Analysis of the impact of socio-economic factors on the number of suicide cases in European countries

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Abstract. Suicide rates in Europe have in the recent years reached a disturbingly high level, sparking frequent discussions on the topic of mental health and suicide prevention, which significantly affect not only individuals but also their environment. The aim of this paper was to analyse the impact of the socio-economic situation on suicide rates using panel data analysis. The study presents an overview of the related literature and the definitions of essential terms concerning suicide, as well as the socio-economic factors determining suicide rates. The parameters of a fixed effects model were estimated, interpreted and compared with the results of earlier research. The analysis of the selected dataset showed that GDP *per capita* and the Gini coefficient have a negative and statistically insignificant impact on suicide rates. On the other hand, the conducted research showed that high divorce and unemployment rates, risk of poverty, social exclusion and excessive alcohol consumption proved to be statistically significant, thus increasing suicide rates.

Keywords: suicide, panel data analysis, socio-economic situation, fixed effects model

JEL: C33, I12, I14, I15

1. Introduction

Suicide is the worst possible outcome of a mental illness, thus suicide rates were chosen as an indicator of mental health problems. Mental health, similarly to physical health, is a broad topic which requires a large number of indicators to be taken into consideration when assessing the condition of the mental state of an individual. Many variables are either hidden and difficult to observe or can be exposed only when one's mental condition deteriorates. In addition, since the identification of both the symptoms of a mental illness and the boundaries between mentally stable and mentally ill varies among specialists, the word 'illness' raises doubts and tends to be replaced in psychology with the word 'disorder'. In extreme cases, patients require hospitalisation and can be treated without their consent, although a hospital stay is not always necessary, as psychotherapy and pharmacotherapy may be a more efficient form of treatment (Pużyński, 2007). Death resulting from an individual's conscious decision to end their life is referred to as

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suicide. The most common methods of taking one's life include hanging, poisoning and jumping from a height. A phenomenon occurring more often than suicide is a suicide attempt (Pieszczachowicz, 1997, p. 61).

The reasons for taking one's own life are extremely difficult to determine; however, it is possible to distinguish the factors that contribute to the decision. These include unexpected situations that have a significant impact on daily life, causing overwhelming stress and the feeling of helplessness, which makes death seem as the best and only solution. Examples of such situations can be the sudden loss of a job, a traumatic experience or an unexpected deterioration in interpersonal relationships, for instance a divorce. There are also long-term factors whose negative impact on the well-being of an individual is often unapparent, and noticeable only after a suicide attempt. A toxic environment at work, school or home lowers self-esteem and destroys interpersonal relationships (Woźniak, 2020).

It is important to note that the scale of the problems associated with mental health disorders is larger than it seems. The actual number of people who experience mental health issues is much higher than the cases recorded in official statistics. Gas or carbon monoxide poisoning, car accidents and many other dangerous situations that seem like a mishap are not always recorded as suicide attempts. There are instances when the members of the close family request that the suicide is recorded under a different name in fear of the negative reaction of their environment. It is important to note that datasets usually focus on the records of deaths, not attempts, according to Woźniak (2020), the number of suicide attempts among adults are estimated to be 10 times higher, and among teenagers from 100 to 200 times higher than the number of suicides (Woźniak, 2020). According to Rosa (2012), official data are unreliable, as the goal of each institution collecting data on suicides is different. It is assumed that suicide attempts occur from 10 to 20 times more often than suicides (Rosa, 2012). For instance, data collected by police officers are only a small part of the real number of suicides. Police officers prioritise determining the cause of death at the scene and their classification of the given death highly depends on the questioned individuals, like the family members or friends of the deceased. Also, police officers' beliefs have an impact on their decision regarding the classification of death as suicide or e.g. an unfortunate accident (Rosa, 2012). A fitting example of the influence of authorities' beliefs on suicide rates is illustrated by the difference between the number of the recorded suicides in protestant parishes and catholic parishes. A study performed by Lincoln Day based on datasets from late 19th century and early 20th century from Switzerland, Prussia and the Netherlands shows that protestant parishes recorded much more suicides than catholic parishes, while the latter recorded much more deaths of an unknown cause. The reason for that may be the fact that for Catholics suicide is a sin, people who die of suicide could not be

buried in the cemetery, which causes enormous distress to the families (Rosa, 2012). It is important to note that suicide is more than just another death in the statistics as it leaves a mark on other people in the immediate environment. In addition, publicising a story about a suicide might result in the Werther effect, which happens when a group of imitators are inspired by such a story. The opposite is the Papageno effect occurring when a person living with suicidal thoughts, influenced by certain information, finds another way out of the crisis, which can lead to a reduction in the number of suicide attempts.

It should also be mentioned that society also suffers through the growing problem of suicide, as it bears the cost of productivity loss and the expense in the form of medical bills from psychiatric hospitals or prevention campaigns or workshops. High suicide rates indicate the disintegration of society. Moreover, despite the growing number of suicide deaths, which are the most common cause of death worldwide, the problem remains a much-downplayed area of public health (Woźniak, 2020).

