associated with an increase in mortality due to vehicle accidents and CCLs, by 4% and 4.4%, respectively. With respect to CCLs, Table IV – in line with Table I – shows that the increase in mortality during fiscally expansionary periods is higher than during contractionary ones.[[2]](#footnote-2)

Third, we test whether our results are robust to the functional form by comparing the results using AAFI as continuous variable rather than using the two dummies FS and A. Table V presents the results for all the 28 EU countries and Table VI presents the results excluding the Baltics, Hungary and Romania.

By making use of this new, transformed variable, we present the results in levels rather than in changes. Before proceeding with the interpretation of the results we should bear in mind the caveat that the AAFI indicator represents a surplus; therefore an increase in the AAFI indicator value represents an increase in the given country’s revenues compared to its expenditure, which would imply a fiscal stimulus policy rather than an austerity one.

These results now seem to be less affected by the sample selection, compared to the results based on the dummy-variable approach. However, they still indicate that fiscal policies are detrimental to health. As far as suicidal and vehicle mortality are concerned, the results broadly align with those based on the sample excluding the Baltics, Romania and Hungary. Our results suggest that a one percentage point increase in the fiscal surplus is associated with a decrease in suicides by 0.3% for the 28 EU countries sample and by 0.4% for the sample excluding the Baltics, Hungary and Romania. At the same time, one percentage point increase in the fiscal surplus is associated with an increase in vehicle attributable mortality by 0.6% when using the whole sample and by 0.7% when excluding the Baltics, Hungary and Romania. It is worth noting that the coefficient of suicides for the whole sample is significant at the 10% level only.

Fourth, we test whether our results are robust to the specific fiscal measure we chose, by comparing the results using another – more simple, but in our view inferior – fiscal stance indicator: the primary deficit. In line with the definition used in the Introduction, a ‘very tight’ fiscal policy is defined as a decline in the primary deficit variable by more than 1.5 percentage points and is taken as a proxy of austerity. By contrast, a ‘very loose’ or fiscal stimulus adjustment is defined as an increase in the primary deficit variable by more than 1.5 percentage points.

Table VII presents the results for all the 28 EU countries and VIII presents the results excluding the Baltics, Hungary and Romania.

Once again, our results suggest that both austerity and fiscal stimulus measures are associated with detrimental health effects. Table VII indicates that the implementation of fiscal austerity measures is associated with an increase in overall, CCLs and infectious disease-related mortality by 0.8%, 3% (significant at 10% level only) and 7.3% and with a decrease in vehicle attributable mortality by 3% (significant at 10%). Somewhat surprisingly, also the implementation of fiscal stimuli is associated with an increase in overall mortality, and the magnitude of the coefficient matches the one found for austerity measures, even though the statistical significance is lower than that attributable to austerity. When excluding the Baltics, Hungary and Romania our results show that austerity is associated with an increase in overall mortality and infectious disease related mortality by 1% and 7.4%, respectively. For the same reduced sample, fiscal stimuli are associated with an increase in overall and accident-related mortality by 0.8% and 6.6%, respectively

The latter set of results highlights that the choice of the fiscal indicator metric we use to define both fiscal austerity and fiscal stimuli measures does matter, as the results appear to be quite sensitive to it. However, one of the main concerns raised against the primary deficit is the hypothesis of full-employment which is quite unlikely during a recession ([Alesina and Perotti 1995](#_ENREF_2)). Therefore, as discussed earlier in the Introduction, the AAFI indicator arguably is a more robust indicator in that specific case. However, we believe that the sensitivity of the results to the metric use is nonetheless a relevant result to be highlighted.

[Tables II – VIII around here]

As further robustness checks, Tables AII and AIII in the Web Appendix present the results using the mortality rates for people older than 65. Those results show that when the countries implement expansionary policies, malignant neoplasm related mortality on people older than 65 appears to be affected and tends to increase by more than 0.6 % (significant at 10% level only).

### 5. DISCUSSION

In this paper, we have built on the existing literature on the relationship between recessions (or booms) and health, by examining the role played by fiscal policy in affecting seven mortality indicators, using – for the first time in this literature – an explicit measure of ‘fiscal impulse’ that has been widely used in the empirical macroeconomic literature. Doing so allowed us to submit the claim that “austerity kills” to more rigorous quantitative, empirical scrutiny than in previous research, which has been primarily based on descriptive case studies.[[3]](#footnote-3)

Our results suggest three key findings:

First, they partly support the claim that austerity has been bad for health. In our overall sample of 28 EU countries, both all-cause mortality and mortality due to CCLs show a significant increase in response to austerity. However, those results are significant at 10% only and, as far as CCLs are concerned, they appear to increase to a similar degree during periods of loose fiscal policy. At the same time, fiscal expansion periods seem to be associated with a significant increase in vehicle-related mortality.

Second, results on the austerity effects (and to a lesser extent on the unemployment effects) are somewhat sensitive to the exclusion of the Baltic countries, Hungary and Romania: when excluding them from the sample, austerity turns out to significantly increase overall mortality and suicide-related mortality.

Third, even though we cannot directly compare the magnitude of macro-economic shocks with the fiscal policy one, as they move at different speed, our results suggest that the overall mortality effect of macroeconomic fluctuations tends to exceed the fiscal policy effect in overall magnitude.

Our results allow us to speculate about at least three potential underlying mechanisms, although the extent to which we can test any specific mechanisms in detail without individual level data remains limited: first, it might be that austerity measures have led to a deterioration in mental health which may explain the increase in suicides as well as an increase in stress ([Suhrcke and Stuckler 2012](#_ENREF_26)). Second, we might observe an income effect, in that during austerity periods people’s purchasing power declines, either via increased taxation or lower social protection, which might lead to a deterioration of public services, such as infectious disease control programs or universal health care access ([Stuckler and Basu 2013](#_ENREF_25), [Bonamore, Carmignani et al. 2015](#_ENREF_9)). Third, fiscal expansions may be associated with an increase in overwork, which in turn might lead to social-isolation that is one of the main drivers for suicides ([Durkheim 1897](#_ENREF_12), [Barstad 2008](#_ENREF_5)).

