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**COMPARISON OF
SOCIAL CAPITAL'S EFFECT
ON CONSIDERATION OF
SUICIDE BETWEEN URBAN
AND RURAL AREAS**

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Comparison of Social Capital's Effect on Consideration of Suicide between Urban and Rural Areas

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An increasing number of works have addressed the socio-economic determinants of suicide. Social capital is a key factor in preventing suicide. However, little is known about the experience of suicide consideration using subjective values. From the viewpoint of suicide prevention, it is worth examining how people think of suicide. This paper attempts to examine the effect of social capital on suicide consideration based on individual-level data from Japan. Furthermore, the paper compares the effect of social capital between urban and non-urban areas.

After controlling for various socio-economic factors, the major findings are that both individual-level social capital and social capital accumulated in one's place of residence reduce the probability that one will consider suicide. After dividing the sample into urban and non-urban residents, the effect of social capital in one's place of residence for urban residents is remarkably larger than for non-urban residents. In contrast, the effect of individual-level social capital disappears for urban residents, while the effect persists for non-urban residents. Overall, community-level social capital plays a more important role in deterring suicide for urban residents.

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1. Introduction

The seminal work of Durkheim (1951) was the first to analyze suicide in the 19th century from the viewpoint of social science. In the 21st century, suicide became a more serious issue than in prior centuries, so it is crucial to implement measures to prevent suicides.¹ According to Durkheim (1951), suicide is a predictable consequence of the degree to which one is integrated into society. Hence, the relation between individuals and society should be analyzed when we explore how and why individuals commit suicide. Therefore, to analyze suicide, previous works consider the extent to which suicide is accounted for by social factors such as social capital (e.g., Putnam 2000; Yamamura 2010; Smith and Kawachi 2014),² the sex ratio (Kuroki 2014), the fertility rate (Okada and Samreth 2013), divorce, and marriage (e.g., Kuncze and Anderson 2002; Neumayer 2003; Andrés et al. 2011). In addition to social relationships, many works consider economic factors, such as public spending (Minoiu and Andrés 2008), inequality (Andrés 2005), and unemployment (e.g., Platt 1984; Yang et al. 1992; Yang and Lester 1995; Breuer 2015).

Japan experienced a remarkable increase in the suicide rate in the mid-1990s. According to the OECD (2013), even though the rates have remained stable since then, the age-standardized rate per 100,000 population of Japan in 2011 was 20.7, remarkably higher than that of the United States in 2011 (12.5). During the mid-1990s, coinciding with the Asian financial crisis, economic stagnation had a detrimental influence on the society of Japan.³ Economic researchers have provided evidence that the increase in the suicide rate was caused partly by the economic conditions (e.g., Koo and Cox 2008; Chen et al. 2009; Inagaki 2010; Kuroki 2010; Sugano and Matsuki 2014, Suzuki et al. 2013; 2014).⁴ However, consistent with Durkheim's view, social factors are also significantly related to the suicide rate in Japan (e.g., Yamamura 2010, Andrés et al. 2011; Sugano and Matsuki 2014). However, the suicide rate is more sensitive to economic factors than to social factors (Chen et al. 2009).

Even though existing works analyzing suicide have used suicide rates, there

¹ Many analyses of suicide have been conducted since the 1970s (e.g., Hamermesh 1974; Yang and Lester 1995; Huang 1996; Viren 1996; Chuang and Huang 1997; Brainerd 2001; Jungeilges and Kirchgassner 2002; Marcotte 2003).

² It has been argued that the suicide rate may be high if the level of social capital is high (Kushner and Sterk 2005).

³ The increase in suicide rates also became an important issue in South Korea, so the issue has been addressed by researchers (Kim et al. 2010). Comparative works on suicide have addressed Japan and Korea (Kim et al. 2011).

⁴ Even prior to the 1990s, economic factors such as unemployment rates have been significantly related to the suicide rate in Japan (Mothohashi 1991).

seems to be a large gap between committing suicide and suicide consideration. An incident of committing suicide is regarded as an extreme case. Therefore, existing works have dealt only with the committing of suicide and do not take into account the intermediate condition between committing suicide and a sound mental condition. To prevent suicide, it is worth investigating how and why individuals consider suicide even if they do not actually commit suicide. To analyze the intermediate situation, the current paper uses survey data from Japan that provide information on individual-level perceptions of suicide. Furthermore, community-level data, such as the degree of social capital, the Gini coefficient of income, and the Gini coefficient of education level in a residential area, are matched with the individual-level data. Then, the association between socio-economic factors in a residential area and individuals' suicide consideration is investigated. The key findings are as follows: social capital reduces the probability that individuals will consider suicide, and the effect is larger for urban residents than for non-urban residents. Further, economic and education inequality leads individuals to consider suicide only in urban areas. These results suggest that economic and social relationships with others in the community are more important for urban residents than for non-urban residents.