2. Literature review

The unemployment rate is one of the most important subjects of macroeconomic research, essential to describing the state of a country's economy. It is associated with unused productive resources, which affect economic growth. Numerous scientific papers indicate a link between suicide rates and unemployment rates; its impact was described in the works of Andrés (2005), Córdoba-Doña et al. (2014), Fountoulakis et al. (2014), Inagaki (2010) and Murali and Oyebode (2004). Unemployment is associated with the loss of financial independence and increased stress. Losing a job entails a loss of relationships with co-workers, which play a key role in a person's social life and has a negative impact on their social status, which, in turn, affects their self-esteem. Increased stress and the sudden loss of a livelihood is also the source of strained family relationships, particularly when the main income earner in a household becomes unemployed. Such a situation increases the risk of suicide (Preti, 2003). According to an article by Murali and Oyebode (2004), economic inequalities result in psychosocial stress, which can lead to poorer mental health and higher mortality rates. Research confirms that there is a direct link between poverty, emotional disorders and disparities in access to medical facilities or treatments. The differences in access to healthcare services are the main source of this correlation. Many studies point to the relevance of social status in understanding mental illness and disability. Moreover, epidemiological studies from around the world confirm the existence of a negative correlation between social status and mental illness. Mental disorders are most common among lower social classes. Murali and Oyebode

(2004) mention findings presented in the study by Gunnell et al. (1995), which show that suicide and murder are most common in poor, densely populated areas, which according to them, is confirmed by a study by Crawford and Prince (1999), who noted rising suicide rates among a group of young, unemployed men living in extreme poverty (Murali & Oyebode, 2004).

The Gini coefficient of equivalised disposable income, i.e. per household member, was included in the work of Andrés (2005), but did not show statistical significance, while it was significant in the work of Inagaki (2010). Some theories indicate that suicide rates can be affected by social inequalities which are a source of social stress and result in higher criminal activity observed among the lowest-income groups. Other theories emphasise the importance of the feeling of inferiority and limited access to health services common among poor social groups. Inequalities contribute to reduced social integration and increased mortality. They have a negative impact on the general health of the population (Andrés, 2005). Inagaki (2010) points out that most research papers do not include Japan even though for a long time Japan had the highest suicide rates in the world. In his work, he distinguishes two types of approaches found in the literature. The first type is characterised by an individual-based approach, in which it is proven that people tend to compare their earnings to others, and individuals are likely to feel dissatisfaction when their neighbours earn more than them. The second type of literature focuses on correlations in collective data which show a positive relationship between income inequality and suicide rates, but which are often statistically insignificant. Inagaki's (2010) research assumes that individual perceptions of self-worth are closely related to suicidal tendencies. His research confirms that in Japan there is a statistically significant positive correlation between unequal income distribution and suicide rates.

Various models and approaches can be found in the academic work on suicide and its relationship to the economy, and the results are sometimes contradictory. For example, Andrés (2005) points out in his paper that existing economic and suicidological theories are inconsistent in terms of the impact of unemployment and economic growth on suicide rates. Furthermore, there are studies indicating an increasing effect of income on this phenomenon, while others show an opposite relationship. The impact of GDP or inflation is also debatable. Fountoulakis et al. (2014) point to the existence of trends and relationships that differ among European countries. A study using data from 29 European countries evaluated the impact of socio-economic factors on suicide rates during the 2000–2011 period. The authors point out that GDP *per capita* is erroneously used as a measure of living standards and that economic growth benefits all citizens, while the unequal distribution of income in society and investment in institutions closely related to quality of life, such as the healthcare system, are often overlooked. The reason for including this

variable to the model was to examine its impact on the number of deaths caused by suicides and compare the results with those obtained by different authors. When it comes to demographic variables, in the work of Andrés (2005), pure alcohol consumed by the average person aged 15 and over measured in litres is found to have a significant impact on suicide rates. The crude divorce rate was also included in Andrés' research as, similarly to unemployment, it is a life-changing event and can be a source of overwhelming stress.

3. Data overview and methodology

An analysis of panel data was conducted to investigate the relationship between suicide rates and selected economic and social variables. The analysis concerned 30 European countries and the years 2011–2018. The data were obtained from Eurostat and the Global Health Observatory (GHO) of the WHO. In order to keep the panel balanced, the research included only those countries for which the data were available in full, i.e.: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. The explanatory variable that represents mental health is the standardised suicide rates, i.e. the weighted average of the raw suicide rates of each age group, with the weights represented by the size of the group.

Figure 1 shows the average suicide rates from 2011 to 2018. During the period of 2012–2013, the average reached the highest values and later it slowly decreased from year to year. Moreover, during the 2011–2014 period, the maximum was reached by 27 countries, the exceptions being Luxembourg reaching the maximum in 2015, and Norway and the UK in 2018. This suggests that during those years, certain phenomena occurred that had a negative impact on mental health in Europe.

Figure 1. Average suicide rates in Europe from 2011 to 2018

Average suicide rates in Europe in 2011–2018
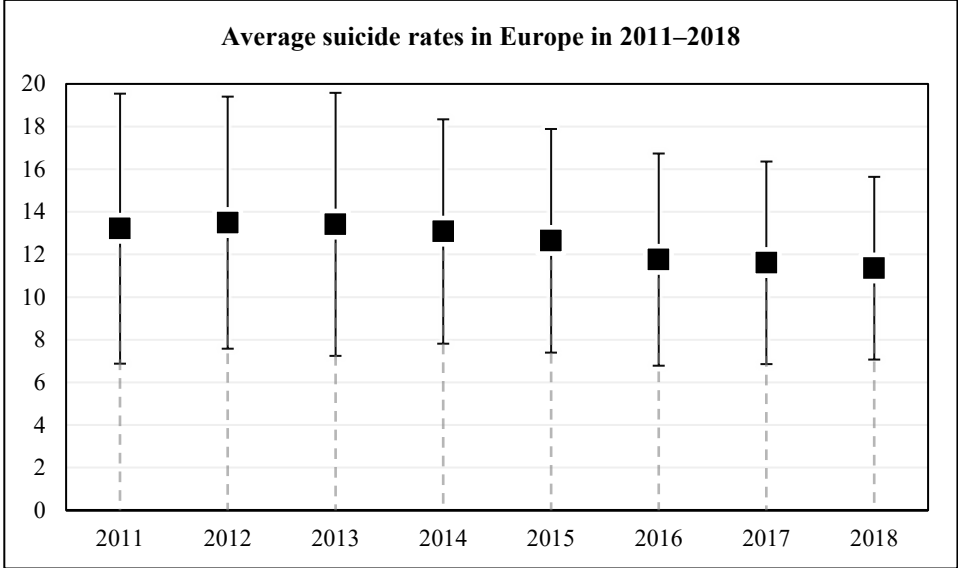
Source: author's work.