While the findings and approach add to the existing literature, there are important limitations that future work should seek to overcome. First, our results describe the association between health, recession and fiscal policies, but they cannot claim a large degree of causal inference, in light of the lack of any common exogenous shock – among the 28 countries – that might have allowed disentangling the inter-relationship between the variables health and austerity. Second, our model refrains from explicitly modelling the likely complex inter-relationship between macro-economic shocks and fiscal policies ([Parker 2011](#_ENREF_20)). Third, the effect of fiscal policies might lead to different consequences according to the population examined – for example, the effect might be different by gender and age.

Notwithstanding these limitations, our findings indicate that if we are interested in understanding the impact of austerity on health, there are insights to be gained from the extensive macroeconomic literature on ways of directly measuring the stance of fiscal policy. These measures should be taken explicitly into account in such analysis, building on what has been presented in this paper. Our initial findings suggest that the actual picture on the role of austerity (and fiscal expansion) in health may be more complex than previously thought.

### REFERENCES

### Alesina, A. and S. Ardagna (2013). "The design of fiscal adjustments." Tax policy and the economy 27(1): 19-68.

### Alesina, A. and R. Perotti (1995). "Fiscal expansions and adjustments in OECD countries." Economic policy 10(21): 205-248.

### Antonakakis, N. and A. Collins (2014). "The impact of fiscal austerity on suicide: on the empirics of a modern Greek tragedy." Social science & medicine 112: 39-50.

### Barro, R. J. and C. J. Redlick (2011). "Macroeconomic effects from government purchases and taxes." The Quarterly Journal of Economics 126(1): 51-102.

### Barstad, A. (2008). "Explaining changing suicide rates in Norway 1948–2004: the role of social integration." Social indicators research 87(1): 47-64.

### Bergin, A., J. F. Gerald, I. Kearney and C. O'Sullivan (2011). "The Irish fiscal crisis." National Institute Economic Review 217(1): R47-R59.

### Bilal, U., R. Cooper, F. Abreu, C. Nau, M. Franco and T. A. Glass (2017). "Economic growth and mortality: do social protection policies matter?" International journal of epidemiology 46(4): 1147-1156.

### Blanchard, O. (1993). "Suggestions for a new set of fiscal indicators." H A A Vernon and F A A M van Winden eds The political economy of government debt: 307-325.

### Bonamore, G., F. Carmignani and E. Colombo (2015). "Addressing the unemployment–mortality conundrum: Non-linearity is the answer." Social Science & Medicine 126: 67-72.

### Crost, B. and A. Friedson (2017). "Recessions and health revisited: New findings for working age adults." Economics & Human Biology 27: 241-247.

### De Vogli, R., M. Marmot and D. Stuckler (2012). "Excess suicides and attempted suicides in Italy attributable to the great recession." Journal of Epidemiology and Community Health: jech-2012-201607.

### Durkheim, E. (1897). Le suicide: étude de sociologie, F. Alcan.

### Eggertsson, G. B. and P. Krugman (2012). "Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach." The Quarterly Journal of Economics 127(3): 1469-1513.

### Gerdtham, U.-G. and C. J. Ruhm (2006). "Deaths rise in good economic times: evidence from the OECD." Economics & Human Biology 4(3): 298-316.

### Granados, J. A. T. (2013). "A flawed diagnosis: "The Body Economic: Why Austerity Kills"." Science 341: 1176-1177.

### Granados, J. A. T. and J. M. Rodriguez (2015). "Health, economic crisis, and austerity: a comparison of Greece, Finland and Iceland." Health Policy 119(7): 941-953.

### Guardian, T. (2010). "IMF warns of the 'human cost' of public spending cuts." https://[www.theguardian.com/business/2010/sep/13/imf-public-sector-cuts](http://www.theguardian.com/business/2010/sep/13/imf-public-sector-cuts) (Accessed on 20th November, 2017).

### Kaplan, E. K., C. A. Collins and F. A. Tylavsky (2017). "Cyclical unemployment and infant health." Economics & Human Biology 27: 281-288.

### Lam, J. P. and E. Piérard (2017). "The Time‐Varying Relationship between Mortality and Business Cycles in the USA." Health economics 26(2): 164-183.

### Parker, J. A. (2011). "On measuring the effects of fiscal policy in recessions." Journal of Economic Literature 49(3): 703-718.

### Pérez-Moreno, S., M. C. Blanco-Arana and E. Bárcena-Martín (2016). "Economic cycles and child mortality: A cross-national study of the least developed countries." Economics & Human Biology 22: 14-23.

### Perotti, R. (2005). "Estimating the effects of fiscal policy in OECD countries."

### Regidor, E., G. Barrio, M. J. Bravo and L. de la Fuente (2014). "Has health in Spain been declining since the economic crisis?" Journal of epidemiology and community health 68(3): 280-282.

### Ruhm, C. J. (2000). "Are recessions good for your health?" The Quarterly journal of economics 115(2): 617-650.

### Stuckler, D. and S. Basu (2013). The body economic: why austerity kills, Basic Books.

### Suhrcke, M. and D. Stuckler (2012). "Will the recession be bad for our health? It depends." Social science & medicine 74(5): 647-653.