The current paper is organized as follows: Section 2 presents a concise explanation of the data and specifies the regression functions. In Section 3, I discuss the results of the estimations. The final section offers concluding observations.

2. Data and Econometric Framework

2.1. Data

In the current paper, Japanese General Social Survey (JGSS) data are used. These are individual-level data.⁵ The JGSS used a two-stage stratified sampling method and was conducted throughout Japan from 2000 to 2012. The paper uses only the data collected in 2006 because a question about suicide consideration was included only in the 2006 survey. The JGSS was designed as a Japanese counterpart to the General Social Survey (GSS) in the United States. The JGSS questionnaire includes standard questions concerning an individual's characteristics via face-to-face interviews. The data cover information related to

⁵ Data for this secondary analysis, "Japanese General Social Surveys (JGSS), Ichiro Tanioka," were provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, the University of Tokyo.

marital and demographic (age and sex) status, annual household income,⁶ years of schooling, age, prefecture of current residence, and prefecture of residence at 15 years of age. A Japanese prefecture is the equivalent to a state in the United States or a province in Canada. There are 47 prefectures in Japan.

Key variables included in the JGSS 2006 are experience of suicide consideration and social capital-related variables. With respect to perceptions about suicide, one of the survey questions asked, “In the past 5 years, have you thought of committing suicide at least once?” Respondents could choose one of three responses: 1 (Never), 2 (Not in the past 5 years but have before that), or 3 (Yes). The responses allow me to quantify the experience of suicide consideration even if suicide has not been committed. Figure 1 shows that 80% of the respondents have not thought of committing suicide. However, 6% of people had thought of committing suicide within the previous five years. The suicide rate in Japan was 0.02% (OECD 2013). Roughly, this means that the number of potential suicides was 300 times larger than the number of those who actually committed suicide in Japan.

As a proxy for social capital, one of the survey questions asked, “Generally speaking, would you say that most people can be trusted?” Respondents could choose one of three responses: 3 (Yes), 2 (Depends), or 1 (No).⁷ According to Putnam (2000), social capital is defined as the features of a social organization, such as networks and norms, and social trust facilitates coordination and cooperation. In the current paper, social trust is used to measure the degree of social capital. As argued by Uslaner (2002), trust is categorized into generalized trust (trust in most people) and particularized trust (trust in members of the group to which one belongs), which should be considered separately. Individual-level generalized trust is measured by the response to the question indicated above.

Because information on the respondents’ residential prefecture was obtained, the rate of generalized trust can be calculated for each prefecture, which is regarded as a proxy for community-level generalized trust. Further, a proxy for particularized trust is also captured as follows. In 1996, the Japan Broadcasting Corporation conducted a survey on the consciousness and behaviors of prefecture residents (Japan Broadcasting Corporation 1997). One of the survey questions asked, “Do you

⁶ In the original dataset, annual earnings were grouped into 19 categories, and we assumed that everyone in each category earned the midpoint value. For the top category of “23 million yen and above,” I assumed that everybody earned 23 million yen. Of the 1,262 observations used in the regression estimations, there were only 18 observations in this category. Therefore, the problem of top coding should not be an issue here.

⁷ Kuroki (2011) used the JGSS data to examine the relation between generalized trust and happiness levels.

trust community members?” Respondents could choose one of three responses: “Yes,” “Unsure,” or “No.” I calculated the rates for those who answered “yes” within a prefecture. The rate of trust in community members can be used as a proxy for community-level particularized trust. It is also used to measure social capital in the current research. I assume here that the rate of trust in community members was stable over time. I obtained a proxy for each of the 47 prefectures. Individual-level generalized trust, community-level generalized trust, and community-level particularized trust are used as proxies for social capital.

Gini data coefficients for prefecture-level household income were calculated using data from the National Survey of Family Income and Expenditure, conducted by the Ministry of Internal Affairs and Communications (1999). These surveys are conducted every five years. To avoid endogeneity bias, the income Gini in 1999 is used as a predetermined exogenous variable. Furthermore, the Gini coefficient of education level in 2000 was constructed by Hojo (2009). I also used the education Gini to capture inequality in one’s place of residence.

