The Link Between Unemployment and Suicide Rate Before and During Economic Crises

Pautan Antara Pengangguran dan Kadar Bunuh Diri Sebelum dan Semasa Krisis Ekonomi

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ABSTRACT

An economic crisis would accelerate unemployment which then could affect people's welfare and mental health. This situation is afraid to lengthen and could trigger the suicide rates. This study aims to examining the relationship between unemployment and the suicide rate before and during the Asian Financial Crisis and the Global Financial Crisis for developed and developing countries. This study used cross-sectional data and applied the ordinaryleast squares (OLS) regression model to complete the investigation. The result indicates thatthere is a positive relationship between the unemployment rate and the suicide rate in the developing countries during the crises. Meanwhile, developed countries had different relationships during different crises. Furthermore, the impact of unemployment toward suicide is adversely affecting developing countries than developed countries during a crisis. By comparing the severity between the Asian Financial Crisis and the Global Financial Crisis, the result shows that the Asian Financial Crisis is more disastrous due to excessive suicide compared to the Global Financial Crisis. This study suggests that the readiness ofthe government to face a crisis by implementing effective policies could lessen the impact.

Keywords: *unemployment, suicide, developed countries, developing countries, economiccrisis.*

ABSTRAK

Krisis ekonomi akan mempercepatkan pengangguran yang kemudiannya boleh menjejaskan kebajikan dan kesihatan mental rakyat. Keadaan ini boleh berlarutan dan boleh mencetuskan kadar bunuh diri. Kajian ini bertujuan untuk mengkaji hubungan antara pengangguran dan kadar bunuh diri sebelum dan semasa Krisis Kewangan Asia dan Krisis Kewangan Global bagi negara maju dan membangun. Kajian ini menggunakan data keratan rentas dan menggunakan model regresi kuasa dua terkecil biasa (OLS) untuk melengkapkan penyiasatan. Hasil kajian menunjukkan bahawa terdapat hubungan positif antara kadar pengangguran dan kadar bunuh diri di negara membangun semasa krisis. Sementara itu, negara maju mempunyai hubungan yang berbeza semasa krisis yang berbeza. Tambahan pula, kesan pengangguran terhadap bunuh diri memberi kesan buruk kepada negara membangun berbanding negara maju semasa krisis. Dengan membandingkan keterukan antara Krisis Kewangan Asia dan Krisis Kewangan Global, keputusan menunjukkan bahawa Krisis Kewangan Asia adalah lebih buruk akibat bunuh diri yang berlebihan berbanding Krisis Kewangan Global. Kajian ini mencadangkan bahawa kesediaan kerajaan menghadapi krisis dengan melaksanakan dasar yang berkesan dapat mengurangkan kesannya.

Kata kunci*: pengangguran, bunuh diri, negara maju, negara membangun, krisis ekonomi.*

1. Introduction

An unemployed person is easily exposed to mental health issues. According to Jahoda (1981,

1982), unemployed persons are in distress because of a lack of five latent functions of employment: time structure, social contact, collective purpose, status, and activity, which are essential psychological needs. Only being employed can provide these latent functions that are sufficient in modern society, while unemployment leads to a state of deprivation, resulting in distress. The significance of unemployed people that faced psychological problems was 34%, compared to 16% among employed individuals (Paul & Moser, 2009). Being unemployed makes a person feel stress, hopelessness, and feelings of uselessness, leading to unemployment hysteresis (Farré et al., 2018). If the impact of mentalhealth caused by unemployment is severe, it could lead a person to take their own life to end the suffering of being alive in a difficult situation.

According to Norström and Grönqvist's (2015), the most significant unemployment increases occurred in the least generous unemployment protection that contributed to the increment of suicide rate in that state regime in the period of the Great Recession. Upon the given concern, suicide should be a focal point of discussion when an economic crisis hits the world to prevent the spread of this epidemic. The repetition of the economic crisis in a decade can be seen in 1982, the World Recession, 1997 because of the Asian Financial Crisis, and in 2009, the Global Financial Crisis. In addition, the Asian Financial Crisis at its peak had caused the unemployment rate at 5.97% in 1999 at the world level (World Bank, 2022). If the impact of mental health caused by unemployment is severe, it could lead a person to take their own life to end the suffering of being alive in a difficult situation. The link between unemployment and suicide may vary depending on the readiness of a country forfacing a crisis.