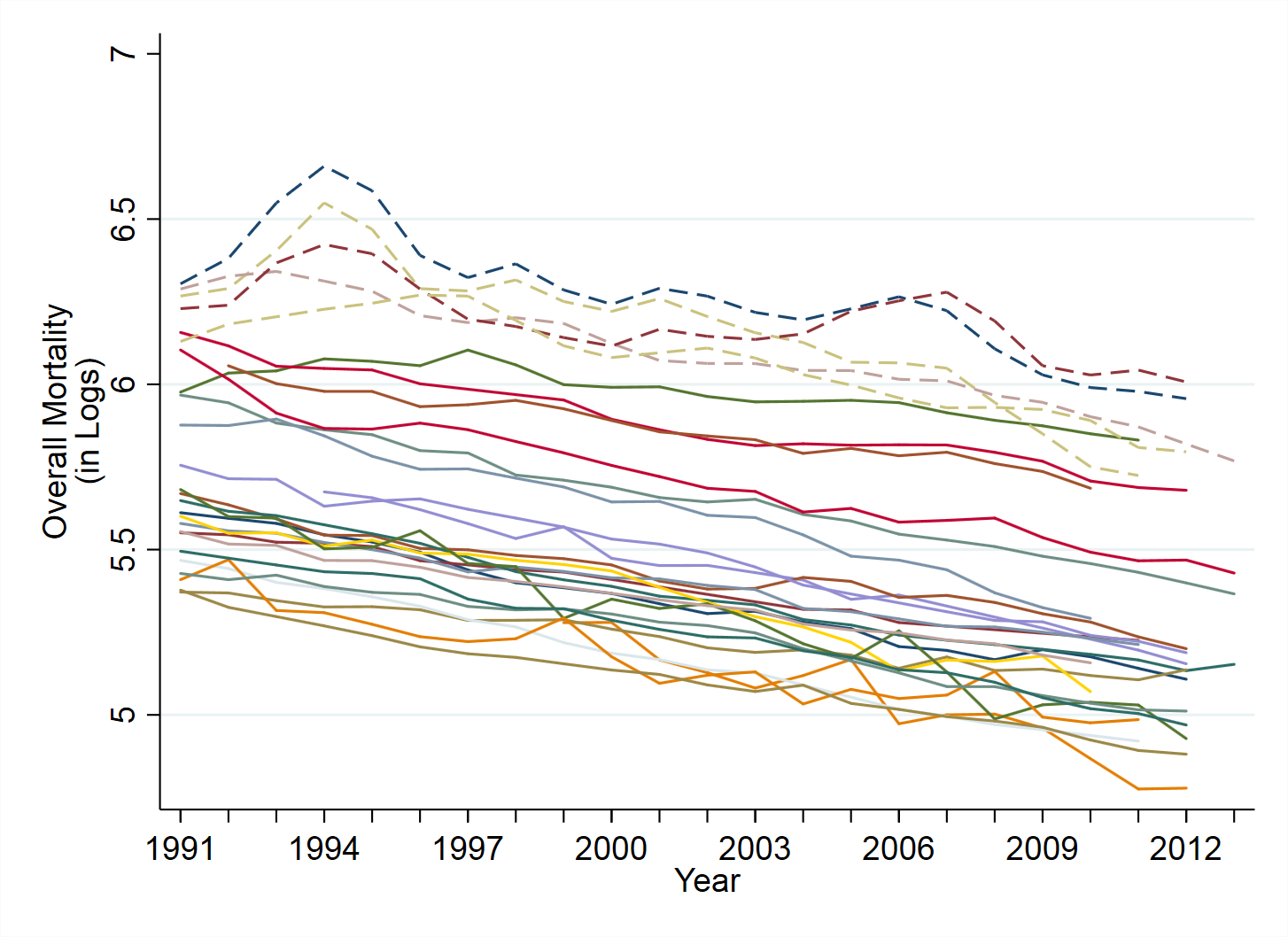
### Tapia Granados, J. A. and E. L. Ionides (2017). "Population health and the economy: Mortality and the Great Recession in Europe." Health economics 26(12): e219-e235.

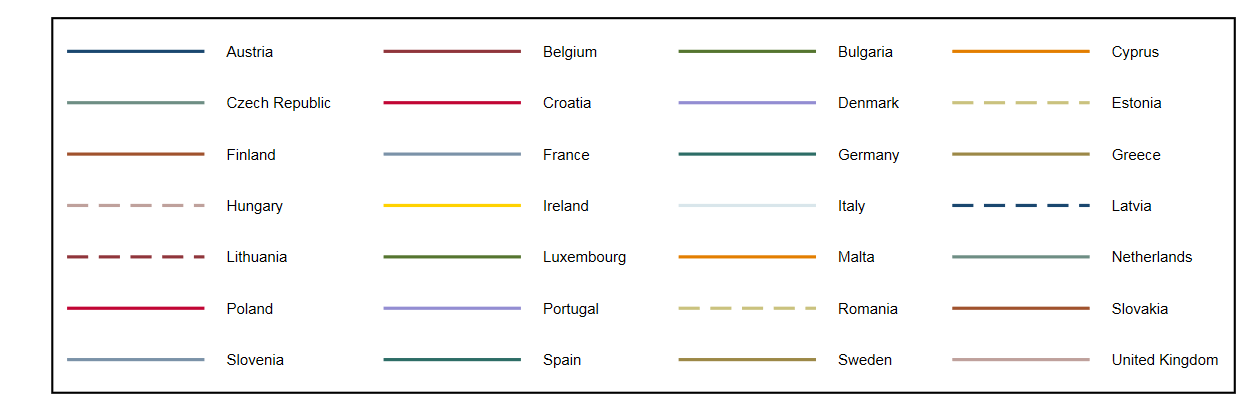
### Taylor-Robinson, D. and B. Barr (2017). "Death rate now rising in UK’s poorest infants." Bmj 357: j2258.

### Toffolutti, V., M. McKee, A. Melegaro, W. Ricciardi and D. Stuckler (2018). "Austerity, measles and mandatory vaccination: cross-regional analysis of vaccination in Italy 2000-14." European journal of public health.

### FIGURES

**Figure 1: Time trends in overall standardized mortality (in logarithms) (for population aged 65 or below) across 28 European Countries (1991-2013)**





Source: Own calculations based on WHO HFA database.

**TABLES**

**Table I:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using data on 28 EU countries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms (N=429) | -0.0005  (0.0005) | 0.005  (0.003) | 0.002  (0.003) | -0.0004  (0.001) |
| Cardiovascular Diseases  (N=440) | -0.005\*\*\*  (0.002) | -0.0001  (0.009) | 0.004  (0.009 ) | -0.005\*\*\*  (0.002) |
| Accidents  (N=442) | -0.018\*\*\*  (0.004) | 0.026  (0.021) | 0.001  (0.022) | -0.017\*\*\*  (0.004) |
| Suicides  (N=438) | 0.009\*\*\*  (0.002) | -0.020  (0.014) | 0.020  (0.014) | 0.006\*\*  (0.003) |
| Vehicle Accidents  (N =426) | -0.024\*\*\*  (0.003) | 0.043\*\*\*  (0.016) | 0.004  (0.017) | -0.022\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N=440) | -0.012\*\*\*  (0.003) | 0.030\*  (0.016) | 0.027\*  (0.016) | -0.012\*\*\*  (0.003) |
| Infectious Diseases  (N=440) | -0.003  (0.005) | 0.019  (0.032) | 0.030  (0.033) | -0.004  (0.006) |
| All causes (N=433) | -0.004\*\*\*  (0.001) | 0.006  (0.004) | 0.007\*  (0.004) | -0.005\*\*\*  (0.001) |

Notes: The dependent variable is the natural logarithm of each cause-specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in the unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

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

SE stands for standard errors that are given in parentheses.