Figure 2 shows a comparison of average suicide rates in selected European countries. From all the countries, Lithuania stood out due to its remarkably high average suicide rates reaching the highest value of 36.12 in 2013, followed by a decrease reaching a minimum of 23.98 in 2018. Other countries characterised by high rates were Hungary, Latvia and Slovenia, with an average of no less than 19. The lowest suicide rates were noted in the UK and the Mediterranean countries: Cyprus, Greece, Italy, Malta and Spain, with an average of no more than eight. The rest of the average rates were between 10 and 17.

Figure 2. Average suicide rates in Europe from 2011 to 2018 by country
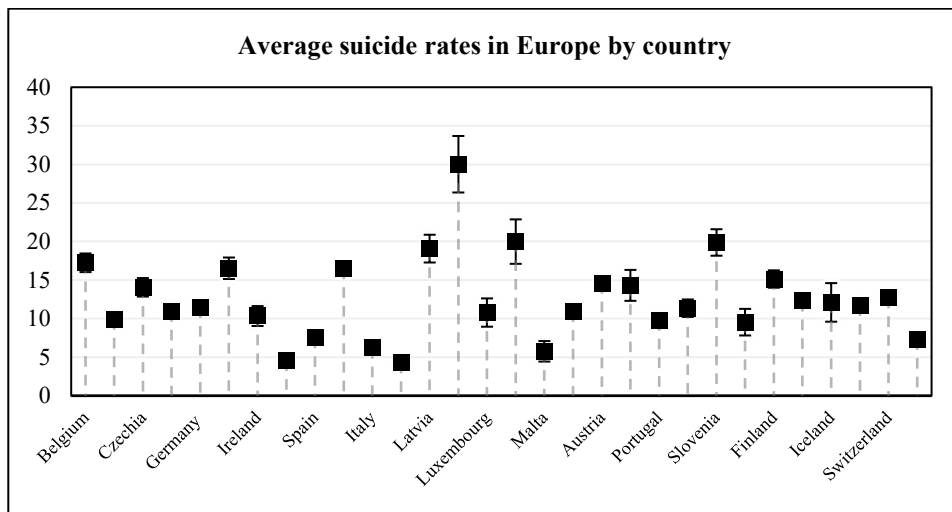
Source: author's work.

Six explanatory variables were selected for the estimation:

– Real GDP *per capita* expressed in PPS, Eurostat's notional currency, which takes into consideration the purchasing power of national currencies. It was included in the work of Andérs (2005), Fountoulakis et al. (2014) and Yin et al. (2016) to represent the condition of the economy,

– The Gini coefficient of equivalised disposable income, i.e. per household member, included in Andrés' (2005) work, although it did not show statistical significance; however, it was significant in Inagaki's (2010) work,

– The percentage of people at risk of poverty or social exclusion, as stated in the article by Murali and Oyebode (2004); these factors can cause mental disorders,

– Pure alcohol consumed by the average person aged 15 years and over measured in litres. According to the work of Andrés (2005), alcohol consumption has a significant impact on suicide rates.

These variables were selected based on the literature and not to negatively affect the balance of the panels. Additional variables included later in the paper are:

– The crude divorce rate, included in the work of Andrés (2005); the crude divorce rate is the ratio of the number of divorces each year to the average population in that year, multiplied by 1,000,

– The unemployment rate, included in the work of Andrés (2005), Córdoba-Doña et al. (2014), Fountoulakis et al. (2014), Inagaki (2010) and Murali and Oyebode (2004).

Figure 3 shows the average values of GDP *per capita* from 2011 to 2018 in 30 European countries. The smallest value was achieved by Bulgaria, which was not significantly different from the rest of the countries, most of which were between 50 PPS and 150 PPS. Countries whose average GDP *per capita* was higher than 150 PPS, but lower than 170 PPS, were Ireland, Norway and Switzerland; moreover, the standard deviation of Ireland and Norway was large, indicating the high variability of GDP *per capita* of these countries at that time. Luxembourg far exceeded the other countries, with an average GDP *per capita* of as much as 267 PPS. There was no significant difference between the countries with the highest and the lowest suicide rates. The average GDP *per capita* of these countries was between 50 PPS and 100 PPS, except for the UK, whose average GDP *per capita* was 109 PPS.