2. Literature Review

2.1 Unemployment and suicide

The economic crisis undoubtedly had brought the unemployment rate high. Past research shows there is a linkage between unemployment and suicide. Snipes et al. (2011) estimate the relationship between the changes in the business cycle and the incidence of suicide. Their result indicates that unemployment and suicide have a significant and positive relationship. A person that faces a job loss might be accompanied by stressors such as financial, psychological and emotional well-being, self-esteem, and familial and social prestige. Furthermore, the spell of the more extended the unemployment duration, the higher the cost, might get a person trapped and decide to commit suicide. Huang and Ho (2016) examined the causal relationship between the unemployment rate and the suicide rate in Japan and South Korea from 1985 to 2012. They suggest that a negative unemployment rate shock will cause a negative impact on the suicide rate. An unemployed person is relatedto worsening health, which influences suicide in developed countries (Rivera et al., 2017). Prospective studies with repeat measures of employment and mental health show that unemployment has a causal influence on depression and suicidal thinking (Dooley et al., 1994).

Kuroki (2010) studies the relationship between unemployment and suicide in Japan. The research shows that suicide affects the prime-age working population (aged 35-64) and has the most significant effect on 55-64. The result reflected Japan's situation, where older workers find it hard to find jobs once they become unemployed. The same result is portrayed by Mohseni-Cheraghlou (2013) in the United States, where unemployment rates are associated with higher suicide rates for adults aged 35-64. These findings suggest that the mental well-being of prime working-age adults is more dependent on labour market conditions than people in other age groups. Therefore, the unemployment-suicide nexus varies by age.

On the other hand, some past research shows contrary results. Chansarn (2017) examines the relationship between suicide, economic development and economic problems in Thailand by applying the feasible generalised least square (FGLS) regression analysis. The result show

that unemployment is significantly negative correlated with the suicide rate in Thailand. Furthermore, this study points out that Thai people have a high unemployment rate because labourers seek new jobs rather than lose jobs. Consequently, they are less likely to commit suicide because they are more satisfied with their lives. Difurio (2017) investigated the relationship of macro-level factors influencing suicide rates. His finding shows that unemployment is not significantly related to countries while income, crime and church density affect the suicide rate. He suggests that certain socioeconomic factors influence suicide in surrounding communities, while others do not. Beside of unemployment being the main factor, there are other factors that affecting the suicide rate before and during an economic crisis which have been included in this study.

3. Data and Methodology

This study investigates the relationship between suicide and unemployment on a time frame before and during economic crises while comparing the impact on developing countries and developed countries. The hypothesis for this study is developed countries would be less impacted by the suicide caused by unemployment as there are plenty of protective measure provided for their citizens, rather than in low-income countries. The approximation is based on Norström and Grönqvist (2015), the largest unemployment increases occurred in the welfare state regimes with the least generous unemployment protection which then the association with suicide is statistically significant.

This study used the data in 1995 and 2005 to determine the impact before the Asian Financial Crisis and the Great Recession, while data in 1998 and 2008 to show the impact during the crisis, respectively. A list of 70 countries in total had been analysed, with 35 countries grouped in developed countries and balanced in developing countries. The classification of countries by either developed or developing countries is based on the classification by the World Bank which is grouped by per capita gross national income (GNI) (Silver, 2003). Countries with less than $1,035 GNI per capita are classified as low-income countries, those with between $1,036 and $4,085 as lower middle income countries, those with between $4,086 and $12,615 as upper middle income countries, and those with incomes of more than $12,615 as high-income countries. The developing countries for this study comprise low-income countries and lower-middle-income countries and developed countries are high-income countries.