2.2. *Econometric Framework and Estimation Strategy*

Table 1 lists the definition and basic statistics for variables used for estimation in the current paper. The estimated function of the baseline model takes the following form:

$$\text{SUICID}_{im} = \alpha_0 + \alpha_1 \text{PTRUST}_m + \alpha_2 \text{GTRUST}_m + \alpha_3 \text{IGTRUST}_{im} + \alpha_4 \text{GINI}_m + \alpha_5 \text{GINI_EDU}_m + \alpha_6 \text{SCHOOL}_{im} + \alpha_7 \text{INCOM}_{im} + \alpha_8 \text{AGE}_{im} + \alpha_9 \text{MALE}_m + \alpha_{10} \text{MARRY}_{im} + \alpha_{11} \text{CHILD}_{im} + \alpha_{12} \text{UNEMP}_{im} + u_{im},$$

where SUICID_{im} represents the dependent variable in individual i and prefecture m . Regression parameters are represented by α . As explained previously, values for SUICID range from 1 to 3, so the ordered probit model is used to conduct the estimations (Greene 2008). The larger the value of SUICID is, the more people are likely to consider suicide. The error term is represented by u_{im} . It is reasonable to assume that the observations may be spatially correlated within a prefecture, as the preference of one agent may well relate to the preference of another in the same prefecture. To consider such a spatial correlation in line with this assumption, I used the Stata cluster command and calculated z -statistics using robust standard errors. The advantage of this approach is that the magnitude of spatial correlation can be unique to each prefecture.

To examine the association between social trust and consideration of suicide, CTRUST, GTRUST, and IGTRUST are included. CTRUST captures community-level particularized trust, while GTRUST captures community-level generalized trust because their values are common for respondents who resided in the same prefecture. IGTRUST captures individual-level generalized trust. Following the arguments of Yamamura (2010) and Smith and Kawachi (2014), the signs of these coefficients are expected to be negative. Inequality is thought to increase social isolation between people of different classes. Inevitably, people are more likely to consider suicide in an unequal society. To examine this issue, GINI and GINI_EDU are included, and they are predicted to have a positive sign. Variables capturing the individual economic effects are SCHOOL, INCOM, and UNEMP, standing for years of schooling, household income level, and an unemployment dummy, respectively. If an improvement in economic conditions reduces the probability that people will consider suicide, the signs of the former two variables will become negative, while that of the latter will become positive. To capture the age effect, marital-related influence, and the existence of children, AGE, MARRY, and CHILD are incorporated, respectively.

The values for the dependent variable, SUICID, are 1 (respondents have never thought of committing suicide), 2 (respondents have not thought of committing suicide in the past five years but have before that), and 3 (respondents have thought of committing suicide at least once). PTRUST, GTRUST, GINI, and GINI_EDU are prefecture-level variables. Accordingly, for migrants from other prefectures, SUICID is thought to be associated with these variables in the former residential prefecture rather than in the current residential prefecture. Overall, migrants cannot be reasonably included in the sample. As explained previously in this section, I can obtain information about the respondents' current prefecture of residence and their prefecture of residence at 15 years of age. If the current prefecture of residence is different from the prefecture of residence at 15, a respondent can be defined as a migrant. As a robustness check, estimations are conducted using not only the full sample but also the sample excluding migrants.

3. Estimation and Discussion of Empirical Results

Tables 2, 3, and 4 list the results based on the full sample, an urban sample, and a non-urban sample, respectively. Further, in each table, columns 1 and 2 present results based on the sample including migrants, while columns 3 and 4 present results based on the sample excluding migrants. In columns 1 and 3, all the

control variables are included as independent variables. As alternative specifications, in columns 2 and 4, MARRY, CHILD, and UNEMP are not included as a robustness check. Some respondents did not respond to the questions associated with MARRY, CHILD, and UNEMP, so the sample size increases when these variables not included. In the ordered probit model, coefficients of variables cannot simply be interpreted as marginal effects (Greene 2008, 833). Instead of coefficients for three probabilities, marginal effects can be calculated. For instance, I can obtain the marginal effects of CTRUST on the probability that SUICID is 1, the effects of CTRUST on the probability that SUICID is 2, and the effects of CTRUST on the probability that SUICID is 3. The current paper reports the marginal effects of independent variables on the probability that SUICID is 3.⁸