**Figure 3.** Average GDP *per capita* in Europe from 2011 to 2018 by country
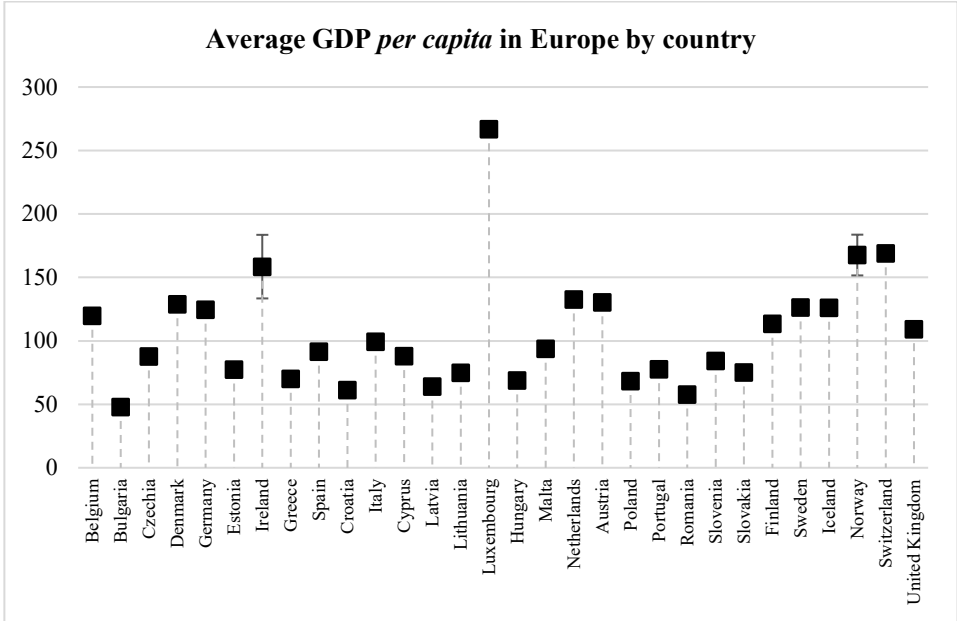
Source: author's work.

A Gini coefficient lower than 30 indicates low-income stratification, and higher than 45 high income stratification (Raczkowska, 2017). Figure 4 shows the average values of the Gini coefficients from 2011 to 2018 in Europe. The highest average Gini coefficient was in Bulgaria, and the lowest in Iceland, Norway, Slovakia and Slovenia. The countries with the lowest average suicide rates were characterised by average income stratification. The exception was Malta, where the average stratification was low. The Gini coefficients of the countries with the highest average

suicide rates were diverse, as the coefficients of Lithuania and Latvia had the second and third highest values, respectively, while Slovenia had the smallest coefficient, and Hungary's coefficient was 28.
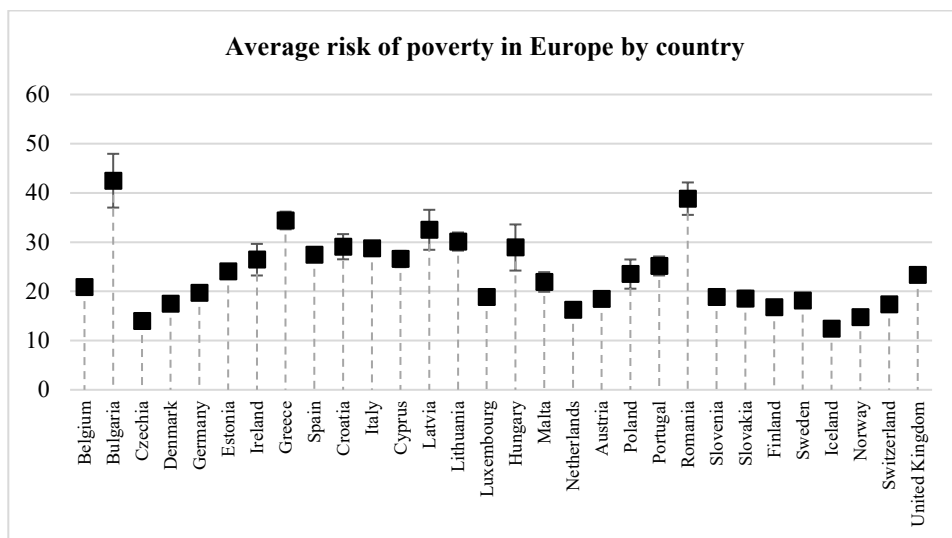
Figure 4. Average Gini coefficients in Europe from 2011 to 2018 by country
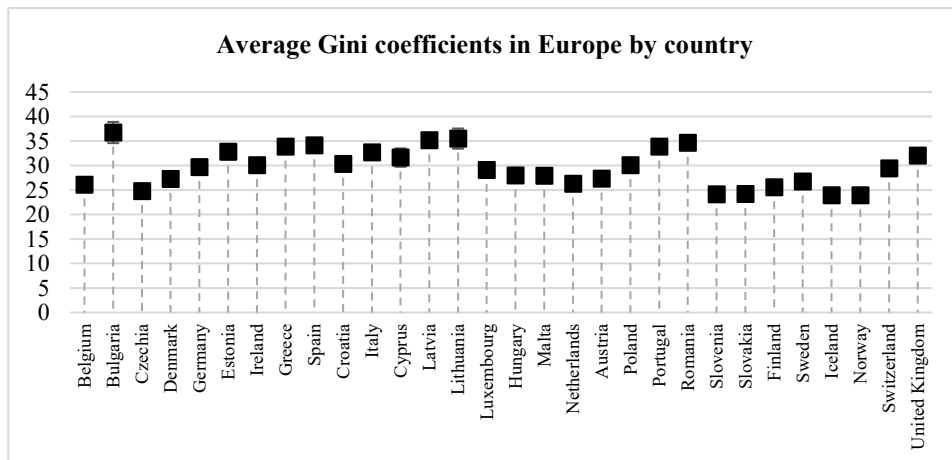
Source: author's work.

