Suicide and Social Relations: A Cross-National and Longitudinal Analysis

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Introduction

Suicide is one of the most crucial indicators of mental health and well-being. According to the WHO, it is among the top 20 leading causes of death for all ages worldwide, and among the leading three causes of death for people aged 15-44 in some countries. Not only is it linked to individual psychological distress, but more fundamentally, it is a product of social and cultural conditions. For example, studies have shown that disintegration of family structure, especially divorce, is positively related to suicide rates (Cutler, Glaeser, and Norberg 2001; Gunnell et al. 2003; Messner et al. 2006; Phillips et al. 2002; Shiner et al. 2009). Participation in civil activities and trust in people in society are related to lower suicide rates (Helliwell 2006). Also, gender equality and more accepting attitude toward working women are associated with lower female suicide rates (Burr, McCall, and Powell-Griner 1997; Pampel 1998). Moreover, suicide rates are complicated by the culture of suicide and the institution of social security (individualist versus collectivist policy) that are specific to a certain country (Chen, Choi, and Sawada 2009; Lester, Agarwal, and Natarajan 1999; McCurry 2006; Pampel 1998).

In light of the fact that social and cultural factors, though identified as crucial in determining suicidal behavior, are still understudied, this paper investigates the risk factors of suicide from a cross-national and longitudinal perspective. It gives special attention to social relations that are undergoing transformation due to modernization and the second demographic transition in recent decades. Although previous studies have investigated some of these issues, their approaches are less than satisfying. Cross-national studies usually only include western countries (except for Japan as a non-western country), which have relatively similar cultural practices and economic development. The majority use cross-sectional analysis that fails to control for country-specific effects. Among those with both cross-national and longitudinal observations, most only analyze country-level suicide rates without looking into suicide rates by age. This is true even if the country-level suicide trend is relatively stable over the past half century, but the age pattern of suicide rates within a country is changing over time (Liu 2009). This study specifically addresses these methodological issues while answering the following two questions:

(1) What are the relationships between suicide rates and various social relations (marriage and divorce rates, importance of family and friends in life, number of children, co-residence with parents, civil participation, gender equality, income equality, and general social trust)?
(2) How are the relationships different from country to country, and from region to region?

Data and Methods

The study uses three different sources of datasets. Suicide rates by gender, age group, and country (dependent variable) in year 1990-91, 1995-96, 2000-01, and 2005-06 are obtained from the WHO Mortality Database. There are seven age groups starting from age 15 in twenty-two countries across four regions of the world (including China, Japan, South Korea, and Taiwan in East Asia, Canada and United States in North America, Brazil, Chile, Colombia, Mexico, and Venezuela in Latin America, and Austria, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, United Kingdom in Europe). The indicators of social relations (independent variables) are obtained from the World Value Survey and the World Databank in the corresponding years. They are calculated in average or proportion for each gender-age-country group if possible. Control variables include gender, age group, country, region, education or subjective social class, self-rated health, and the version of the International Classification of Disease (ICD).

Multilevel mixed-effects linear regression is used as the analytical strategy in this study. This regression model contains both fixed effects and random effects, allowing intercept and coefficient estimates to be random as well as multiple levels of nested groups. These features address the research objective: to examine how the association between suicide and social relations vary across countries and regions.

Preliminary Findings

Country Overview

The overall suicide rates vary greatly by country and by gender, and they are significantly different between 1990 and 2005 for some countries. In 1990, the average suicide rate among the 22 sampled countries is 16.5 per 100,000 for men and 6.4 per 100,000 for women. Male suicide rates range from 3.9 in Colombia and Mexico to 49.3 in Finland. Female suicide rates range from 0.7 in Mexico to 15.8 in China. In 2005, the average suicide rate barely changes (16.9 per 100,000 for men and 6.3 per 100,000 for women), but the level and ranking among the sampled countries shift. Male suicide rates range from 5.9 in Greece to 36.1 in Japan, and female suicide rates range from 1.2 in Greece to 16.5 in South Korea.