I now proceed to examine Table 2. Looking at the social capital-related variables CTRUST, GTRUST, and IGTRUST reveals that the coefficients were all negative and statistically significant in columns 1–4. This implies that social capital plays an important role in preventing suicide by leading people not to consider suicide. That is, social capital is thought to cure the mental weakening regarded as the cause of suicide in its early stages. Apart from this, other variables do not show statistical significance in any columns, with the exception of AGE. That is, inconsistent with previous works (e.g., Andrés 2005; Koo and Cox 2008; Chen et al. 2009; Inagaki 2010; Kuroki 2010; Sugano and Matsuki 2014; Breuer 2015), economics-related variables such as GINI, GINI_EDU, INCOM, and UNEMP are not associated with suicide. Existing works examine the influence of economic factors on actual suicide rates, while the current work investigates its influence on potential suicide probability by using data on subjective perceptions of suicide. As mentioned previously, in Japan, the suicide rate is only 0.02% (OECD 2013), which is equivalent to 1 out of 300 people considering suicide within the previous five years. That is, the number of those who have actually committed suicide is very small, although about 20% of people have considered suicide. Therefore, economic factors are critical determinants for advanced cases, but not for cases in an early stage.

I concentrate on key variables in the current paper because most of the variables do not show statistical significance. Let me turn to the results based on the urban sample. According to Table 3, CTRUST and GTRUST exhibit a negative sign and statistical significance at the 1% level in all columns. However, IGTRUST

⁸ Other results (the probability that SUICID is 1 and the probability that SUICID is 2) are available upon request from the corresponding author.

shows statistical significance only in column 1. Further, the coefficient's sign for IGTRUST is negative in columns 1–3 and positive in column 4. Therefore, the results for IGTRUST are not robust, so IGTRUST does not have an influence on SUICID. Considering the social capital-related variables jointly leads me to argue that, in urban areas, community-level social capital contributes to the prevention of suicides, but individual-level social capital does not. As for variables used to capture inequality, it is interesting to observe that GINI and GINI_EDU have a positive sign and are statistically significant, with the exception of column 2. This implies that inequality in society provides a motive to consider suicide in urban areas. Furthermore, the absolute values of GINI_EDU are about four times larger than those of GINI. I interpret this as suggesting that inequality in education plays a greater role than income inequality in dividing society and thus isolates people to the extent that they may consider suicide. That is, non-economic factors are more critical in providing motives to consider suicide in an early stage than economic factors.

As shown in Table 4, the social capital-related variables CTRUST, GTRUST, and IGTRUST all show a negative sign and are statistically significant in columns 1–4. However, the z-values of CTRUST and GTRUST are smaller than those in Table 3. Furthermore, the absolute values of their coefficients are about 0.002 or 0.003, remarkably smaller than those in Table 3. Comparing the results for CTRUST and GTRUST in Table 4 with those in Table 3 indicates that community-level social capital is more important in preventing suicide in urban areas than in non-urban areas. In contrast, individual-level social capital (IGTRUST) is more important in non-urban areas than in urban areas. Regarding inequality, GINI and GINI_EDU are not statistically significant in any columns, although they show a positive sign. Therefore, in non-urban areas, inequality cannot be considered a key factor that causes suicide.

From the discussion thus far, I suggest that one's relationships with others play a greater role in preventing suicide in urban areas than in non-urban areas. The reason for this might be that social relations are weaker and thus more valuable for urban residents. Furthermore, economic factors are not associated with the probability that people have considered suicide. This differs from the results of existing works that have investigated the rare and extreme cases in which people have actually committed suicide.

4. Concluding Remarks

Many works have attempted to examine the relationship between socio-economic factors and suicide. However, these works analyzing suicide are mainly based on suicide rates in administrative districts, such as states, prefectures, and municipalities. Cases of suicide are very rare compared with cases in which people consider suicide. Most people who have considered suicide do not commit it. From the viewpoint of preventing suicide, it is valuable to investigate how and why individuals consider suicide even if they do not actually commit suicide. Therefore, the current paper uses survey data from Japan to analyze the issue.

The main findings are that both individual-level social capital and social capital accumulated in one's place of residence are negatively associated with potential suicides. After dividing the sample into urban and non-urban residents, community-level social capital was found to make a greater contribution to suicide prevention in urban areas than in non-urban areas. However, the effect of individual-level social capital disappears for urban residents but persists for non-urban residents. I interpreted this as implying that social capital is scarcer and thus valuable in reducing social isolation in urban areas. Further, economic and education inequality leads individuals to consider suicide only in urban areas. Therefore, economic and social relations with others is a more important remedy for suicide consideration in urban residents than in non-urban residents.