Figure 5 shows the average poverty risk from 2011 to 2018 in Europe. The highest average poverty risk of 42% was in Bulgaria, while the lowest in Iceland reaching 12%.

Figure 5. Average risk of poverty in Europe from 2011 to 2018 by country

Source: author's work.

Figure 6 shows average alcohol consumption from 2011 to 2018 in Europe. Estonia had the highest variability and the highest average alcohol consumption. The average Estonian drank an average of 16 litres of pure alcohol during the period studied. Lithuania had the second highest average, with its average suicide rates well above the average of the other countries. Its standard deviation, as in the case of Spain and Latvia, was large. The lowest average alcohol consumption, equal to six litres, was recorded in Norway. An average citizen of Greece, Iceland, Italy, Malta and Sweden drank seven litres of pure alcohol during the studied period.

Figure 6. Average consumption *per capita* of pure alcohol (in litres) in Europe from 2011 to 2018 by country.
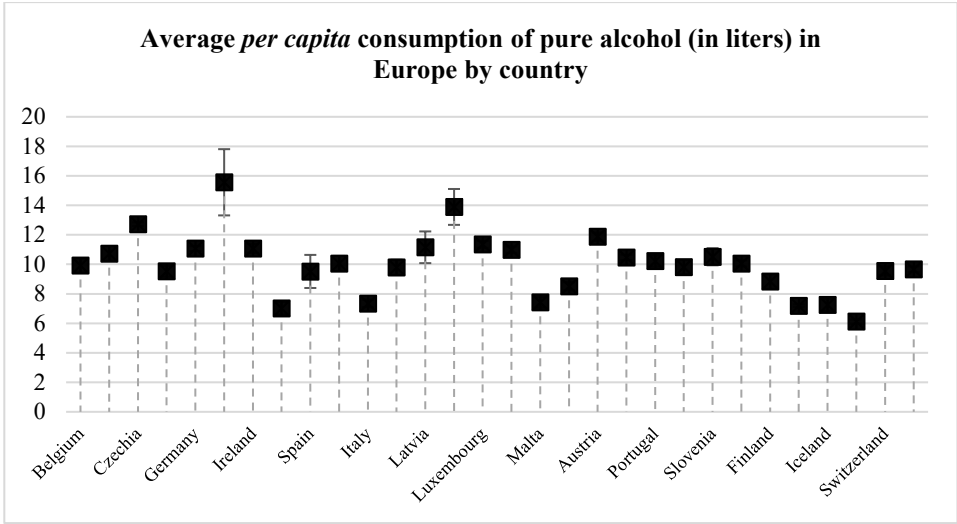
Source: author's work.

Figure 7 shows the average divorce rates from 2011 to 2018 in Europe. The highest average rates were in Lithuania and Latvia, while the lowest in Ireland and Malta. The average suicide rates in these countries also happened to be among the lowest. Moreover, Denmark, Italy, Latvia and Malta were characterised by high variability in the rates during the period under review. The figure shows a considerable variation in the values of average divorce rates among the studied countries. Some observations were missing from the divorce data: for Ireland and Greece for 2018, for the UK for 2017 and 2018, while for Iceland, only data for 2011 were available.

Figure 7. Average crude divorce rates in Europe from 2011 to 2018 by country
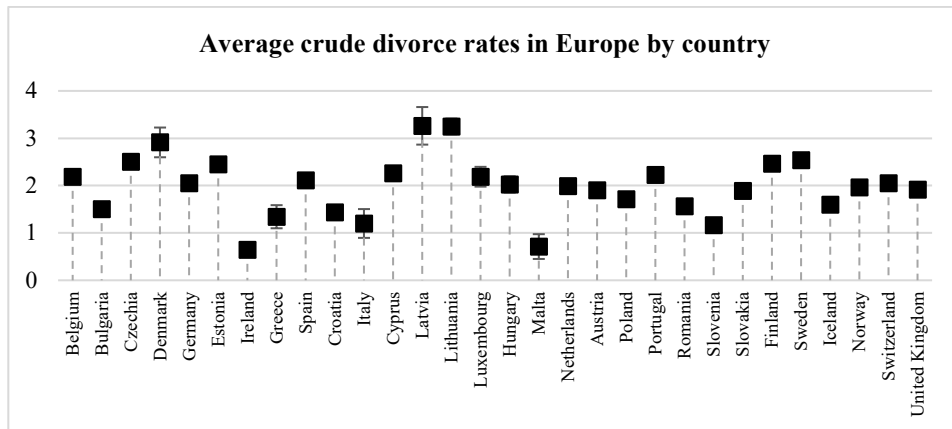
Source: author's work.

Figure 8 shows the average unemployment rates from 2011 to 2018 in Europe. The UK was omitted due to missing observations over the entire period studied. Greece and Spain had the highest average unemployment rates, equal to 23.2% and 21.4%, respectively. The lowest average unemployment rates of less than 5% were observed in Germany, Iceland, Norway and Switzerland, whose average was 3.8%. The average of most countries was between 5% and 15%. Half of the countries are characterised by a significant variation in the average.

