

# Economic Perspective and Empirical Analysis of College Students' Suicidal Tendency

Matthew Liang

School of Economics, Shanghai university, China  
232389038@qq. Com

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**Abstract.** The main purpose of this paper is to explore the causes and influencing factors of college students' suicide. First of all, based on theoretical analysis, from the perspective of economics, using the theory of cost-benefit and utility function and externality to analyze college students' suicide phenomenon. Secondly, nearly 100 data on college students' suicidal motives and tendencies were collected through questionnaires, and econometric models were used for logistic regression analysis. After fitting the results of the model and its tests in empirical analysis, we have obtained academic performance, professional satisfaction, physical health, interpersonal relationships, whether only children, family annual income, family economic difficulties, and family internal conflicts. Factors have a greater impact on college students' suicidal tendencies.

## Introduction

According to the latest data released by the World Health Organization (WHO) official website in 2014, nearly one million people die each year from suicide, with a suicide rate of 16/100,000. On average, one person commits suicide every 40 seconds. In the past 45 years, the suicide rate worldwide has increased by 60%.

In many countries, suicide is among the top three leading causes of death among people aged 15-44, the second leading cause of death in the 10-24 age group. These figures do not include suicide attempts, and suicide deaths. The proportion of attempted suicide is about 1:20. The suicide rate of young people has been rising and has become the highest risk group in one third of the world, both in developed and developing countries. About 112,983 people aged 15-34 die each year in China, which is the first cause of death in this group. In the 15-24 age group, suicide is still the leading cause of death, higher than traffic accidents and malignant tumors. The age of college students is at this stage. At the same time, in recent years, college students' suicides have been widely watched by various media. In recent years, the number of suicides among college students has increased, and suicide prevention is the top priority of colleges and universities. Based on the model research, this paper reveals the influencing factors of college students' suicide. Universities and society can find corresponding measures from corresponding aspects to reduce the suicide rate of college students.

Suicide is the result of a combination of physical, psychological and social factors, and the factors are interrelated and mutually influential. Domestic and foreign scholars have also carried out a lot of research on this. Based on the results of the comprehensive scholar's thesis and the author's analysis, we found that the influencing factors can be divided into three major aspects: economy, family and individual. Among them, the economy refers to China's social and economic background, specifically China's per capita GDP, the gap between the rich and the poor, the employment rate of college students, college education investment, etc., household average monthly income, family education expenditure, etc., individual aspects, academic pressure, employment competition, postgraduate research Failure, love breakdown, mental illness are all influencing factors. Based on various factors, combined with relevant theories in the field of economics, we further explore the suicide of college students.

In 2012, in "Stress, coping and suicide ideation in Chinese college students", Xiaoyun Zhang found that as the process of social reform and development accelerated, college students faced more and more challenges. Faced with the increasingly severe employment situation and competition, a

considerable number of college students who are not deeply involved in the world and lack of social experience are at a loss in the face of various choices. The lower the employment rate, the higher the suicide rate, and the reverse correlation[1]. In 2005, Tang Xuepeng mentioned in the article "Suicide and Rationalism" that as personal income increases, the tendency to commit suicide will decrease[2]. In 2011, Cukrowicz Kelly C showed in "Suicide ideation among college students evidencing subclinical depression" that family income is also one of the factors of college students' suicide. In families with lower incomes, college students tend to commit suicide more[3]. In 2015, Tang Fang pointed out in the article "Influencing factors of college students' suicidal behavior and its interactive network model" that college students must purchase commodity assets in order to meet the most basic material needs. The exchange of money is required to achieve this exchange process. Demand is expanding, while supply capacity is quite limited, especially for poor families. As a result, their living space is relatively narrow, resulting in greater survival pressure[4]. In 2016, in the "Study on the pattern of suicide rate in China with changes in social and economic conditions", Xu Wenbin pointed out that for college students, scholarships, joining the party, and judging seem to be a completely competitive state, but this is also extremely The monopoly nature, because there are strong and strong, weak and weak Matthew effect, some people in the university for four years, nothing, it seems very helpless[5]. In addition, there are also self-esteem and pain caused by academic pressure and personal illness. In the employment competition and love issue, on the one hand, there is a strong demand, on the other hand, there is a shortage of supply; or, demand and supply are targeted. In some people, there is a serious imbalance in the structure, and the result is likely to lead to the urge to be unfamiliar with the world. Suicide is a method that every economic person takes for his own benefit. In their view, death may be more effective for them.