Countries included: see Appendix Table A1 for details.

**Table II:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using data on 23 EU countries (excluding the Baltics, Hungary and Romania)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=355) | 0.0004 | 0.0056 | 0.0024 | 0.0006 |
| (0.0007) | (0.0035) | (0.0037) | (0.0007) |
| Cardiovascular Diseases  (N =355) | -0.004\*\*  (0.002) | -0.004  (0.009) | 0.005  (0.009) | -0.004\*\*  (0.002) |
| Accidents  (N =367) | -0.014\*\*\*  (0.004) | 0.024  (0.0237) | 0.011  (0.024 ) | -0.014\*\*\*  (0.005) |
| Suicides  (N =363) | 0.008\*\*  (0.003) | -0.021  (0.016) | 0.028\*  (0.016) | 0.005  (0.003) |
| Vehicle Accidents  (N =352) | -0.018\*\*\*  (0.003) | 0.031\*  (0.016) | -0.004  (0.017) | -0.016\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N =365) | -0.005\*  (0.003) | 0.032\*\*  (0.016) | 0.019  (0.016) | -0.004  (0.003) |
| Infectious Diseases  (N =365) | -0.001  (0.007) | 0.019  (0.037) | 0.039  (0.038) | -0.002  (0.007) |
| All causes  (N =358) | -0.001\*\*  (0.001) | 0.005  (0.003) | 0.007\*\*  (0.004) | -0.002\*\*  (0.001) |

Notes:

The dependent variable is the natural logarithm of each cause-specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in the unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

Countries included: see Appendix Table A1 for details.

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

**Table III:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using data on 17 EU countries (excluding countries that were formerly either part of Yugoslavia or members of the Soviet bloc)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=273) | 0.0003 | 0.005 | 0.005 | 0.0003 |
| (0.0009) | (0.004) | (0.004) | (0.0009) |
| Cardiovascular Diseases  (N =280) | -0.002  (0.002) | -0.004  (0.011) | 0.006  (0.011) | -0.002  (0.002) |
| Accidents  (N =282) | -0.029\*\*\*  (0.005) | 0.025  (0.026) | 0.050\*  (0.027) | -0.030\*\*\*  (0.006) |
| Suicides  (N =280) | 0.007\*  (0.004) | -0.024  (0.020) | 0.043\*\*  (0.021) | 0.004  (0.004) |
| Vehicle Accidents  (N =272) | -0.028\*\*\*  (0.003) | 0.013  (0.016) | 0.032\*  (0.017) | -0.030\*\*\*  (0.004) |
| Cirrhosis and Chronic Liver Diseases  (N =280) | -0.006  (0.004) | 0.032\*  (0.019) | 0.024  (0.020) | -0.005  (0.004) |
| Infectious Diseases  (N =280) | 0.003  (0.009) | 0.033  (0.045) | 0.035  (0.047) | 0.003  (0.010) |
| All causes  (N =274) | -0.001  (0.001) | 0.005  (0.004) | 0.012\*\*\*  (0.004) | -0.001  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities. The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

**Table IV**: The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), including 28 EU countries, plus Iceland, Norway and Switzerland

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=476) | -0.001 | 0.003 | 0.004 | -0.001 |
| (0.001) | (0.003) | (0.003) | (0.001) |
| Cardiovascular Diseases  (N =488) | -0.006\*\*\*  (0.001) | -0.001  (0.009) | -0.004  (0.009) | -0.005\*\*\*  (0.002) |
| Accidents  (N =486) | -0.019\*\*\*  (0.004) | 0.011  (0.021) | -0.001  (0.021) | -0.019\*\*\*  (0.004) |
| Suicides  (N =486) | 0.008\*\*\*  (0.002) | -0.019  (0.013) | 0.018  (0.013) | 0.006\*\*  (0.002) |
| Vehicle Accidents  (N =473) | -0.027\*\*\*  (0.003) | 0.040\*\*  (0.017) | 0.014  (0.018) | -0.025\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N =487) | -0.014\*\*\*  (0.003) | 0.044\*\*  (0.018) | 0.040\*\*  (0.018) | -0.014\*\*\*  (0.003) |
| Infectious Diseases  (N =487) | -0.005  (0.005) | 0.012  (0.031) | 0.024  (0.031) | -0.006  (0.006) |
| All causes  (N =477) | -0.005\*\*\*  (0.001) | 0.005  (0.004) | 0.006\*  (0.004) | -0.005\*\*\*  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

**Table V:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using AAFI as continuous variable (i.e. in levels) rather than as a dummy (capturing changes) on data for 28 EU countries

|  |  |  |  |
| --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | |
| Cause of death | Unemployment Rate | AAFI | Unemployment Rate |
| (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=429) | -0.0005  (0.0005) | 0.0002  (0.0003) | -0.0004  (0.0006) |
| Cardiovascular Diseases  (N=440) | -0.005\*\*\*  (0.002) | -0.0004  (0.0009) | -0.005\*\*\*  (0.002) |
| Accidents  (N=442) | -0.018\*\*\*  (0.004) | 0.004  0.002 | -0.016\*\*\*  (0.004) |
| Suicides  (N=438) | 0.009\*\*\*  (0.002) | -0.003\*  (0.002) | 0.006\*\*  (0.003) |
| Vehicle Accidents  (N =426) | -0.024\*\*\*  (0.003) | 0.006\*\*\*  (0.002) | -0.022\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N=440) | -0.012\*\*\*  (0.003) | -0.008  (0.002) | -0.013\*\*\*  (0.003) |
| Infectious Diseases  (N=440) | -0.003  (0.005) | -0.003  (0.003) | -0.004  (0.006) |
| All causes (N=433) | -0.004\*\*\*  (0.0007) | -0.0002  (0.0004) | -0.005\*\*\*  (0.0007) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

