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14 June 2011

Online at <https://mpra.ub.uni-muenchen.de/31622/>
MPRA Paper No. 31622, posted 17 Jun 2011 03:24 UTC

Does corruption affect suicide? Empirical evidence from OECD countries

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June 2011

Abstract

The question to what extent corruption influences suicide remains still unanswered. This paper examines the effect of corruption on suicide using a panel data approach for 24 OECD countries over the period 1995-1999. Our results indicate suicide rates are lower in countries with lower levels of corruption. We also find evidence that this effect is approximately three times larger for males than for females. It follows that corruption has a detrimental effect on societal well-being.

Running title: Corruption and suicide in OECD countries

Keywords: Corruption, Panel data, Suicide, Well- Being, OECD

JEL classification: D73, H75, I18

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I. INTRODUCTION

Ideally, governments can be expected to improve quality of life and increase well-being by preventing market failure. In the real world, this does not hold true. Since the seminal work of Mauro (1995) showing that corruption hampers economic growth, a growing number of studies have investigated the impact of corruption on various facets of society³. Recently, researchers have paid attention to a more fundamental issue by examining the association between governance and well-being (Helliwell and Huang, 2008; Fischer and Rodríguez, 2008; Ott 2010, among others).

Self-reported measures of subjective well-being are often criticized for lack of reliability and validity (for example, Bertrand and Mullainathan, 2001). Koivumaa *et al.* (2001) provided evidence that there is a high correlation between suicide and subjective well-being at individual and aggregate levels. Unlike self-reported measures, suicide data⁴ are more frequently used in cross-country comparisons. Self-reported data comparisons are difficult because of problems with interpersonal comparisons of utility. Indeed, Daly and Wilson (2009) asserted that the determinants of well-being are the same determinants of suicide, using data for the United States. Thus, suicide rate is thought to be an appropriate proxy for well-being. Using suicide rates as an indicator of societal well-being has a great advantage in that they are a more reliable and objective indicator of well-being compared with self-reported well-being measures (Helliwell, 2007). However, few researchers have attempted to examine the association between suicide and quality of governance. In the present study, we investigate the effect of corruption on suicide rates. Thus, this corruption index reflects the quality of a country's institutions. For that purpose, we used a simple fixed effects model to conduct estimation

³ For instance, it has been found that corruption has a detrimental effect on the damage from natural disasters (Kahn, 2005; Escaleras *et al.*, 2007). Corruption causes traffic accidents (Anbarci *et al.*, 2006). Corruption is negatively related to access to improved drinking water and adequate sanitation (Anbarci *et al.*, 2009) and leads to reductions in public spending on education and health (Delavallade, 2006).

⁴ The term suicide refers to completed suicides throughout this paper, unless noted otherwise.

for 24 OECD countries. In the sections that follow, we present the data and empirical model and estimation results. The paper concludes with a summary of our findings.

II. DATA AND EMPIRICAL MODEL

This study used a panel data set covering a 5-year period (1995–1999). As shown in the Appendix, Table A1, 24 OECD countries were included. The data used were extracted from several sources. Annual suicide deaths were extracted from the WHO Mortality Database (past update Dec 2009)⁵ which contains data for number of deaths by year, country, age group, and sex as well as cause of death. One important issue is that suicide can be misclassified. Hence, measurement error in the suicide statistics can be an issue. Data on the number of undetermined deaths are available and we could also conduct robustness analysis. We used the corruption perception index (CPI) developed by Transparency International (TI) as a proxy for the degree of corruption⁶. That is, higher values of CPI indicated lower corruption. This index was collected from Transparency International⁷. The CPI has been widely used to measure cross-country corruption (for examples, see Lambsdorff 2006)⁸. Some authors argue that indices based on perceptions reflect the quality of a country's institutions (Andvig 2005). Among the set of explanatory variables included were: per capita income, economic inequality, unemployment rates, divorce rates, total alcohol consumption, fertility rates, and total population. As a measure of income, we used the per capita real gross domestic product (*INCOM*) in

⁵ Available at <http://www.who.int/whosis/mort/download/en/index.html> (accessed May 10, 2010).

⁶ An important issue is how to define corruption. There are many definitions. Most share a common denominator which can be expressed as follows: “the abuse of public authority or position for private gains.” The data are available at http://www.transparency.org/policy_research/surveys_indices/cpi (accessed February 2, 2011).