### **Economic Analysis of College Students' Suicide**

**Cost-benefit analysis.** The behavior of college students committing suicide seems to be an irrational behavior in the eyes of ordinary people. However, since the theoretical premise of economics is the assumption of rational people, we must consider suicidal behavior as a rational choice if we analyze it from the perspective of economics. Economics is a discipline that studies optimal resource allocation. It discusses how to make optimal choices under the premise that constraints are given or known. Therefore, we discuss resource allocation. We use input and output to analyze and discuss suicidal behavior. We use cost-benefit analysis. Suicide is an individual behavior that must be profitable than cost for a rational person. Once a person chooses to commit suicide, one can understand his personal income as a kind of relief, and get rid of the various negative effects that reality brings to him. The cost is that he loses the positive effects of the material and spiritual aspects of the entire life cycle, but at the same time it brings negative externalities to society, because the death of a college student will hit the spirit and material of relatives and friends. And damage, society will also lose a high-quality workforce with higher education, which will form an external cost.

**A utility function discount model for suicide.** The main feature of suicide is that there is no second chance once it is over. Therefore, any targeted suicide must be considered a major irreversible behavior. Suicide reflects a belief that it is not worth living. We explain that "not worthy" means that the maximum utility obtained from life is less than the satisfaction of one person feeling that he has died after zero utility. This level of utility after death is defined as its utility function equal to zero.

In short, assume that the utility  $u(t)$  at age  $t$  is fixed for people of all ages. If  $u(t) < 0$ , life is not worth living when  $t$  is old, but since suicide is irreversible, this situation does not mean that suicide is reasonable for future careers, because the utility may be at  $t$ . After that, it was greatly improved. If the current and future utility discounted value is completely determined from the beginning of  $t$  to the various life stages of the future, then we can discount the utility of the future period to the present to judge whether a suicidal behavior is rational. Therefore, it is divided into the current and future periods to measure the discounted value (similar to the two inter-temporal choices in the whole life cycle), but if the data can be fully measured and the indicators can be fully utilized, then

the whole life cycle is divided into A smooth and many consecutive periods of discounting will be more reasonable. Therefore, we can explain the behavior of suicide according to two different discount methods in finance. The first one is the discount method of annual interest rate, and the second is the discount method of continuous compound interest.

**Premise assumption.** The satisfaction of a college student is divided into two periods, current and future, and the satisfaction can be positive or negative. Let the current satisfaction (satisfied) be  $S_N$  and the future satisfaction as  $S_F$ . And assume that the satisfaction of college students is influenced by factors such as academic achievement (G); family background (F); emotional state (E), that is,  $S_N = f(G, F, E, \dots)$ ; Will be affected by the current satisfaction, and there is a certain positive correlation, according to the adaptive expectation may be set  $S_F = a * S_N + b$ , (a is the impact coefficient, generally  $a > 0$ ; b represents an ordinary person in the current society The general minimum standard of satisfaction that can be provided is usually related to a social material welfare level and social basic spiritual satisfaction, such as sense of accomplishment, recognition, freedom, security, respect, etc. in interpersonal social relationships.

**Inter-temporal suicide discount model.** Let  $g$  be a person's growth rate, including a person's ability to grow, wealth growth, experience growth, psychological quality and cultural taste growth. After discounting the future utility  $S_F$  to the current utility  $S_N$ :

$$\text{If } \frac{S_F}{1+g} + S_N < 0, \text{ Suicidal motive, Transform it into: } \frac{aS_N + b}{1+g} + S_N < 0. \quad (1)$$

Suicide discount model for consecutive periods. Under certainty and duration, if a person's life cycle is from the current  $t$  period to the natural death  $T$  period, then the utility function is  $S_F + S_N$ ,

$$\text{And } S_F(X) = \int_t^T e^{-\lambda x} S_N(X) dx \quad (2)$$

Where  $\lambda$  is the immediate discount rate that may include exogenous risk mortality from “natural” causes, and suicide motivation exists when  $S_F + S_N < 0$ .