The source of data for the suicide rate, mean year of schooling and alcohol consumption was obtained from the Our World in Data Organization, while the GDP per capita and the unemployment rate were retrieved from the World Development Indicator from the World Bank. Following the literature review on suicide, this research employs ordinary least squares (OLS) to estimate the relationship between suicide, unemployment rate, GDP per capita, mean year of schooling and alcohol consumption in linear, logarithmic form as specified in the following model:

$$LnSU_{1i} = \beta_0 + \beta_1 \ln UNR_i + \beta_2 \ln GDP_i + \beta_3 \ln SCH_i + \beta_4 \ln ALC_i + \varepsilon_i$$

where SU is the total number of suicides, UNR the unemployment rate, GDP the GDP per capita, SCH the mean year of schooling, and ALC the alcohol consumption. This model is estimated separately for developing and developed countries by the four years stated before.

4. Result

4.1 The Asian Financial Crisis

TABLE 1. Regression Results for the Unemployment-Suicide Link for Developing andDeveloped Economies Before and During Asian Financial Crisis

	Asian Financial Crisis			
Variable	Before Crisis (1995)		During Crisis (1998)	
	Developing	Developed	Developing	Developed
Constant	4.753*** (0.629)	3.401** (1.416)	3.983*** (0.583)	2.436* (1.434)
Unemployment	0.163* (0.084)	-0.042 (0.133)	0.219** (0.094)	-0.105 (0.139)
GDP per capita	-0.477***	-0.284**	-0.335***	-0.321***
	(0.117)	(0.108)	(0.107)	(0.111)
Mean year of schooling	0.036 0.137	0.387 0.588	-0.108 (0.159)	1.054* (0.569)
Alcohol use disorder	0.644*** (0.137)	0.973*** (0.263)	0.658*** (0.147)	0.849*** (0.239)
R-squared	0.586	0.592	0.514	0.626
F-stat	10.594***	10.899***	7.931***	12.537***

Note: * significance level at 10 per cent

** significance level at 5 per cent

*** significance level at 1 per cent Values in the bracket

are standard errors

The numbers above refer to 3 decimal places

For 1995, the R^2 value for developing countries is 58.6% meanwhile 59.2% for developed countries shows that the variation in the suicide rate is influenced by the unemployment rate, GDP per capita, mean year of schooling and alcohol use disorder. At the same time, the balances are 41.4% and 40.8% for developing and developed countries respectively showing that other factors that are not included might influence suicide in that group of countries. The F values for the developing and developed countries are 10.594 and 10.899, respectively, significant at a 1 per cent level because the P-values are lower than 0.01. It shows that the whole model is significant statistically to explain the impact of the unemployment rate on the suicide rate for both groups of countries.

The output of this analysis shows that unemployment, GDP per capita and alcohol use disorder are related to suicide statistically significant for developing countries. The unemployment rate is positively related at 10 per cent significance level to suicide in developing countries which means an increase of 1 percentage point in the unemployment rate will increase the suicide rate by 0.163 percentage points. The GDP per capita has a negative

relationship with suicide rate at 1 per cent significance level. A 1% increment of the GDP per capita would reduce the suicide rate as much as 0.477 percentage points. Moreover, alcohol use disorder is positively related to the suicide rate at a 1 per cent significance level which rises of a 1 percentage point of alcohol use disorder would boost the suicide rate to 0.644 percentage point. For developed countries, the significant factor toward suicide is the GDP per capita which is negatively related at 5 per cent significance level. A 1 per cent increase in GDP per capita in developed countries would shrink the suicide rate by
0.284 percentage points. At the same time, alcohol use disorder is positively related to the suicide rate where a 1 percentage point increase in alcohol use disorder would escalate the suicide rate by 0.973 percentage points.

By comparing the two groups of countries, the unemployment rate is only influencing suicide in developing countries. The GDP per capita and alcohol use disorder have the same relationship toward suicide in both countries, but the impact is different. For instance, the impact of the suicide rate reduction by an increase of 1% in GDP per capita, will reduce more effectively in developing countries (-0.477%) than developed countries (-0.284%).