**Table VI:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using AAFI as continuous variable (i.e. in levels) rather than as a dummy (capturing changes) on data for 23 EU countries (i.e. excluding the Baltics, Hungary and Romania)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | |
| Cause of death | Unemployment Rate | AAFI | Unemployment Rate |
| (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=355) | 0.0004 | 0.0003 | 0.0005 |
| (0.0007) | (0.0004) | (0.0007) |
| Cardiovascular Diseases  (N =355) | -0.004\*\*  (0.002) | -0.0006  (0.001) | -0.004\*\*  (0.002) |
| Accidents  (N =367) | -0.014\*\*\*  (0.004) | 0.003  (0.003) | -0.014\*\*\*  (0.005) |
| Suicides  (N =363) | 0.008\*\*  (0.003) | -0.004\*\*  (0.002) | 0.005  (0.003) |
| Vehicle Accidents  (N =352) | -0.018\*\*\*  (0.003) | 0.007\*\*\*  (0.002) | -0.015\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N =365) | -0.005\*  (0.003) | 0.001  (0.002) | -0.005  (0.003 ) |
| Infectious Diseases  (N =365) | -0.001  (0.007) | -0.004  (0.004) | -0.003  (0.007) |
| All causes  (N =358) | -0.001\*\*  (0.0007) | -0.0003  (0.0004) | -0.002\*\*  (0.0007) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

**Table VII**: The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using 28 EU countries the Primary Deficit as Fiscal Indicator

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering Primary Deficit | Considering the Primary Deficit | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=429) | -0.001 | 0.004 | -0.002 | -0.0004 |
| (0.001) | (0.003) | (0.003) | (0.001) |
| Cardiovascular Diseases  (N =440) | -0.005\*\*\*  (0.001) | 0.009  (0.009) | 0.012  (0.009) | -0.005\*\*\*  (0.001) |
| Accidents  (N =442) | -0.018\*\*\*  (0.004) | 0.025  (0.022) | -0.010  (0.022) | -0.018\*\*\*  (0.004) |
| Suicides  (N =438) | 0.009\*\*\*  (0.002) | 0.002  (0.014) | 0.010  (0.014) | 0.009\*\*\*  (0.002) |
| Vehicle Accidents  (N =426) | -0.024\*\*\*  (0.003) | -0.017  (0.017) | -0.030\*  (0.017) | -0.023\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N =440) | -0.012\*\*\*  (0.003) | 0.017  (0.016) | 0.030\*  (0.016) | -0.013\*\*\*  (0.003) |
| Infectious Diseases  (N =440) | -0.003  (0.005) | 0.035  (0.033) | 0.073\*\*  (0.032) | -0.005  (0.005) |
| All causes  (N =433) | -0.004\*\*\*  (0.001) | 0.008\*  (0.004) | 0.008\*\*  (0.004) | -0.005\*\*\*  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

**Table VIII:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1991-2013), using 23 EU countries (with the primary deficit as the basis of the classification of the fiscal indicator)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering Primary Deficit | Considering the Primary Deficit | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=355) | -0.001 | 0.004 | -0.003 | -0.001 |
| (0.001) | (0.004) | (0.004) | (0.001) |
| Cardiovascular Diseases  (N =365) | -0.004\*\*  (0.002) | 0.008  (0.009) | 0.014  (0.010) | -0.004\*\*  (0.002) |
| Accidents  (N =367) | -0.014\*\*\*  (0.004) | 0.066\*\*\*  (0.024) | 0.007  (0.024) | -0.014\*\*\*  (0.004) |
| Suicides  (N =363) | 0.008\*\*\*  (0.003) | -0.002  (0.017) | 0.013  (0.017) | 0.007\*\*  (0.003) |
| Vehicle Accidents  (N =352) | -0.018\*\*\*  (0.003) | -0.005  (0.017) | -0.022  (0.018) | -0.017\*\*\*  (0.003) |
| Cirrhosis and Chronic Liver Diseases  (N =365) | -0.006\*  (0.003) | 0.017  (0.017) | 0.027  (0.017) | -0.006\*  (0.003) |
| Infectious Diseases  (N =365) | -0.001  (0.007) | 0.027  (0.039) | 0.074\*  (0.039) | -0.003  (0.007) |
| All causes  (N =358) | -0.001\*\*\*  (0.001) | 0.008\*\*  (0.003) | 0.010\*\*\*  (0.003) | -0.002\*\*\*  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people below the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses.