Community-based suicide prevention programs have been started in some model project communities that are financially supported by a local government of Japan (Motohashi et al. 2004). The results of the current paper show that such community-based programs are a more useful measure to prevent suicide in urban areas than in rural areas. Therefore, community-based suicide prevention programs should be implemented in urban areas.

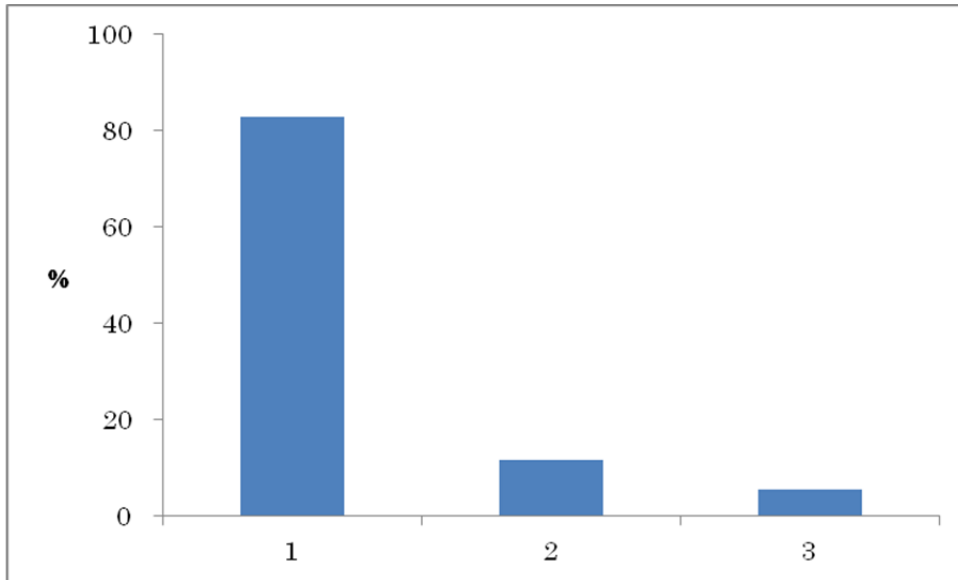
References

- Andrés, A.R. 2005. Income inequality, unemployment, and suicide: a panel data analysis of 15 European countries. *Applied Economics* 37: 439-51.
- Andrés, A.R., Halicioglu, F., Yamamura, E. 2011. Socioeconomic determinants of suicide in Japan, *Journal of Socio-Economics* 40(6): 723-31.
- Brainerd, E. 2001. Economic reform and mortality in the former Soviet Union: a study of the suicide epidemic in the 1990s. *European Economic Review* 45: 1007-19.
- Breuer, C. 2015. Unemployment and suicide mortality: evidence from regional panel data in Europe. Forthcoming in *Health Economics*.
- Chen, J., Choi, Y.J., Sawada, Y. 2009. How is suicide different in Japan? *Japan and the World Economy* 21: 140-50.
- Chuang, H.L., Huang, W.C. 1997. Economic and social correlates of regional suicide rates: a pooled cross-section and time-series analysis. *Journal of Socio-Economics* 26: 277-89.
- Durkheim, E. 1951. *Suicide: a study in sociology*. Translated by J.A. Spaulding and G. Simpson. Gencoe, IL: Free Press.
- Hamermersh, D.S. 1974. The economics of black suicide. *Southern Economic Journal* 41: 188-99.
- Hamermersh, D. S., Soss, N.M. 1974. An economic theory of suicide. *Journal of Political Economy* 82: 83-98.
- Hojo, M. 2009. Inequality in Japanese education: estimation using the Gini education coefficient. *Japanese Economy* 36(3): 3-27.
- Huang, W.-C. 1996. Religion, culture, economic and sociological correlates of suicide rates: a cross-national analysis. *Applied Economics Letters* 3: 779-82.
- Inagaki, K. 2010 Income inequality and the suicide rate in Japan: evidence from cointegration and LA-VAR. *Journal of Applied Economics* 8: 113-33.
- Japan Broadcasting Corporation. 1997. *Data book: survey on consciousness of prefecture residents (Zenkoku Kenmin Ishiki Chosa 1996)*. Tokyo: Japan Broadcasting Corporation Press.
- Jungeilges, J., Kirchgassner, G. 2002. Economic welfare, civil liberty, and suicide: an empirical investigation. *Journal of Socio-Economics* 31: 215-31.
- Kim, M.H, Jung-Choi, K., Jun H.J., Kawachi, I. 2010. Socioeconomic inequalities in suicidal ideation, parasuicides, and completed suicides in South Korea. *Social Science and Medicine*. 70(8): 1254-61.