⁷ The SIDD adjusts the raw World Income Inequality Database (WIID) for differences in scope of coverage, income definition, and reference unit to a nationally representative, gross income, household per capita standard.

⁸ Another corruption indicator is that from the International Country Risk Guide (ICRG). This ICRG index of corruption might be problematic as it does not measure a country's level of corruption but the political risk involved in corruption.

the year 2000 in international dollars taken from the Penn World Tables (PWT v 6.3)⁹. Economic inequality (*GINI*) was proxied by the Gini coefficient which was taken from the Standardized Income Distribution Database (SIDD) created by Babones and Alvarez-Rivadulla (2007)¹⁰. Harmonized unemployment rates (UNEMP) were taken from the OECD database to allow for comparisons across countries. We also employed crude divorce rates (per 1,000 people) (*DIV*) taken from the United Nations Common Database, Demographic Yearbook¹¹. Total recorded per capita alcohol consumption (*ALCO*) was obtained from the Global Information System on Alcohol and Health (GISAH) of the World Health Organization (WHO)¹². Total fertility rates (*FERTIL*) were taken from the World Development Indicators Database (World Bank 2006). Lastly, mid-year total population (*POP*) was taken from the WHO Mortality Database.

The empirical model to explain suicide rates and analyze the impact of corruption on suicide takes the following form:

$$\begin{aligned} \text{SUICI}(\text{MSUICI}, \text{FSUICI})_{it} = & \alpha_1 \text{CORRUPT}_{it} + \alpha_2 \text{ALCO}_{it} + \alpha_3 \text{GINI}_{it} + \alpha_4 \text{INCOM}_{it} \\ & + \alpha_5 \text{UNEMP}_{it} + \alpha_6 \text{DIV}_{it} + \alpha_7 \text{FERTIL}_{it} + \alpha_8 \ln(\text{POP})_{it} + m_t + k_i + \varepsilon_{it}, \end{aligned} \quad (1)$$

where dependent variables in country i and year t are total suicide rates as SUICI_{it} (male and female suicide rates). m_t represents unobservable year specific effects such as macro-level shock at t years. k_i and ε_{it} represent individual effects of country i (a fixed effect country vector) and the error term of country i and year t , respectively. The structure of the data set used in this study is a panel; m_t is controlled by incorporating year dummies. k_i holds the time invariant feature. So we can use the fixed effects model to capture k_i (Baltagi 2005). The fixed effects allow to control for differences in

⁹ The data are available at http://pwt.econ.upenn.edu/php_site/pwt_index.php (accessed January 15, 2010).

¹⁰ The data are available at <http://salvatorebabones.com/data-downloads> (accessed March 1, 2011).

¹¹ Available at <http://data.un.org/Default.aspx> (Accessed May 10, 2010).

¹² Available at <http://apps.who.int/globalatlas/default.asp> (Accessed May 10, 2010).

national characteristics such as culture, religious concepts about death or life across nations, climate and traditional values, and in periodical characteristics such as changes in social acceptance to suicide. The regression parameters to be estimated are α ; and ε_{it} represents the classical error term. If *CORRUPT* takes 10, this indicates an absence of corruption. On the other hand, if *CORRUPT* takes 0, business transactions in the country are entirely dominated by kickbacks and extortion, for example. *CORRUPT* was included to capture the degree of governance corruption. If people are less likely to commit suicide in less corrupt societies, *CORRUPT* will take the negative sign. One of the reasons to employ a fixed effects model is that is a closed sample (homogenous) and we do not extrapolate these results to other set of countries. We also expect some correlation between the individual effects and some of the explanatory variables. What about the results of Hausman test?

Following the suicide literature, we include several socioeconomic variables on the right hand side of our regression models (e.g. Brainerd 2001, Kuncze and Anderson 2002, Andrés 2005, Chuang and Huang 2007, Chen *et al.*, 2009; Noh 2009, Yamamura 2010). To begin, economic factors were captured by per capita income (INCOM), unemployment rate (UNEMP), and Gini index (GINI). Social factors were controlled for by divorce rates (DIV), total alcohol consumption (ALCO), and fertility rates (FERTIL). Lastly, we control for the corresponding total populations to account for country size¹³. Table 1 provides definitions and descriptive statistics of the variables.