Alcohol abuse is the most influencing factor toward suicide in developed countries as it boosts the suicide rate by 0.973 percentage points than 0.644 percentage points in developing countries by a 1% increase in alcohol use disorder. These regression results might explain how an increase in GDP per capita in developing countries could help to lift people's welfare in developing countries. Wibowo (2019) poised that GDP per capita positively correlated with the quality of life of people where the higher the income, the higher the quality of human beings in ASEAN. The result of higher alcohol abuse in developed countries is related to Glantz et al., (2014) where alcohol abuse is higher in developed countries than in developing countries is because of the influence of cultural and socioeconomic factors on the development, and the manifestation of alcohol abuse and psychiatric character of people in developed countries.

Additionally, in 1998 during the crisis, the R^2 value for developing countries is 51.4% meanwhile 62.6% for developed countries shows that the variation in the suicide rate being influenced by the unemployment rate, GDP per capita, mean year of schooling and alcohol use disorder. At the same time, the balance are 48.6% and 37.4% for developing and developed countries respectively show that other factors that are not included might influence suicide in that group of countries. The F value for the developing and developed countries are 7.931 and 12.537 respectively and are both significant at 1 per cent level because the P values are lower than 0.01. It shows that the whole model is significant statistically to explain the impact of unemployment rate towards suicide rate for both group ofcountries.

The output of this analysis show that unemployment, GDP per capita and alcohol use disorder are related to suicide statistically significant for developing countries. The unemployment rate is positively related at 5 per cent significance level to suicide in developing countries which means an increase of 1 percentage point of unemployment rate would increase the suicide rate by 0.219 percentage points. The GDP per capita has a negative relationship with suicide rate at 1 per cent significance level. A 1% increment of the GDP per capita would reduce the suicide rate as much as 0.335 percentage point. Moreover, alcohol use disorder is positively related to suicide rate at 1 per cent significance level which a 1 percentage point rise of alcohol use disorder would boost the suicide rate to 0.658 percentage points. For developed countries, the significant factors toward suicide is the GDP per capita which is negatively related at 5 per cent significance level. A 1 per cent increasein GDP per capita in developed countries would shrink the suicide rate by 0.321%. At the same time, the mean year of schooling is positively related at a 10 per cent significance level. An increase of 1% of mean year of schooling will increase the suicide rate by 1.054 percentage points. Alcohol use disorder is also positively related to suicide rate at 1 percent significance level. A 1 percentage point increase in alcohol use disorder will increase the suicide rate by 0.849 percentage points.

4.2 Comparison Before And During The Asian Financial Crisis

In developing countries, the unemployment rate had a higher coefficient and lower significance value which means the variables is stronger correlated with suicide rate when the crisis hit than before the crisis. For the unemployment rate, before the crisis hit the coefficient value was 0.163% with a 10 percent significance level, but when the crisis hit, the coefficient value had increased to 0.219% with a 5 percent significance level. The impact of unemployment on suicide can be seen clearly in developing countries while unemployment does not affect the suicide rate in developed countries before and during the Asian Financial Crisis. The average unemployment rate for developing countries shows that increasing trend from 6.269% to 7.161% between 1995 and 1998, which does relate to the output of this regression where the relationship between the unemployment rate and the suicide rate for this group gets deeper. This result is supported by Chang et. al (2009) study where the Asian Financial Crisis was associated with 10,400 more suicides in 1998 compared to 1997 in Asian countries due to the one of the impacts which is unemployment. According to Bastia and Kar (2009) unemployment is a stressful factor for young adults which lead to suicide in India because they lost their source of income. Lewis and Sloggett (1998) support that the association between suicide and unemployment is more important than other socioeconomic measures because unemployment would increase the risk of subsequently developing a common mental disorder. The insignificant relationship between unemployment and suicide for developed countries can be explained by Haw et. al (2014) where developed countries have the resources to initiate active labour market programmes which help reduce unemployment rate at the same time could lessen the suicide rate. This finding is consistent with Snipes et al. (2011), Huang and Ho (2016), and Dooley et al. (1994) but not consistent with Chansarn (2017) and Difurio (2017).