- Kim, S.Y., Kim, M.H., Kawachi, I., Cho, Y. 2011. Comparative epidemiology of suicide in South Korea and Japan: effects of age, gender and suicide methods. *Crisis: The Journal of Crisis Intervention and Suicide Prevention* 32(1): 5-14.
- Koo, J., Cox, W.M. 2008. An economic interpretation of suicide cycles in Japan. *Contemporary Economic Policy* 26(1): 162-74.
- Kunce, M, Anderson, A.L. 2002. The impact of socioeconomic factors on state suicide rates: a methodological note. *Urban Studies* 39: 155-62.
- Kuroki, M. 2010. Suicide and unemployment in Japan: evidence from municipal level suicide rates and age-specific suicide rates. *The Journal of Socio-Economics* 39:683-91.
- Kuroki, M. 2011. Does social trust increase individual happiness in Japan? *Japanese Economic Review* 62(4): 444-59.
- Kuroki, M. 2014. The effect of sex ratios on suicide. *Health Economics* 23(12): 1502-10.
- Kushner, H.I., Sterk, C.E. 2005. The limits of social capital: Durkheim, suicide, and social cohesion. *American Journal of Public Health* 95: 1139-43.
- Marcotte, D.E. 2003. The economics of suicide, revisited. *Southern Economic Journal* 69: 2769-76.
- Minoiu, C., Andrés, R.A. 2008. The effect of public spending on suicide: evidence from US state data. *Journal of Socio-Economics* 37: 237-61.
- Motohashi, Y. 1991. Effects of socioeconomic factors on secular trends in suicide in Japan: 1953-1986. *Journal of Biosocial Science* 23: 221-7.
- Motohashi, Y., Kaneko, Y., Sasaki, H. 2004. Community-based suicide prevention program in Japan using a health promotion approach. *Health and Preventive Medicine* 9: 3-8.
- Neumayer E. 2003. Socioeconomic factors and suicide rates at large unit aggregate levels: a comment. *Urban Studies* 40: 276.
- OECD. 2013. Health at a glance 2013: indicators. <http://www.oecd.org/els/health-systems/Health-at-a-Glance-2013.pdf> (accessed March, 2015).
- Okada, K., Samreth, S. 2013. A study on the socio-economic determinants of suicide: evidence from 13 European OECD countries. *Journal of Socio-Economics* 45: 78-85.
- Platt, S. 1984. Unemployment and suicidal behavior: a review of the literature. *Social Science & Medicine* 19: 93-115.
- Putnam, R. 2000. *Bowling alone: the collapse and revival of American community*.

- New York: A Touchstone Book.
- Schaede, U. 2013. Sunshine and suicide in Japan: revisiting the relevance of economic determinants of suicide. *Contemporary Japan* 25(2): 105-26
- Smith, N.D.L., Kawachi, I. 2014. Stats-level social capital and suicide mortality in the 50 U.S. states. *Social Science and Medicine* 120: 269-77.
- Statistics Bureau of the Ministry of Internal Affairs and Communications. 1999. *National survey of family income and expenditure (Zenkoku shohi Jittai chosa)*. Tokyo: Statistics Bureau of the Ministry of Internal Affairs and Communications.
- Sugano, S., Matsuki, Y. 2014. Poisson analysis of suicide in Japan using municipal data. *Applied Economics Letters* 21(11): 723-6.
- Suzuki, E., Kashima, S., Kawachi, I., Subramanian SV. 2013. Social and geographical inequalities in suicide in Japan from 1975 through 2005: a census-based longitudinal analysis. *PLOS One* 8(5): e63443.
- Suzuki, E., Kashima, S., Kawachi, I., Subramanian, SV. 2014. Prefecture-level economic conditions and risk of suicide in Japan: a repeated cross-sectional analysis 1975-2010. *European Journal of Public Health* 24(6): 949-54.
- Uslaner, E.M. 2002. *The moral foundations of trust*. New York: Cambridge University Press.
- Viren, M. 1996. Suicide and business cycles: Finnish evidence. *Applied Economics Letters* 3: 737-38.
- Yamamura, E. 2010. The different impacts of socio-economic factors on suicide between males and females. *Applied Economics Letters* 17(10): 1009-12.
- Yang, B., Sark. S., Lester, D. 1992. Suicide and unemployment: predicting the smoothed trend and yearly fluctuations. *Journal of Socio-Economics* 21: 39-41.
- Yang, B., Lester, D. 1995. Suicide, homicide and unemployment. *Applied Economics Letters* 2: 278-79.