The distribution of suicide deaths among different age groups also changes between 1990-91 and 2005-06. It is more or less patterned by region. Among the four East Asian countries, suicide rates generally increase with age. From 1990-91 to 2005-06, the age pattern of suicide rates shifts upward in Japan, South Korea, and Taiwan (Figure 1, S. Korea as an example). This might be related to the economic downturn between the late 90s and early 2000s, as well as changes in family structure over recent decades (e.g. transition from the extended family to the nuclear family). In contrast, the suicide rates by age groups in China shifts downward slightly over time, more so for women than for men. One explanation is that gender inequality is steadily improved when the industrialization, urbanization, and the relaxation of *hukou* system bring better opportunities especially for young women. But due to data availability, the period of observations in China is 1987-2000 instead of 1990-2005. This might also reflect some of the difference from the other Asian countries.

The five Latin American countries are distinct by their low suicide rates for both men and women (Figure 2, Mexico as an example). Between 1990 and 2005, the age-specific suicide rates generally go up in Brazil, Chile, Colombia, and Mexico. The increase in suicide rates tends to be concentrated among younger age groups in these countries. Weakening religiosity, stigma of suicide, and family ties might explain some of the change. In contrast, suicide rates in Venezuela come down between 1990 and 2005 for all age groups, though it is mostly driven by the decrease in older groups. Another distinct pattern for the Latin American countries is that their female suicide rates generally decrease with age, especially in 2005. This phenomenon is not found in countries of other regions.

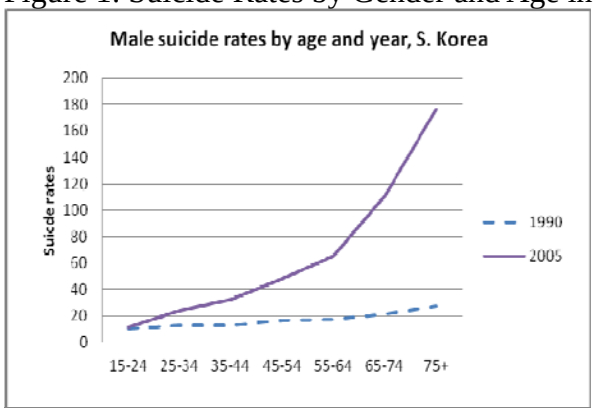
Two countries in North America, the United States and Canada, share a similar age pattern of suicide rates (Figure 3, US as an example). Overall, suicide rates in most age groups slightly decrease between 1990 and 2006. Both the younger and older cohorts have reduced suicide rates over time, whereas the middle-aged cohort has stable or increased rates. In the case of the US, this pattern is different from the pattern between 1950 and 1990, when suicide rates of youth tripled while middle-aged and elder suicide rates dropped. The reasons, however, require further investigation.

Among the European countries, Finland, Norway, Sweden, United Kingdom, the Netherlands, and Greece have a similar age pattern of suicide rates over time as the US and Canada (Figure 4, Sweden as an example). First, the suicide rates in most of the age groups fell between 1990-91 and 2005-06. Second, the male suicide rates turned flatter along the age axis over time. Third, the female suicide rates tend to peak in the middle-aged group, especially in 2005.

The rest of the European countries, Austria, Germany, France, Italy, and Spain, have their suicide rates increase monotonically with age for both genders (Figure 5, Germany as an example). This age pattern is quite similar to the four East Asian countries. However, unlike the Asian countries, their age-specific suicide rates shifted downward instead of upward between 1990-91 and 2005-06.

The results of testing the association between social relations and suicide across countries and regions will be presented in the follow-up version of this paper.

