# Does corruption affect suicide? Empirical evidence from OECD countries

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***Abstract***

Panel data regressions for 24 OECD countries showed that the less corrupt a society is, the lower the total suicide rate. This effect was approximately three times larger for males than for females. It follows that corruption has a detrimental effect on social well-being.

***Keywords:*** Corruption, Panel data, Suicide, OECD

***JEL classification:*** D73, H75, I18

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## 1. 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 society[3]. Recently, researchers have paid attention to a more fundamental issue by examining the association between governance and well-being (Helliwell and Huang, 2008; Ott 2010).

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 data 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. However, few researchers have attempted to examine the association between suicide and quality of governance. The purpose of this paper is to investigate the effect of corruption on suicide rate. To this end, we used a simple random effects model to conduct estimation for 24 OECD countries.

[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).

## 2. Data and 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 derived from several sources. Suicide deaths were extracted from the WHO Mortality Database (past update Dec 2009)[4] which contains data for number of deaths by year, country, age group, and sex as well as cause of death. We used the corruption perception index (CPI) as a proxy for the degree of corruption[5]. That is, higher values of CPI indicated lower corruption. This index was collected from Transparency International[6]. The CPI has been widely used to measure cross-country corruption (for examples, see Lambsdorff 2006). Some authors argue that indices based on perceptions reflect the quality of a country's institutions (Andvig 2005). Fertility rates were taken from the World Development Indicators Database (World Bank 2006). Among the set of explanatory variables were alcohol consumption, income, divorce rates, unemployment rates, and income inequality. As a measure of income, we used the per capita real gross domestic product in the year 2000 in international dollars taken from the Penn World Tables (PWT v 6.3)[7]. Income inequality was a proxy for the Gini coefficients taken from the Standardized Income Distribution Database (SIDD) created by Babones and Alvarez-Rivadulla (2007)[8]. Harmonized unemployment rates were taken from the OECD database to allow for comparisons across countries. We also employed crude divorce rates (per 1,000) taken from the

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

5 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).

6 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.

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

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

United Nations Common Database, Demographic Yearbook[9]. Mid-year population was taken from the WHO Mortality Database. Total recorded per capita alcohol consumption was obtained from the WHO Global Information System on Alcohol and Health (GISAH)[10].

Table 1 includes definitions and descriptive statistics of the variables employed in the empirical analysis. The empirical model to explain suicide rates and analyze the impact of corruption on suicide takes the following form:

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

where dependent variables in country $i$ and year $t$ are total suicide rates as $\text{SUICI}_{it}$ (male and female suicide rates). $m_t$ represents unobservable year specific effects such as macro-level shock at $t$ years. $k_i$ and $\varepsilon_{it}$ 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 and so can be captured by the random effects model (Baltagi 2005). The regression parameter is represented by $\alpha$; $\varepsilon_{it}$ represents the 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.

Following the existing literature on suicide, we incorporated socioeconomic variables as the independent variables (e.g. Brainerd 2001, Kunce and Anderson 2002, Andrés 2005, Chuang and Huang 2007, Noh 2009, Yamamura 2010). Economic factors were captured by per capita income

[9] Available at http://data.un.org/Default.aspx (Accessed May 10, 2010).
[10] Available at http://apps.who.int/globalatlas/default.asp (Accessed May 10, 2010).

(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). Furthermore, we controlled for corresponding total populations to control for country size.

## 3. Results

We checked the validity of the random effects estimation. A Hausman test examines the null hypothesis that the difference in coefficients between the fixed effects and random effects estimation is not systematic (Baltagi 2005). As shown in Table 2, the null hypothesis was not rejected in all columns. Hence, the random effects approach is valid and preferred over the fixed effects approach.

In the interest of brevity, we have concentrated our focus on results for CORRUPT and results where coefficients were statistically significant. Table 2 shows that CORRUPT took the expected negative sign and was statistically significant in all columns. Furthermore, the absolute value of CORRUPT was 0.62, suggesting that a 1 point increase in CORRUPT resulted in a 0.62 point decrease in suicide rates. The absolute value of CORRUPT was 0.91 for male suicide rate, whereas the value was only 0.32 for female suicide rate. These results were not statistically significant, although they had the expected positive signs in all estimations. A 1 point increase in CORRUPT resulted in a 0.91 point decrease in male suicide rate, while a 1 point increase in CORRUPT resulted in a 0.32 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.

## 4. Conclusions

This study explored how corruption influences suicide rate, using a panel of OECD countries. Empirical results from the random effects estimation revealed that people are less inclined to commit suicide in less corrupt societies. This effect for males was approximately three times larger than for

females. 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 regressions of rates of suicide using a random effects model

| Explanatory variables | (1) Dependent variable: Total suicide rate | (2) Dependent variable: Male suicide rate | (3) Dependent variable: Female suicide rate |
|---|---|---|---|
| CORRUPT | -0.62* | -0.91* | -0.32* |
| | (-1.92) | (-1.84) | (-1.70) |
| ALCO | 1.24*** | 1.89*** | 0.55*** |
| | (3.48) | (3.46) | (2.68) |
| GINI | 3.28 | 9.33 | -2.86 |
| | (0.47) | (0.87) | (-0.71) |
| INCOM | -0.07 | -0.19 | 0.06 |
| | (-0.51) | (-0.92) | (0.75) |
| UNEMP | 0.26* | 0.33 | 0.18** |
| | (1.67) | (1.40) | (2.04) |
| DIV | 2.87*** | 5.18*** | 0.66 |
| | (3.20) | (3.74) | (1.27) |
| FERTIL | -0.55 | -2.33 | 1.16 |
| | (-0.17) | (-0.45) | (0.60) |
| Ln(POP) | -1.03 | -1.83 | -0.24 |
| | (-0.99) | (-1.18) | (-0.41) |
| Constant | 16.2 | 30.2 | 2.90 |
| | (0.81) | (1.00) | (0.25) |
| Hausman test | 3.64 | 11.6 | 12.4 |
| | P-value=0.98 | P-value=0.47 | P-value=0.41 |
| R-squared (Within) | 0.33 | 0.34 | 0.27 |
| 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 |