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

### APPENDIX Table AI: List of countries and data availability for mortality rates and AAFI

|  |  |  |
| --- | --- | --- |
| Country | Years of data available | |
| Mortality rates | AAFI |
| Austria | 1991-2013 (S, ALL, CVD, CCL, INF, AC, ALL); 1991-2012 (VA, MN) | 1992-2011 |
| Belgium | 1991-1999 and 2004-2006, 2012(S, CVD,CCL, VA, INF) | 1992-2006, 2009-2011 |
| 1991-1999 and 2004-2006(MN, ALL) |
| 1991-2006, 2012 (AC) |
|  |
| Bulgaria | 1991-2011(S, MN, CVD, CCL, VA, INF, ALL, AC) | 1996-2006, 2009-2011 |
|  |
| Croatia | 2002-2013(S, MN, CVD, CCL, VA, INF, ALL, AC) | 2002-2013 |
| Cyprus | 2002-2012(ALL), 2000, 2004-2012(MN, CVD, CCL, INF, ALL, AC), 2004-2012(VA) | 2000-2012 |
| Czech Republic | 1996-2013(S, MN, CVD, CCL, VA, INF, ALL, AC) | 1996-2013 |
| Denmark | 1991-2006, 2011-2012 (S, MN, CVD, CCL, VA) | 1992-2011 |
| 1994-2006, 2011-2012 (ALL) |
| 1995-2006, 2011-2012 (AC) |
| Estonia | 1991-2011(S, MN, CVD, ALL, VA, INF, CCL, AC) | 1996-2011 |
| Finland | 1991-2013(S, CVD, CCL, AC, INF)  1991-2012( MN,VA, ALL) | 1992-2011 |
| France | 1991-2011 (S, MN, CVD, CCL, VA, INF, ALL, AC) | 1996-2006, 2009-2012 |
| Germany | 1991-2011 (S, MN, CVD, CCL, VA, ALL, AC, INF) | 1992-2011 |
| Greece | 1991-2009, 2011 -2012 (S, MN, CCL, VA, ALL, AC, INF) | 1996-2012 |
| Hungary | 1991-2009, 2011-2013 (S, CCL, CVD, ALL, AC, INF)  1991-2009, 2011-2012 (MN, INF) | 1996-2004, 2007-2013 |
| Ireland | 1991-2010 (S, MN, CCL, VA, ALL, AC, INF) | 1996-2010 |
| Italy | 1991-2003, 2006-2012 (S, CVD, CCL, VA, INF, AC) | 1992-2003, 2007-2009,  2011-2012 |
| 1991-2003, 2006-2011 (ALL, MN) |
|  |
| Latvia | 1991-2012 (S, MN, CVD, VA, INF, ALL, CCL, AC) | 1993-2006, 2009-2012 |
|  |
| Lithuania | 1991-2012 (S, MN, CVD, VA, ALL, CCL, AC) | 1996-2012 |
| Luxembourg | 1996-2012 (S, MN, CVD, VA, INF, ALL, CCL, AC) | 1992-2013 |
| Malta | 1996-2012 (S, MN, CVD, CCL, VA, INF, ALL, AC) | 1996-2012 |
| Netherlands | 1991-2013(S, CVD, CCL, VA, AC, INF ) | 1992-2013 |
| 1991-2012 (MN, ALL) |
| Poland | 1991-1996, 1999-2013 (S, INF, CVD, CCL)  1991-1996, 1999-2012 (MN, ALL, VA)  1991-1997, 2000-2013 (AC) | 1996-2006, 2009-2013 |
| Portugal | 1991-2004, 2006-2013(S, CVD, CCL, INF) | 1996-2013 |
|  |
| 1991-2004, 2006-2012(MN, ALL, VA) |
| Romania | 1991-2012 (S, MN, CVD, ALL, AC, CCL) | 1996-2004, 2009-2012 |
|  |
| 1991-1993, 1996-2012(VA) |
| Slovakia | 1991-2005, 2008-2010 (S) | 1994-2011 |
| 1992-2010 (ALL) |
| 1991-2010 (MN, CVD, CCL, INF) |
| 1991-2005, 2008-2010 (VA) |
| 1993-2010 (AC) |
| Slovenia | 1991-2010(S, MN, CVD, CCL, VA, INF, ALL, AC) | 1996-2011 |
| Spain | 1991-2013 (S,CVD, AC, CCL, INF) | 1996-2006, 2009-2013 |
| 1991-2012 (MN, ALL,VA) |
| Sweden | 1991-2013 (S, CVD, AC, CCL, AC, INF)  1991-2012 (MN, ALL, VA) | 1994-2006  2009-2013 |
| United Kingdom | 1991-2011 (S, CVD, AC, CCL, VA, AC, INF) | 1992-2006, 2009-2011 |
| 1991-2010 (MN) |
| 1991-2000, 2002-2010 (ALL) |

*Notes:*  Overall mortality (‘ALL’) broken down by cause-specific deaths, abbreviations for which are as follows: S=Suicide; MN= Malignant Neoplasms; CVD= Cardio-vascular; INF= infections and parasitic diseases; CCL= cirrhosis and liver diseases; VA= vehicle accidents; AC= accidents; HM= homicides. *Source*: WHO HFA database and Eurostat.

**Table AII:** The effect of very loose or tight policies on mortality rates for people older than 65, cross-country panel regression results (1992-2013), using 28 EU countries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=362) | -0.0001 | 0.006\* | -0.002 | 0.0003 |
| (0.001) | (0.003) | (0.003) | (0.001) |
| Cardiovascular Diseases  (N =362) | -0.001  (0.002) | 0.002  (0.010) | 0.014  (0.010) | -0.001  (0.002) |
| Accidents  (N =362) | -0.009\*\*\*  (0.002) | 0.007  (0.012) | 0.003  (0.012) | -0.009\*\*\*  (0.002) |
| Suicides  (N =344) | -0.001  (0.003) | -0.002  (0.015) | -0.007  (0.015) | -0.0003  (0.003) |
| Vehicle Accidents  (N =359) | -0.007  (0.005) | 0.016  (0.025) | -0.024  (0.026) | -0.005  (0.005) |
| Infectious Diseases  (N =362) | -0.009\*  (0.005) | 0.034  (0.026) | -0.011  (0.027) | -0.006  (0.005) |
| All causes  (N =346) | -0.001\*  (0.001) | 0.003  (0.004) | -0.003  (0.004) | -0.001  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people above the age of 65.

All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

Unfortunately, the Gateway version of the HFA database provides mortality rates due to cirrhosis only for people younger than 65, therefore we cannot provide the result for people aged 65 or more for CCL attributable mortality.

SE stands for standard errors that are given in parentheses.

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

**Table AIII:** The effect of very loose or tight policies on mortality rates for people older than 65, cross-country panel regression results (2000-2013), using 23 EU countries (i.e. excluding the Baltics, Hungary and Romania)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N=228) | -0.002\* | 0.005 | 0.003 | -0.002\* |
| (0.001) | (0.003) | (0.004) | (0.001) |
| Cardiovascular Diseases  (N =228) | 0.001  (0.002) | -0.006  (0.008) | 0.003  (0.009) | -0.0001  (0.002) |
| Accidents  (N =228) | -0.001  (0.003) | 0.024\*\*  (0.011) | 0.006  (0.013) | 0.001  (0.003) |
| Suicides  (N =224) | -0.001  (0.006) | -0.013  (0.021) | -0.025  (0.024) | 0.001  (0.006) |
| Vehicle Accidents  (N =225) | -0.014\*  (0.008) | -0.018  (0.029) | -0.053  (0.035) | -0.018  (0.029) |
| Infectious Diseases  (N =228) | -0.007  (0.008) | 0.034  (0.037) | -0.003  (0.009) | -0.004  (0.007) |
| All causes  (N =230) | 0.001  (0.001) | 0.001  (0.004) | 0.001  (0.005) | 0.001  (0.001) |

Notes:

The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people above the age of 65.