Figure 1: Suicide Rates by Gender and Age in South Korea, 1990 and 2005



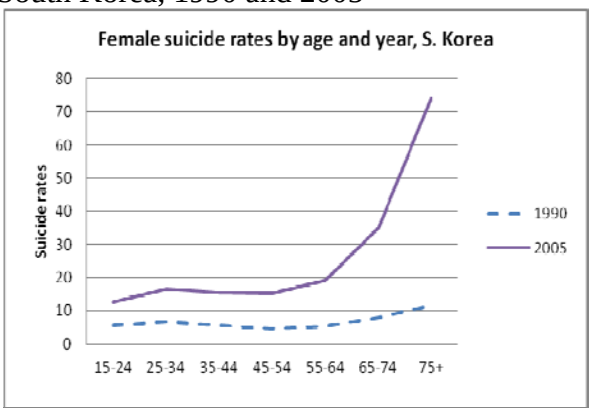
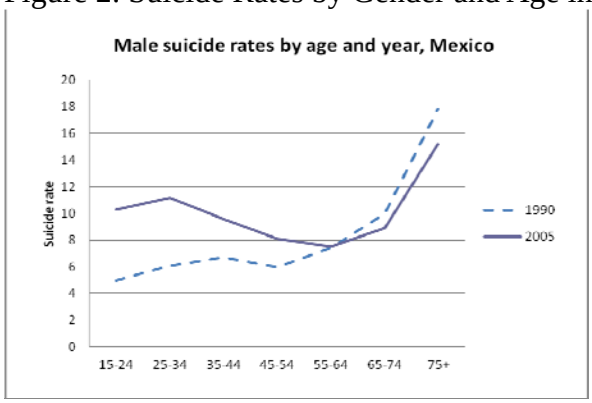


Figure 2: Suicide Rates by Gender and Age in Mexico, 1990 and 2005



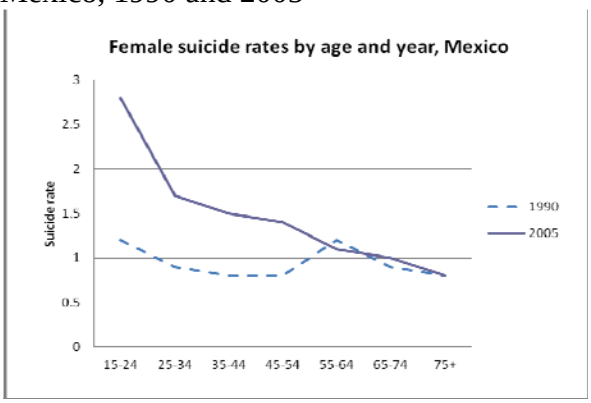
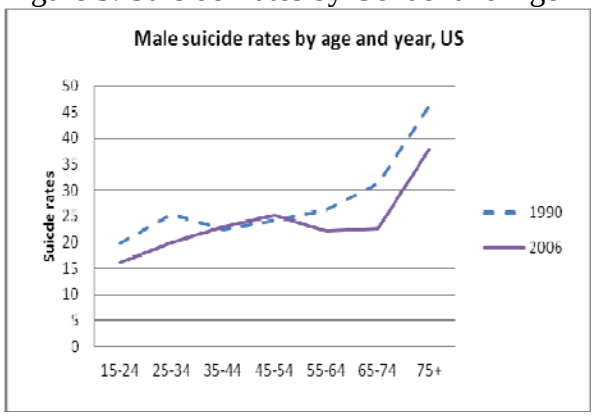