Figure 8. Average unemployment rate in Europe from 2011 to 2018 by country
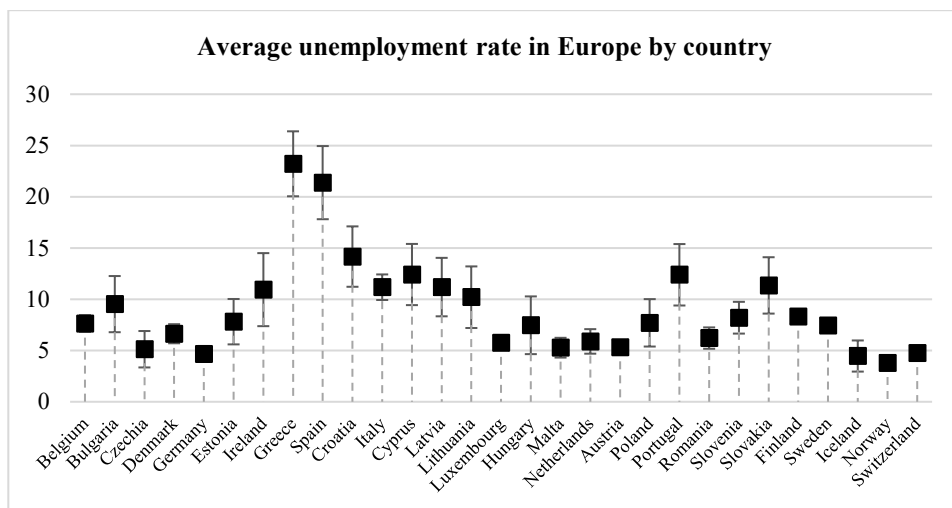
Source: author's work.

4. Empirical results

In this research, six variables were studied: the unemployment rate, the percentage of people at risk of poverty or social exclusion, the Gini coefficient of equivalised disposable income, the crude divorce rate, pure alcohol consumption and real GDP *per capita*. To examine the dependencies between the endogenous variables and the exogeneous variable, the parameters of a fixed effects model were estimated. While working in the RStudio environment, the variables were coded as follows: *gini* stands for the Gini coefficient, *alcohol* stands for alcohol consumption, *poverty* stands for the percentage of the population at risk of poverty, GDP stands for GDP *per capita*. The parameters of the fixed effects model take the values presented in Table 1.

Table 1 shows the estimation of the model parameters with dummy variables. The impact of the Gini coefficient is statistically significant at the level of 10%, which may result from the fact that the average Gini coefficients among European countries are remarkably close to one another. Poverty risk and alcohol consumption are statistically significant at the level of 0.1%. The impact of GDP *per capita* is not significant. The coefficient of determination is 33%.

Table 1. Fixed-effects model estimation for a panel of 30 European countries from 2011 to 2018

	Estimate	Std. Error	t-value	$Pr(> |t|)$	
Gini	−0.16	0.08	−1.90	5.90E-02	.
alcohol	0.57	0.13	4.37	1.93E-05	***
poverty	0.36	0.04	8.50	3.85E-15	***
GDP	−0.01	0.01	−0.63	0.52759	
R-Squared:	0.33				

Note. The *Estimate* column – estimated parameter values, *Std. Error* – standard error, *t-value* – value of the statistic, $Pr(> |t|)$ – p-value, where *** – significance at a 0.1% level, ** – significance at a 1% level,* – significance at a 5% level, . – significance at a 10% level, the *R-Squared* row – value of the R^2 coefficient of determination.
Source: summary of the results generated in the RStudio.

Table 2 shows the values of the estimated fixed-effects model with two additional variables. The *divorce* variable denotes raw divorce rates, and *unemployment* denotes the unemployment rate. There are missing observations in both datasets, so the UK was not included in this model. Adding the two additional variables had a positive effect on the coefficient of determination, as it increased it to 49%. The unemployment rate, poverty risk and alcohol consumption have a statistically significant impact at a 0.1% level, the divorce rate has a significant impact at a 1% level, the Gini coefficient has a significant impact at a 10% level, while the impact of GDP *per capita* is not statistically significant. The impact of GDP *per capita* is close to zero, but removing it from the model results in a slight reduction in the coefficient of

determination and entails minor changes in the values of the model parameters. As in the earlier models, the Gini coefficient and GDP *per capita* have a negative impact on suicide rates, while the other variables, along with the additional variables have a positive impact.

Table 2. Estimation of a fixed effects model with additional variables for a panel of 29 European countries from 2011 to 2018

	Estimate	Std. Error	*t*-value	$Pr(>|t|)$	
gini	−0.13	0.07	−1.78	7.69E-02	.
alcohol	0.52	0.11	4.57	8.67E-06	***
poverty	0.19	0.05	3.91	1.31E-04	***
GDP	−0.003	0.01	−0.24	0.812699	
divorce	1.47	0.46	3.17	1.78E-03	**
unemployment	0.23	0.05	4.61	7.34E-06	***
R-Squared:	0.49				

Note. As in Table 1.

Source: summary of the results generated in the RStudio.

Figure 9 shows the fixed effects of the model with dummy variables. Lithuania, whose average suicide rates from the years 2011–2018 were the highest among all countries, had the largest group effect. Slovenia had the second highest group effect, followed by Hungary, whose average suicide rates also ranked among the highest. The group effect of Latvia, whose average suicide rates were among the highest, was not high, but close to zero. Cyprus Greece and Spain, whose average suicide rates were among the lowest, had the lowest and negative group effects, while the group effects of Italy and Malta, whose average rates were among the lowest, were negative, but close to zero. The group effects of the remaining countries ranged from –5 to 5.