All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

Unfortunately, the Gateway version of the HFA database provides mortality rates due to cirrhosis only for people younger than 65, therefore we cannot provide the result for people aged 65 or more for CCL attributable mortality.

SE stands for standard errors that are given in parentheses.

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

**Table AIV:** The effect of very loose or tight policies on mortality rates, cross-country panel regression results (1970-2010), using OECD countries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Without considering AAFI | Considering the AAFI | | |
| Cause of death | Unemployment Rate | Fiscal Stimulus (FS) | Austerity (A) | Unemployment Rate |
| (SE) | (SE) | (SE) | (SE) |
| Malignant-Neoplasms  (N1=673) | 0.001\* | 0.004 | -0.0003 | 0.001 |
| (0.001) | (0.004) | (0.006) | (0.001) |
| Accidents  (N1=670) | -0.011\*\*\* | -0.018\* | -0.004 | -0.011\*\*\* |
| (0.002) | (0.010) | (0.015) | (0.002) |
| Cardiovascular Diseases  (N1=673) | -0.002\*\* | 0.005 | -0.011 | -0.002\*\*\* |
| (0.001) | (0.006) | (0.008) | (0.001) |
| Suicides | 0.009\*\*\* | -0.014 | 0.071\*\*\* | 0.009\*\*\* |
| (N1=671) | (0.002) | (0.010) | (0.014) | (0.002) |
| Vehicle Accidents  (N1=671) | -0.020\*\*\*  (0.002) | 0.006  (0.012) | 0.009  (0.018) | -0.020\*\*\*  (0.002) |
| Infectious Diseases  (N1=673) | 0.006\*\*  (0.003) | 0.007  (0.019) | 0.010  (0.029) | 0.006\*  (0.001) |
| Cirrhosis and Chronic Liver Diseases  (N1=672) | -0.009\*\*\*  (0.001) | 0.021\*\*  (0.009) | 0.010  (0.013) | -0.009\*\*\*  (0.001) |
| All causes  (N=673) | -0.002\*\*\*  (0.001) | -0.0004  (0.004) | -0.008  (0.006) | -0.002\*\*\*  (0.001) |

Notes: The dependent variable is the natural logarithm of each specific mortality rate per 100,000 population. The mortality rates refer to people above the age of 65. All the specifications include vectors of country, year dummy variables, country-specific trends, demographic characteristics (percentage of males under the age of 65). Coefficients represent semi-elasticities, The unemployment rate coefficient represents the percentage variation in mortality rates due to a percentage point variation in unemployment rate. The Fiscal Stimulus (Austerity) coefficient represents the percentage variation in mortality rates due to the implementation of Fiscal Stimulus (Austerity) policy.

SE stands for standard errors that are given in parentheses. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.Period: 1970-2010.Source: OECD. The fiscal indicator we used comes from Alesina and Ardagna 2013. We acknowledge the authors for having kindly shared their data with us.

**Table AV:** Definition of Fiscal Stimuli according to AAFI, data for 28 EU countries covering the period 1992-2013.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country/Year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| Austria | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 |
| Belgium | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | FS | 0 |  |  |  |  |  | 0 |  |
| Bulgaria |  |  |  |  | 0 | 0 | FS | 0 | 0 | 0 | FS | FS | 0 | FS | FS |  |  | FS | 0 | 0 |  |  |
| Croatia |  |  |  |  |  |  |  |  |  |  | 0 | FS | FS | 0 | FS |  |  | FS | 0 | 0 | 0 | 0 |
| Cyprus |  |  |  |  |  |  |  |  | 0 | FS | FS | 0 | 0 | 0 | 0 |  |  | FS | 0 | 0 | 0 |  |
| Czech Republic | |  |  |  | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 |  |  | 0 | FS | FS | 0 | 0 | 0 | 0 | 0 |
| Denmark | 0 | 0 | 0 | FS | FS | 0 | FS | 0 | 0 | 0 | FS | 0 | 0 | 0 | FS |  |  |  |  | 0 | FS |  |
| Estonia |  |  |  |  | 0 | 0 | FS | 0 | 0 | FS | FS | 0 | 0 | FS | FS | FS | FS | 0 | 0 | FS |  |  |
| Finland | 0 | 0 | 0 | FS | 0 | FS | 0 | FS | 0 | FS | 0 | FS | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 | 0 | 0 | 0 | 0 |  |  | 0 |  | 0 | 0 |  |
| Germany | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | FS | 0 |  |  |
| Greece |  |  |  |  | 0 | 0 | 0 | 0 | 0 | FS | FS | FS | 0 | 0 | FS | FS | FS | 0 |  | 0 | 0 |  |
| Hungary |  |  |  |  | 0 | FS | FS | 0 | FS | FS | FS | 0 | FS |  |  | 0 | 0 | 0 |  | 0 | 0 | FS |
| Iceland | 0 | 0 | 0 |  |  |  |  | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 |  |  |  |  |
| Ireland |  |  |  |  | FS | FS | FS | FS | 0 | FS | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 | FS |  |  |  |
| Italy | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | 0 | FS | 0 | 0 |  |  |  | 0 | 0 | 0 |  | 0 | 0 |  |
| Latvia |  | 0 | FS | 0 | 0 | 0 | 0 | FS | FS | 0 | 0 | 0 | 0 | FS | FS |  |  | 0 | 0 | 0 | 0 |  |
| Lithuania |  |  |  |  | FS | FS | 0 | 0 | 0 | 0 | FS | FS | FS | FS | FS | FS | 0 | 0 | 0 | FS | 0 |  |
| Luxembourg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 | 0 | 0 |
| Malta |  |  |  |  | FS | 0 | FS | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 |  |
| Netherlands | FS | 0 | 0 | FS | 0 | FS | FS | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | FS | 0 | FS | 0 | 0 | 0 | 0 |
| Norway | 0 | 0 | 0 | 0 | 0 | 0 | FS | 0 | 0 | 0 | FS | 0 | 0 | 0 |  |  | 0 | FS | 0 | 0 | 0 | FS |
| Poland |  |  |  |  | FS | FS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS |  |  | 0 | 0 | 0 | 0 | 0 |
| Portugal |  |  |  |  | 0 | 0 | FS | 0 | 0 | FS | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 | 0 | 0 | 0 |
| Romania |  |  |  |  | FS | 0 | 0 | 0 | FS | 0 | 0 | FS | 0 |  |  |  |  | 0 | 0 | FS | 0 |  |
| Slovakia |  |  | 0 | 0 | FS | 0 | 0 | 0 | FS | 0 | 0 | 0 | 0 | FS | FS | FS | FS | 0 | 0 |  |  |  |
| Slovenia |  |  |  |  | 0 | 0 | 0 | FS | FS | FS | 0 | 0 | 0 | 0 | FS | FS | FS | FS | 0 |  |  |  |
| Spain |  |  |  |  | 0 | 0 | FS | FS | FS | FS | 0 | 0 | 0 | FS | 0 |  |  | 0 | 0 | 0 | 0 | 0 |
| Sweden |  |  | 0 | 0 | 0 | 0 | 0 | FS | 0 | FS | FS | 0 | 0 | 0 | 0 |  |  | 0 | 0 | FS | 0 | 0 |
| Switzerland | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 0 |  |  |
| United Kingdom | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | FS | FS | FS | 0 | 0 | 0 |  |  | 0 | 0 | 0 |  |  |