### **An Empirical Analysis of College Students' Suicidal Tendency**

This logistic regression analysis is used to determine whether a student has had a suicidal tendency as an explanatory variable (0 means no suicidal thoughts, 1 means suicidal thoughts), and the student's gender, grade, academic achievement, professional satisfaction Logistic regression analysis was performed as an explanatory variable of degree, physical health status, degree of self-recognition of the surrounding students, degree of confidence in future prospects, and influence of relationship. A total of 100 questionnaires were sent out, 76 questionnaires were returned, and 66 were valid questionnaires.

Table 1 Explanatory variables represent meaning

Explanatory variables	Representative meaning
V1	Your gender
V2	Your grade
V3	How is your academic record
V4	How satisfied are you with your profession
V5	How do you think your health is
V6	How do you feel about your future
V7	nterpersonal relationship is very poor, can not communicate properly
V8	Love is not smooth or relationship is broken
V9	Heavy learning burden, stress
V10	Employment competition is grim
V11	Are you an only child
V12	Your family type
V13	What is the average annual income of your family
V14	Whether your monthly living expenses can cover your expenses
V15	How much care does your parents care about you?
V16	Family economic difficulties
V17	Serious internal contradictions in the family

The following table is descriptive statistics for raw data:

Table 2 Descriptive statistics

	N	Minimum value	maximum	Mean	Standard deviation	variance
	Statistics	Statistics	Statistics	Statistics	Standard error	Statistics
V1	66	1	2	1.53	.062	.253
V2	66	1	4	2.68	.137	1.236
V3	66	1	5	2.95	.130	1.121
V4	66	1	5	3.14	.126	1.043
V5	66	1	5	3.53	.113	.838
V6	66	1	5	3.35	.121	.969
V7	66	1	5	2.41	.138	1.261
V8	66	1	5	2.38	.134	1.193
V9	66	1	5	2.53	.128	1.084
V10	66	1	5	2.39	.129	1.104
V11	66	1	2	1.58	.061	.248
V12	66	1	2	1.91	.036	.084
V13	66	1	5	2.82	.151	1.505
V14	66	1	5	3.44	.126	1.050
V15	66	1	5	4.09	.110	.792
V16	66	1	5	2.45	.128	1.083
V17	66	1	5	2.35	.142	1.338
Valid N (list state)	66					

Next, the principal component factor is extracted. The main component factor is mainly viewed in two aspects. One is the feature value, and the other is the contribution rate. The feature value is greater than 1, indicating that the factor can reflect information above one original variable, and vice versa. The rate is the ratio of the factor that reflects the information of all the original variables. Generally, there are two methods for extracting the main component, one is that the eigenvalue is

greater than 1, and the other is greater than 80% according to the cumulative contribution rate. This paper refers to the second method, which selects 8 principal components, and the cumulative contribution rate is 82.242%, which can basically reflect all the information of the original variables.

Table 3 is a matrix of component score coefficients obtained from the operation.

Table 3 Component Score Coefficient Matrix

	Ingredients							
	1	2	3	4	5	6	7	8
V1	-.087	.038	-.162	.132	.547	.086	.509	.193
V2	.000	-.022	.411	-.292	.118	.030	.379	-.463
V3	.068	.257	-.213	-.282	-.042	-.110	.099	-.167
V4	.079	.234	-.217	-.279	-.100	-.059	.065	-.194
V5	.074	.251	.072	.146	.233	.102	-.246	.014
V6	.111	.267	.158	.115	-.042	-.011	-.204	.019
V7	.160	-.134	-.087	.034	.206	.223	.110	.082
V8	.166	-.073	-.067	-.200	-.204	.035	.116	.159
V9	.173	-.049	.112	.086	-.112	.086	.302	-.163
V10	.158	-.069	.214	.125	-.082	-.019	.253	-.133
V11	-.056	.079	.207	.001	.039	.668	-.324	-.172
V12	.001	.191	.231	-.090	-.144	.127	.332	.859
V13	.052	-.004	.293	.147	.141	-.567	-.242	.139
V14	-.062	.013	-.081	.416	-.547	.098	.189	-.040
V15	.083	.164	-.094	.450	.109	-.034	.227	-.301
V16	.178	-.125	-.107	-.035	.005	.133	-.205	.162
V17	.170	-.083	-.092	.056	.179	.071	-.189	.150

Extraction method: Principal component analysis.