Figure 1. Respondents' self-reported thoughts of suicide.



Note: Question: In the past 5 years, have you thought of committing suicide at least once?

The numbers are the respondent's choices: 1 (Never), 2 (Not in the past 5 years but have before that), or 3 (Yes).

Table 1. Descriptive Statistics

Variables	Definition	Mean	Std. Dev	Max	Min
SUICID	<p>Considering suicide:</p> <p>Question: In the past 5 years, have you thought of committing suicide at least once?</p> <p>Choices for respondents are as follows:</p> <p>1 (Never), 2 (Not in the past 5 years but have before that), or 3 (Yes).</p>	1.22	0.53	3	1
PTRUST	Rate of those who trust community members within a residential prefecture: rate of those whose reply to the question (exhibited in definition of GTRUST) is 3 (%)	46.6	4.3	59.3	40.1
GTRUST	Rate of those who generally trust others within a residential prefecture (%).	21.1	2.7	28.8	14.3
IGTRUST	<p>Respondent's individual level of generalized trust.</p> <p>Question: Generally speaking, would you say that most people can be trusted?</p> <p>Choices for respondents are as follows:</p> <p>3 (yes), 2 (depends), 1 (no).</p>	2.09	0.56	3	1
GINI	Gini coefficient of household income within a residential prefecture in 1999	29.5	1.2	35.3	27.5
GINI_EDU	Gini coefficient of education within a residential prefecture in 2000	9.9	0.2	11.1	9.2
SCHOOL	Years of schooling	12.1	2.62	18	6
INCOM	Household income ^a	611.4	417.0	2,300	0
AGE	Age	52.3	16.6	89	20

MALE	Male dummy: 1 if respondent is male; otherwise 0	0.45	---	1	0
MARRY	Dummy for a married person: 1 if respondent is married; otherwise 0	0.78	---	1	0
CHILD	Number of children	1.71	1.16	8	0
UNEMP	Dummy for unemployment. 1 if respondent is unemployed; otherwise 0	0.02	---	1	0

Notes: ^a In tens of thousands of yen.

Source: Ministry of Health, Labor and Welfare (various years) Jinko Dotai Tokei Tokushu Hokoku.

Asahi Shinbunsha (various years). *Minryoku: TODOFUKEN-BETSU MINRYOKU SOKUTEI SHIRYOSHU.* Tokyo: Asahi-Shinbunsha.

Table 2. Full sample: regression results on considering suicide (ordered probit model)

	(1)	(2)	(3)	(4)
PTRUST	-0.003*** (-2.61)	-0.002** (-2.41)	-0.003** (-2.29)	-0.003** (-2.23)
GTRUST	-0.003** (-2.30)	-0.003** (-2.21)	-0.003* (-1.85)	-0.003* (-1.97)
IGTRUST	-0.019*** (-3.21)	-0.018*** (-2.89)	-0.022** (-2.50)	-0.020** (-2.18)
GINI	0.002 (0.59)	0.002 (0.75)	0.002 (0.42)	0.003 (0.83)
GINI_EDU	0.005 (0.28)	0.009 (0.57)	0.008 (0.48)	0.014 (0.86)
SCHOOL	-0.001 (-0.06)	-0.001 (-0.42)	0.001 (0.59)	0.0004 (0.02)
INCOM	0.005 (0.45)	-0.003 (-0.24)	0.014 (1.10)	0.011 (0.90)
AGE	-0.002*** (-7.30)	-0.002*** (-7.72)	-0.002*** (-5.91)	-0.002*** (-5.87)
MALE	-0.005 (-0.63)	-0.001 (-0.99)	-0.001 (-0.11)	-0.003 (-0.25)
MARRY	-0.032* (-1.81)		-0.024 (-1.33)	
CHILD	0.001 (0.22)		0.004 (0.92)	
UNEMP	0.024 (0.41)		-0.020 (-0.51)	
Migrants	Including	Including	Excluding	Excluding
Log pseudolikelihood	-666.7	-769.2	-480.6	-549.1
Observations	1262	1413	903	1013

Notes: Values without parentheses are marginal effects on the probability that a respondent will choose 3 for a question about a desire for suicide. In other words, the values are the probabilities that respondents have thought of committing suicide at least once in the past 5 years. The reported values of INCOM (SCHOOL) are multiplied by 1000 (10) for convenience of interpretation. Values in parentheses are z-statistics obtained by the robust standard error clustered on residential prefecture. *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. In all estimations, dummies for size of residential place are included, but the results are not reported.