Moreover, GDP per capita do related for both group which it could shrink the suicide rate. It shows that the GDP per capita for developing countries shows an increase from USD 636.98 to USD 918.67 while for developed countries there is a slight decrease from USD 17305.36 to USD 17245.56. The changes in value of coefficient and significance level had explained well the relationship between GDP per capita and the suicide rate. For developing countries, the significance value is still the same at a 1 percent significance level but the coefficient value had a slight cutback from -0.477% to -0.335% meanwhile for developed countries had changed from -0.284% to -0.321% with a lower significance level. This relationship can be proven by Meda et. al (2021) where GDP per capita is negatively related to suicide where every 1000 US dollar increase could reduced suicide by 2%. GDP percapita is intertwined with economic growth, which then could improve social status and also lifestyle. Zhang et al. (2010) support that GDP per capita in the China are negatively associated with the urban, rural and overall suicide rates. The result is consistent with Zhang et al. (2010) and Meda et al. (2021).

Mean year of schooling for both groups of countries shows an increasing trend between 1995 to 1998. For this factor, only developed countries has positive significant relationship with suicide during the crisis while developing countries is insignificant for both years. This relationship may be related to the norm that a highly educated person should have the upperhand in the job market. According to Levy (2018) pressures that are surrounding successful people could lead them to commit suicide. For instance, the pressure to achieve more, pressure to make things look easy, isolation and fear of judgment. During the crisis, the pressure on successful people that face unemployment during the crisis could be very high as they have to face the society that is being judgemental towards them. According to Todd Essig, Forbes contributor and psychologist in New York City, the high executives personnels are prone to depression, despite their success, maybe even because of it (Walton, 2015).

Alcohol use disorder is related positively to suicide for both groups of countries in 1995 and 1998. The average value for alcohol use disorder for developing countries is declining but in a small amount from 1.781% to 1.759% while developed countries show an increasing trend

from 3.109% to 3.126%. The result shows that developed countries have a higher alcohol use disorder which can be related to the culture of drinking. Mouret et. al (2013) points out that for French people, drinking wine is embedded to their custom and eating traditions, and as social representations. The strong correlation of alcohol use disorder with suicide in developed countries can be explained by Sher (2005) which 90% people in Western countries use alcohol at some time in ther lives, and 40% experience temporary or permanent alcohol-related impairment in some area of life as a result of drinking. Suicide completers have high rates of positive blood alcohol where intoxicated people are more likely to attempt suicide using more lethal methods. The result does show the same output, where alcohol use disorder do positively related with suicide in developing countries. Tobin (2014) points out that difficult social and economic issues such as poverty and dependence on a cash economy causes people in developing countries to begin abusing alcohol.

4.3 The Global Financial Crisis

TABLE 2. Regression Results for the Unemployment-Suicide Link for Developing andDeveloped Economies Before and During Global Financial Crisis

	Global Financial Crisis			
Variable	Before Crisis (2005)		During Crisis (2008)	
	Developing	Developed	Developing	Developed
Constant	4.121*** (0.812)	3.223* (1.662)	3.963*** (0.761)	3.146 (1.868)
Unemployment	0.221* (0.110)	-0.411 (0.157)	0.179* (0.092)	-0.326** (0.151)
GDP per capita	-0.363** (0.150)	-0.454*** (0.131)	-0.319** (0.134)	-0.400*** (0.137)
Mean year of schooling	-0.031 (0.203)	1.568*** (0.534)	-0.019 (0.246)	1.293** (0.582)
Alcohol use disorder	0.603*** (0.164)	0.683*** (0.209)	0.590*** (0.173)	0.702*** (0.235)
R-squared	0.402	0.613	0.452	0.576
F-stat	5.037***	11.881***	6.181***	10.190***

Note: * significance level at 10 per cent

** significance level at 5 per cent

*** significance level at 1 per cent Values in the bracket

are standard errors

The numbers above refer to 3 decimal places

For 2005, The R^2 value for developing countries is 40.2% meanwhile 61.3% for developed countries shows that the variation in the suicide rate being influenced by the unemployment rate, GDP per capita, mean year of schooling and alcohol use disorder. At the same time,the

balance are 59.8% and 38.7% for developing and developed countries respectively showing that other factors that are not included might influence the suicide rate in that group of countries. The F values for the developing and developed countries are 5.037 and 11.881 respectively are both significant at a 1 percent level because the P-values are lower than 0.01. It shows that the whole model is significant statistically to explain the impact of the unemployment rate on the suicide rate for both groups of countries.