According to the component score, you can write the expression of each principal component:

$$FAC1 = -0.087V1 + 0.068V3 + 0.079V4 + 0.074V5 + 0.111V6 + 0.16V7 - 0.166V8 + 0.173V9 + 0.158V10 - 0.056V11 + 0.001V12 + 0.052V13 - 0.062V14 + 0.083V15 + 0.178V16 + 0.17V17$$

Similarly, an expression of another seven principal components, FAC2, FAC3, FAC4, FAC5, FAC6, FAC7, and FAC8, can be obtained.

**Logistic regression fitting model.** Using the calculated expressions of the eight principal components, the eight principal component values of the 66 sets of data are calculated. Using this set of data as an independent variable, whether there is a suicidal tendency Y value as a dependent variable, the "backward Wald" is adopted. Perform regression analysis. As shown in the table below, after 7 times of backward Wald; the probability of predicting success of 49 groups without suicide in 66 groups was 95.9%, the probability of success of 17 groups with suicidal tendency was 70.6%, and the probability of overall prediction success was 89.39%.

The expression of the logistic regression model is obtained according to Table 4:

Table 4 Classification table

	Observed	Observed		Percent correction	
		Y	0		1
step 1	Y	0	45	4	91.8
		1	11	6	35.3
		Total percentage			
step 2	Y	0	45	4	91.8
		1	11	6	35.3
		Total percentage			
step 3	Y	0	44	5	89.8
		1	11	6	35.3
		Total percentage			
step 4	Y	0	47	2	95.9
		1	11	6	35.3
		Total percentage			
step 5	Y	0	47	2	95.9
		1	10	7	41.2
		Total percentage			
step 6	Y	0	47	2	95.9
		1	11	6	35.3
		Total percentage			
step 7	Y	0	47	2	95.9
		1	12	5	29.4
		Total percentage			

a. Cutting value is .500

$$\ln \frac{P}{1-P} = -1.261 - 0.742FAC2 - 0.678FAC6$$

(3)

The P in the expression represents the probability of college students' suicidal tendencies. It can be seen from the expression that the second principal component and the sixth principal component of the principal component, namely FAC2 and FAC6, have a greater influence on the suicidal tendency of college students; while the main influencing variables of FAC2 are: V3, V4, V5, V16; The main influence explanatory variables of FAC6 are: V7, V11, V13.

**Hosmer and Lemeshow inspection.** The H-L test is used to detect the fit of the model. The larger the Sig. value, the better the model fits. The final Sig. of the model is 0.27 greater than 0.05, so the model has a high degree of fit and passes the H-L test.

Table 5 Comprehensive test of model coefficients

		Chi-square	df	Sig.
Step 7	step	-1.214	1	.270
	block	10.829	2	.004
	model	10.829	2	.004

a. A negative chi-square value indicates that the chi-square value has been reduced from the

previous step.

**Empirical results.** After logistic regression analysis, fitting models and testing, we obtained academic performance, professional satisfaction, physical health, interpersonal relationships, whether only children, family annual income, family economic difficulties, and family internal conflicts. The impact is greater, and other factors are less important.

## Summary

In most cases, college students commit suicide in the short term to satisfy their own utility maximization, but in the long run, this has a significant negative externality for others and society, so it reduces the phenomenon of college students committing suicide and curbs college students. The rising trend of suicide is very necessary. After measuring the benefits of suicide that outweigh the costs, college students choose to commit suicide. But obviously, this measure is based on an estimate of future uncertainty. Therefore, we can suggest that colleges and universities establish regular psychological evaluation mechanisms, early detection and early resolution, and do not let the momentary impulses blind their minds and make irreparable behavior. Today, in the frequent occurrence of college students' suicides, in addition to caring about the academic performance and physical health of college students, mental health should receive more extensive attention and attention from the community as well as financial and policy support.

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