**Table AVI:** Definition of Austerity periods according to AAFI, data for 28 EU countries covering the period 1992-2013.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country/Year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| Austria | 0 | 0 | 0 | 0 | A | A | 0 | 0 | 0 | A | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 |
| Belgium | 0 | 0 | A | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | A | 0 |  |  |  | 0 | 0 |  |
| Bulgaria |  |  |  |  | 0 | A | 0 | 0 | 0 | A | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| Croatia |  |  |  |  |  |  |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 |
| Cyprus |  |  |  |  |  |  |  |  | A | 0 | 0 | 0 | A | A | 0 | A | 0 | 0 | 0 | 0 | 0 |  |
| Czech Republic | |  |  |  | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A |
| Denmark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | A | 0 |  |  |  |  | 0 | 0 |  |
| Estonia |  |  |  |  | 0 | A | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | A | 0 |  |  |
| Finland | 0 | 0 | A | 0 | A | A | A | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | A | 0 |  |
| Germany | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | A | A | 0 | 0 | 0 | A | 0 | 0 |
| Greece |  |  |  |  | A | A | 0 | 0 | A | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 |  | A | 0 |  |
| Hungary |  |  |  |  | A | 0 | 0 | A | A | 0 | 0 | A | 0 | 0 | 0 | A | 0 | 0 |  | 0 | A | 0 |
| Iceland | 0 | 0 | 0 |  |  |  |  | A | 0 | 0 | 0 | 0 | A | A | 0 | 0 | 0 | A |  |  |  |  |
| Ireland |  |  |  |  | A | A | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Italy | 0 | 0 | 0 | A | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | A | 0 | 0 |  | A | 0 |  |
| Latvia | 0 | 0 | 0 | A | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | A |  |
| Lithuania |  |  |  |  | 0 | 0 | A | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | A |  |
| Luxembourg | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | A | A | 0 | 0 | 0 | 0 | 0 | 0 |
| Malta |  |  |  |  | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | A | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Netherlands | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norway | 0 | 0 | A | A | A | 0 | 0 | A | A | 0 | 0 | 0 | A | A | A | 0 | A | 0 | 0 | A | 0 | 0 |
| Poland |  |  |  |  | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | A | 0 | 0 |
| Portugal |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | A | A | 0 |
| Romania |  |  |  |  | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | A | A |  |
| Slovakia |  |  | A | A | 0 | A | 0 | 0 | 0 | A | 0 | A | 0 | 0 | 0 | A | 0 | 0 | 0 |  |  |  |
| Slovenia |  |  |  |  | A | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Spain |  |  |  |  | A | A | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | A |
| Sweden |  |  | A | A | A | 0 | A | 0 | A | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Switzerland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom | 0 | 0 | 0 | A | 0 | A | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | A |  |  |

1. ♣ Corresponding author. “Carlo F. Dondena’’ Centre for Research on Social Dynamics and Public Policies, Bocconi University, via Rontgen, 1, 20136 Milan, Italy. Tel.: +39 02 5836.5890. E-mail address : [veronica.toffolutti@unibocconi.it](mailto:veronica.toffolutti@unibocconi.it) . [↑](#footnote-ref-1)
2. We also extended the analyses to all the OECD countries using a longer time-span (1970-2010), results available in the Web Appendix table AIV. By using this new, larger sample, we find, in line with our previous results, that fiscal stimuli lead to an increase in CCL-mortality. In line with the results excluding the Baltics, Hungary and Romania we find that very tight fiscal policies lead to an increase in suicide mortality. However, in contrast with our results using the European sample we find that fiscal stimuli lead to a mild decrease in accident-related mortality. Note, however, that, the coefficient associated with austerity measures related to suicide-related mortality is considerably higher than the one we find using the European sample. [↑](#footnote-ref-2)
3. The paper by Antonakakis and Collins (2014) is arguably the closest to ours in the existing literature that assesses the effect of austerity (in their analysis focused on suicides in Greece). The paper uses a linear model with an autoregressive component of order one, employing three different proxies for austerity: (i) the first difference of the natural logarithm of government expenditures (in % of GDP), (ii) the first difference of the budget deficit (in % of GDP), (iii) the first difference of the natural logarithm of tax revenues (in % of GDP). We would argue that Antonakakis and Collins (2014) do not really examine the role of austerity, but rather the association between a set of fiscal variables and suicides. [↑](#footnote-ref-3)