Figure 3: Suicide Rates by Gender and Age in the US, 1990 and 2006



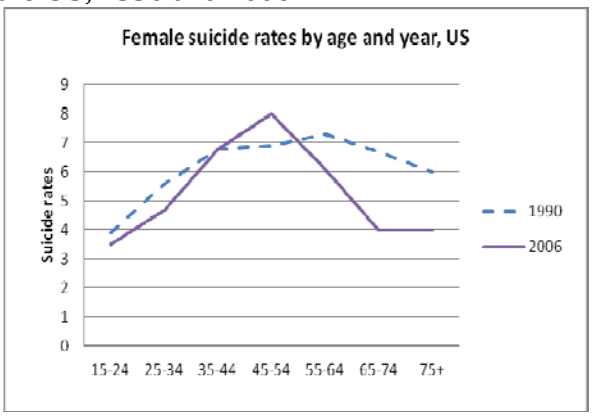
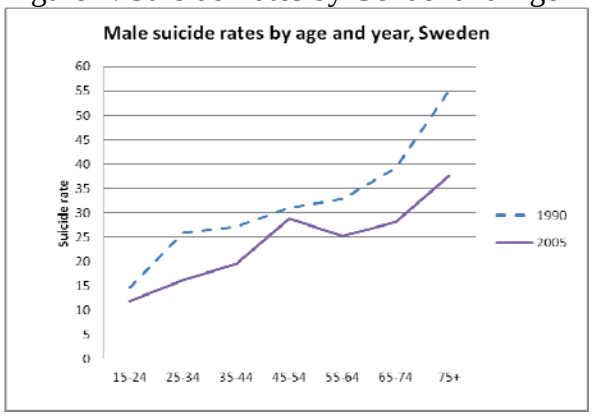


Figure 4: Suicide Rates by Gender and Age in Sweden, 1990 and 2005



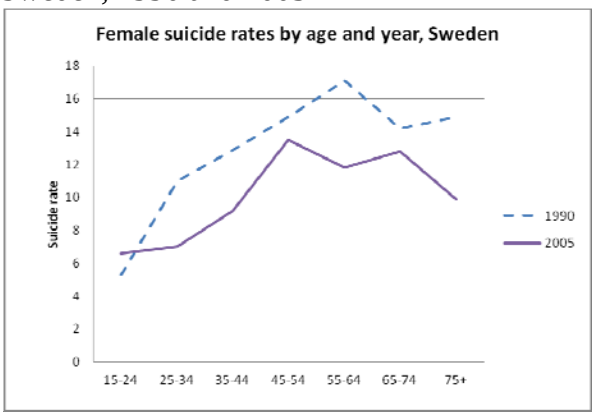
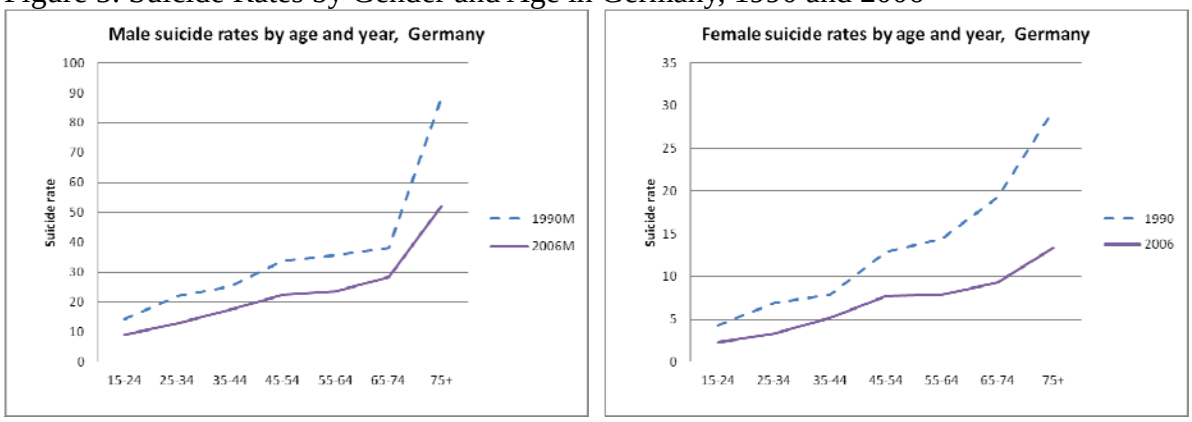


Figure 5: Suicide Rates by Gender and Age in Germany, 1990 and 2006



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