Figure 9. Fixed effects of the model with dummy variables for 29 European countries
from 2011 to 2018
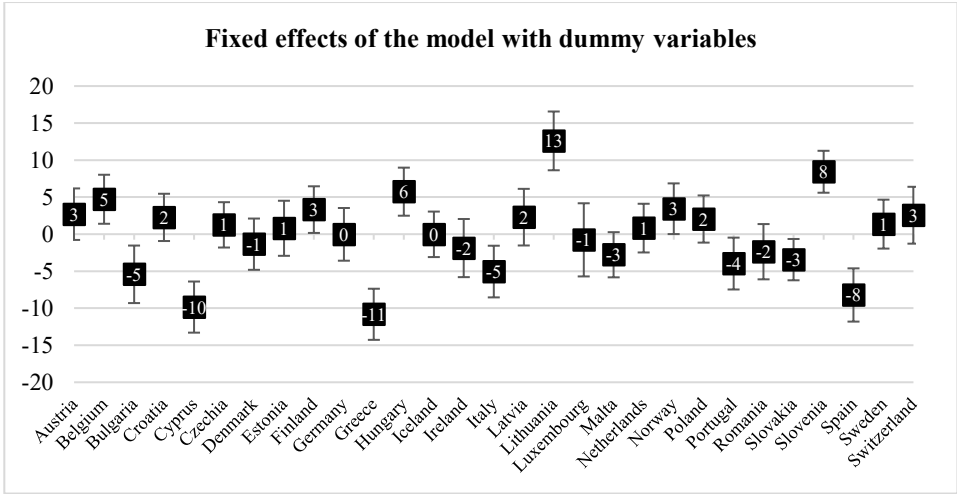
Source: results obtained in the RStudio; graph developed in Excel.

5. Results interpretation

In the estimated model, the impact of the Gini coefficient was negative and, at a significance level of 5%, statistically insignificant. In all models estimated by Inagaki (2010), the parameters determining the impact of the Gini coefficient on suicide rates in Japan are positive and statistically significant. In an article by Andrés (2005), who studied the effect of unemployment and social inequality on suicide rates in 15 European countries the Gini coefficient is also statistically insignificant, but its effect is negative only among women, while positive among men. The breakdown by age also yields inconsistent results. An article written by Kołodziej-Sarzyńska et al. in 2019 mentions a study whose results were contradictory to the results of Andrés (2005) and indicated that the effect of Gini coefficients on female suicide rates is positive. In the literature, the effect of income inequality on suicide rates was interpreted as the effect of less affluent individuals comparing themselves to their wealthier counterparts. In other words, the pressure associated with one's financial situation is closely related to the wealth of their neighbourhood. As a result, individuals living in richer areas and whose financial situation is clearly worse than that of other residents are more likely to resort to suicide (Kołodziej-Sarzyńska et al., 2019). The reason behind the negative value of the estimation of the Gini coefficient parameter presented in Table 1 may be that its variation among countries was small during the studied period. In Andrés' (2005) article, the direction of influence of the Gini coefficient parameter on suicide rates differed among age groups and between

men and women. It is likely that countries are too large geographic areas to study the impact of income inequality on suicide rates; therefore, examining these relationships in smaller areas, such as cities or towns and even neighbourhoods of given cities, would provide more accurate and statistically significant results.

Similarly to the Gini coefficient, the impact of GDP *per capita* on suicide rates is negative and statistically insignificant, which is consistent with the results of Andrés (2005) and Fountoulakis et al. (2014). The interpretation of the impact of GDP *per capita* is not related to its effect on individual financial status, but rather to the benefit of the society in the form of financial support distributed in the area of medical care, social care or education. The higher the GDP *per capita*, the more financial aid can be allocated towards measures that directly or indirectly prevent the deterioration of individual mental health (Kołodziej-Sarzyńska et al., 2019).

If the crude divorce rate for a country and a given year had been one unit higher between 2011 and 2018, the suicide rate would have been 1.47 units higher. According to Table 2, the crude divorce rate has a positive and statistically significant parameter, although its significance is lower than that of the other variables. In the model estimated by Andrés (2005), the divorce coefficient has a positive but insignificant impact, which may be caused by individual-specific factors whose influence is suppressed in the aggregated data. On an individual level, divorce entails a major change in a person's life, affecting its every aspect. Firstly, it shatters family relations, as it involves the emergence of negative feelings between the former spouses and a reduction in the contact of one of the parents with the children. The financial situation may deteriorate, in case when the duty of supporting the family rests on the shoulders of only one parent. What is more the perception of a divorcee by their environment also changes, as divorce is often viewed in a negative way. All this can take a toll on mental health. According to a study mentioned in the work of Kołodziej-Sarzyńska et al. (2019), depression and suicidal tendencies are more common among divorced people, especially in the first months after the process is finalised, than among people whose marital status has not changed (Kołodziej-Sarzyńska et al., 2019).

If the unemployment rate for a given year and a given country had been one percentage point higher between 2011 and 2018, suicide rates would have been 0.23 units higher. The unemployment rate is one of the most studied economic factors in the area of suicide. In most models, its effect has a positive direction, while the results are inconsistent regarding its statistical significance. In models estimated by Córdoba-Doña et al. (2014), Fountoulakis et al. (2014) and Inagaki (2010), the unemployment rate has a statistically significant effect, while in the work of Andrés (2005), its effect is significant at a 10% level only in the group of men aged 45 to 64. An individual's occupational status is closely related to their sense of worth and

sense of security, both of which are closely connected with mental health, so abrupt changes in these areas increase the risk of suicide.