III. ESTIMATION RESULTS.

Results for the fixed effects models are given in Table 2, each corresponding to another dependent variable (total, male, and female suicide rates). Regressions using the male suicide rates as dependent variable are very similar to those on total suicide rates because males account for the bulk of suicides. As indicated at the bottom of Table 2, the R squared values are higher in the models

¹³ Using adjusted suicide rates to control for differences in the structure of population is equivalent to regress the crude rate and control for age structure of population.

in which the dependent variable is the total and male suicide rates. One might also conclude that male suicide behaviour could be more responsive to socioeconomic conditions as opposed to female behaviour. For the sake of brevity, we have focus on concentrated our focus on results for CORRUPT and results where coefficients were statistically significant. As Table 2 shows the degree of corruption is consistently negatively associated with suicide rates (in all regression models).. Furthermore, its coefficient magnitudes are higher for total and male suicide rates than for female suicide rates. In particular, the absolute value of CORRUPT coefficient was 0.65, suggesting that a 1 point increase in CORRUPT resulted in a 0.62 point decrease in suicide rates. The absolute value of CORRUPT was 0.99 for male suicide rate, whereas the value was only 0.33 for female suicide rate. This implies that a 1 point increase in CORRUPT resulted in a 0.99 point decrease in male suicide rate, while a 1 point increase in CORRUPT resulted in a 0.33 point decrease in female suicide rate. Hence, the effect of CORRUPT on male suicide rate was approximately three times larger than that for female suicide rate. Regarding other control variables, our results are similar to many other previous empirical studies using panel data. We found significant effects of divorce rate on male suicides, and it has little effect on female suicide. Alcohol consumption is positively associated with suicide rates, regardless of gender. Unemployment, income inequality and fertility rates are found to be statistically insignificant in all regression models (for instance, Minoiu and Andrés, 2008).

IV. CONCLUSION

Although suicide research is a multidisciplinary subject and socioeconomic factors are well documented risk factors for suicide. Past research has neglected the role of quality governance indicators. In particular, this study explored how corruption influences suicide rate using a panel dataset for 24 OECD countries. Empirical results from the fixed effects estimation revealed that

suicide rates are lower in countries with lower levels of corruption. Furthermore, its coefficient magnitude is higher for male suicide rates than for female suicide rates. This implies that corruption has a detrimental effect on social well-being.

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Table 1
 Variable definitions, means, and standard deviations (Observations = 102).

Variables	Definition	Mean	Standard Deviation
SUICI	Suicide rate (per 100,000)	14.5	6.4
MSUICI	Male suicide rate (per 100,000)	21.4	9.4
FSUIC	Female suicide rate (per 100,000)	7.8	4.1
CORRUPT	Degree of corruption	7.6	1.7
ALCO	Recorded adult per capita alcohol consumption (in liters)	10.7	3.0
GINI	Gini coefficient	0.42	0.11
INCOM	Per capita income (\$1000 US)	23.2	7.0
UNEMP	Unemployment rate (%)	7.4	3.6
DIV	Crude divorce rate (per 1,000; %)	2.0	0.9
FERTIL	Fertility rate, total (births per woman)	1.6	0.2
POP	Mid-year population (millions)	37.2	58.9

Table 2

Panel data regression models. Fixed effects approach.

Explanatory variables	(1) Dependent variable: Total suicide rate	(2) Dependent variable: Male suicide rate	(3) Dependent variable: Female suicide rate
CORRUPT	-0.65** (-2.00)	-0.99* (-1.95)	-0.33* (-1.70)
ALCO	2.05*** (4.65)	3.26*** (4.79)	0.89*** (3.38)
GINI	5.83 (0.83)	13.6 (1.27)	-1.69 (-0.41)
INCOM	-0.49** (-2.23)	-0.86** (-2.55)	-0.14 (-1.06)
UNEMP	0.21 (1.21)	0.25 (0.97)	0.16 (1.59)
DIV	2.33** (2.45)	4.33*** (2.95)	0.38 (0.67)
FERTIL	-0.84 (-0.24)	-2.97 (-0.55)	1.22 (0.59)
Ln(POP)	0.41 (1.58)	0.57 (1.41)	0.27* (1.74)
R-squared (Within)	0.39	0.41	0.32
No. of observations	102	102	102

Note: Numbers in parentheses are t-statistics. *, ** and *** indicate significance at 10, 5 and 1 percent levels, respectively. Year and country dummies are included in all estimations, but to save space are not reported.

APPENDIX.

Table A1. OECD countries in the regression analysis

Australia	Japan
Austria	Luxembourg
Belgium	Netherlands
Canada	New Zealand
Denmark	Norway
Finland	Portugal
France	South Korea
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom
Italy	United States