Table 3. Urban sample: regression results considering suicide (ordered probit model)

	(1)	(2)	(3)	(4)
PTRUST	-0.009*** (-4.51)	-0.007*** (-3.47)	-0.016*** (-3.16)	-0.013*** (-3.59)
GTRUST	-0.009*** (-3.80)	-0.008*** (-2.91)	-0.023*** (-3.52)	-0.018*** (-3.17)
IGTRUST	-0.033** (-2.50)	-0.019 (-1.42)	-0.001 (-0.05)	0.013 (0.51)
GINI	0.010** (2.18)	0.006 (1.50)	0.025*** (3.05)	0.016* (1.79)
GINI_EDU	0.044** (2.20)	0.023 (0.65)	0.112*** (2.61)	0.070* (1.97)
SCHOOL	0.001 (0.17)	0.0004 (0.14)	0.002 (0.41)	0.003 (0.56)
INCOM	0.024 (0.63)	0.003 (0.08)	0.041 (1.23)	0.018 (0.43)
AGE	-0.001*** (-3.82)	-0.002*** (-2.66)	-0.001 (-0.92)	-0.001 (-1.07)
MALE	-0.009 (-0.72)	-0.021 (-1.41)	0.010 (0.46)	-0.002 (-0.10)
MARRY	-0.018 (-0.36)		-0.022 (-0.87)	
CHILD	0.013* (1.88)		0.014** (2.43)	
UNEMP				
Migrants	Including	Including	Excluding	Excluding
Log pseudolikelihood	-135.5	-185.2	-80.8	-111.6
Observations	267	330	161	199

Notes: Values without parentheses are marginal effects on the probability that a respondent will choose 3 for a question about a desire for suicide. In other words, the values are the probabilities that respondents have thought of committing suicide at least once in the past 5 years. The reported values of INCOM are multiplied by 1000 for convenience of interpretation. Values in parentheses are z-statistics obtained by the robust standard error clustered on residential prefecture. Because of the small sample, there is no observation of unemployed persons, so the results for UNEMP cannot be obtained. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

Table 4. Non-urban sample: regression results on considering suicide (ordered probit model)

	(1)	(2)	(3)	(4)
PTRUST	-0.002* (-1.88)	-0.002* (-1.86)	-0.002* (-1.76)	-0.002* (-1.92)
GTRUST	-0.003** (-2.05)	-0.003** (-1.85)	-0.003* (-1.68)	-0.003** (-1.76)
IGTRUST	-0.015** (-2.29)	-0.018*** (-2.78)	-0.025*** (-3.13)	-0.026*** (-3.33)
GINI	0.001 (0.26)	0.002 (0.45)	-0.001 (-0.37)	0.001 (0.22)
GINI_EDU	0.007 (0.36)	0.010 (0.64)	0.015 (0.91)	0.020 (1.31)
SCHOOL	-0.001 (-0.47)	-0.001 (-0.60)	-0.0001 (-0.06)	-0.001 (-0.32)
INCOM	0.002 (0.10)	-0.004 (-0.37)	0.009 (0.67)	0.009 (0.73)
AGE	-0.002*** (-6.63)	-0.002*** (-6.59)	-0.002*** (-5.69)	-0.002*** (-5.74)
MALE	-0.002 (-0.19)	-0.002 (-0.30)	-0.002 (-0.22)	-0.003 (-0.26)
MARRY	-0.033* (-1.76)		-0.015 (-0.73)	
CHILD	-0.003 (-0.78)		0.0004 (0.07)	
UNEMP	0.042 (0.62)		-0.005 (-0.10)	
Migrants	Including	Including	Excluding	Excluding
Log pseudolikelihood	-525.8	-583.7	-392.6	-435.9
Observations	995	1083	742	814

Notes: Values without parentheses are marginal effects on the probability that respondent will choose 3 for a question about a desire for suicide. In other words, the values are probabilities that respondents have thought of committing suicide at least once in the past 5 years. The reported values of INCOM are multiplied by 1000 for convenience of interpretation. Values in parentheses are z-statistics obtained by the robust standard error clustered on residential prefecture. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.