If the poverty risk had been one percentage point higher in a country and a year between 2011 and 2018, suicide rates would have been 0.19 units higher. The impact of poverty risk on suicide rates is positive and statistically significant. According to a study described in an article by Murali and Oyebode (2004), members of the lowest and poorest social classes are the most vulnerable to mental illnesses, and suicides occur most commonly in these groups. This is because financial hardship is associated with tremendous social stress. In addition to the threat of not being able to meet one's needs, poverty is associated with social exclusion, which further limits an individual's opportunities to improve their situation (Murali & Oyebode, 2004).

The impact of alcohol consumption on suicide rates is positive and statistically significant. If the average citizen of a European country had drunk one litre of pure alcohol more each year between 2011 and 2018, suicide rates would have been 0.52 units higher. In the work of Andrés (2005), excessive alcohol consumption has a positive and significant effect on suicide rates. Murali and Oyebode (2004) note that high alcohol consumption is most prevalent among the poorest social groups, especially those including people working physically. Alcoholism is associated with the loss of employment and family breakdown; moreover, the risk of aggressive and self-aggressive behaviour increases under the influence of alcohol. The number of suicide-related deaths resulting from excessive alcohol consumption varies strongly from country to country, depending on the cultural attitudes toward alcohol consumption and the type of alcohol consumed (Kołodziej-Sarzyńska et al., 2019).

The highest average suicide rates from among the countries studied for all exogenous variables, except GDP *per capita*, are observed in Lithuania. The Gini coefficient, risk of poverty and social exclusion, the unemployment rate, alcohol consumption and divorce rates reach some of the highest values in this country, while the GDP *per capita* remains one of the lowest. Cyprus, on the other hand, whose average suicide rate reaches the lowest value of 4.3, has a slightly lower Gini coefficient, lower poverty risk, lower alcohol consumption and lower divorce rates compared to Lithuania, while the unemployment rate is higher, as is the GDP *per capita*. It should be noted, however, that Cyprus is among the smaller countries analysed.

6. Conclusions

The aim of this study was to examine the impact of socioeconomic variables on suicide rates in European countries. For this purpose, a panel analysis was performed using a fixed effects model. From the dataset examined, the only variables that reduce suicide rates are GDP *per capita* and the Gini coefficient, but their

impact is statistically insignificant at a 5% level. The remaining variables are statistically significant at a 5% significance level and increase suicide rates. The growing effect of divorce on suicide rates is related to the overwhelming stress experienced by the divorcee, resulting from the sudden change in the family situation, greater financial burden, limited contact with the children and a culturally determined bias towards divorced people. Both unemployment and the risk of poverty are related to the financial situation of an individual, affecting one's sense of security. The lack of work, especially an abrupt change in the occupational status, reduces an individual's sense of worth and agency over their fate. The risk of poverty and social exclusion is associated with long-term financial and social hardship, which results in a feeling of hopelessness. Consumption of pure alcohol has an increasing and significant impact on suicide, which can be the result of problems stemming from alcohol addiction.

Two groups of countries with the highest and lowest suicide rates emerged based on the estimated group fixed effects. The fixed effects from 2011 to 2018 were the highest in Lithuania and Slovenia and the lowest in Cyprus, Greece and Spain. The fixed effects model suggests the existence of unmeasured factors specific to each country, which also significantly affect the level of suicide rates. These factors include e.g. the country's latitude, which determines the level of sunshine, amount of rainfall or the temperature in a country. Another factor could be related to the perception of suicide in terms of a country's culture or dominant religion, e.g. Christianity sees suicide as a sin, while in Japanese culture suicide is of a ritualistic nature.

Based on the results obtained from the model and information in the literature, it is safe to say that certain economic and social factors significantly shape the mental health of the residents of a country. Determining which of these factors have a significant impact and which do not is difficult. In some cases, the trend is dependent on the studied period, the population or distribution with respect to gender and age groups. The impact of GDP *per capita*, unemployment and the Gini coefficient are characterised by a high degree of inconsistency among studies in terms of both their statistical significance and direction of change. On the other hand, divorce rates, poverty risk and alcohol consumption produce consistent results, so it can be assumed that their impact should be given special consideration when planning suicide prevention policies.

Divorce is a sensitive topic that involves many negative emotions and difficult situations, for instance cheating, fighting or even violence. For this reason, reducing their impact on mental health is exceedingly difficult, as it requires an individual approach to each case, possible only during couples' therapy, which, for several reasons, not everyone wants to undergo. The fight against excessive and unhealthy alcohol consumption is possible primarily by making the public aware of the

negative effects of alcoholism, which affect not only the person with the disease, but also their closest family. The threat of poverty can be reduced through social benefits and creating opportunities for a better life, for instance detailed assistance with finding a job that includes not only finding work offers, but also preparing for interviews and future employment.

In summary, the phenomenon of suicide is an overly complex disease process that takes a different course in each case. Suicides do not occur suddenly from nowhere but are preceded by suicidal thoughts which eventually escalate to suicidal behaviour. They are influenced by many internal factors, specific to each individual, which are challenging in analysis due to their complexity and difficulty of detection. There are also external factors whose impact is observable, thus enabling prevention. Although collective data may not fully indicate a significant in individual suicide cases impact of economic or demographic events, their analysis is essential to suicide prevention, as it highlights which areas should be the focus of legislators.

It is also vital to spread awareness and to promote mental health care. Struggling individuals should be provided with easy access to specialists and facilities. Mental health is key to an individual's effective functioning in a society, thus more attention should be directed towards the provision of mental health treatment and suicide prevention.

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