The output of this analysis shows that unemployment, GDP per capita and alcohol use disorder are related to suicide statistically significant in developing countries which are the same as in 1995. The unemployment rate is positively related at a 10 per cent significance level to suicide in developing countries which means an increase of 1 percentage point in the unemployment rate would increase the suicide rate by 0.221 percentage points. The result shows that the impact of unemployment is worsening the suicide rate in developing countries. The GDP per capita has a negative relationship with thesuicide rate at a 5 per cent significance level. A 1% increment of the GDP per capita would reduce the suicide rate as much as 0.363 percentage point. Moreover, alcohol use disorder is positively related to the suicide rate at a 1 per cent significance level which a 1 percentagepoint rise in alcohol use disorder would boost the suicide rate to 0.603 percentage points. For developed countries, the significant factor toward suicide is the GDP per capita which is negatively related at a 1 per cent significance level. A 1% increase in GDP per capita in developed countries would shrink the suicide rate by 0.454 percentage point. At the same time, the mean year of schooling and alcohol use disorder is positively related to the suicide rate at a 1 per cent significance level. A 1% rise in both factors would escalate the suicide rate by 1.568 percentage point. Meanwhile, a 1 percentage increase in alcohol use disorder will increase the suicide rate by 0.683 percentage points.

The same factors that influence suicide are GDP per capita and alcohol use disorder while unemployment only affects developing countries and the mean year of schooling affects developed countries. The relationship between the unemployment rate and suicide had shown a severe impact on developing countries because the coefficient had increased from 0.219% to 0.221% from the previous year. Although the unemployment rate has decreased since 1998, the impact of this factor is getting more critical. The same goes for the group of developed countries where the mean year of schooling had risen from the previous year, but the impact on suicide got clearer where the coefficient had increased from1.054% in 1998 to 1.568% in 2005.

For 2008, where the crisis took place, the R^2 value for developing countries is 45.2% meanwhile 57.6% for developed countries shows that the variation in the suicide rate being influenced by unemployment rate, GDP per capita, mean year of schooling and alcohol use disorder. At the same time, the balances are 54.8% and 42.4% for developing and developed countries respectively show that other factors that are not included might influence the suicide in that group of countries. The F value for the developing and developed countries are 6.181 and 10.190 respectively are both significant at 1 percent levelbecause the P value is lower than 0.01. It shows that the whole model is significant statistically to explain the impact of the unemployment rate on the suicide rate for both groups of countries.

The output of this analysis shows that unemployment, GDP per capita and alcohol use disorder are related to suicide statistically significant in developing countries. The unemployment rate positively related at 10 per cent significance level to suicide in developing countries which means an increase of 1 percentage point of unemployment rate would increase the suicide rate by 0.179 percentage points. The GDP per capita has a negative relationship with the suicide rate at a 5 per cent significance level. A 1% increment of the GDP per capita would reduce the suicide rate as much as 0.319 percentage points.

Moreover, alcohol use disorder is positively related to the suicide rate at a 1 per cent significance level which a 1 percentage point rise of alcohol use disorder would boost the suicide rate to 0.590 percentage points. For developed countries, the significant factors toward suicide are the unemployment rate at a 10 per cent significance level where an increase of 1 percentage point of the unemployment rate would degenerate 0.221 percentage points of suicide rate. The GDP per capita is negatively related at a 5 per cent significance level to the suicide rate in this group of countries. A 1% increase in GDP per capita in developed countries would shrink the suicide rate by 0.400 percentage points. At the same time, the mean year of schooling and alcohol use disorder are positively related toward the suicide at a 5 per cent and a 1 per cent significance level respectively. A 1% increase in mean year of schooling will increase the suicide rate by 1.293 percentage points. Meanwhile, an increase of 1 percentage points of alcohol use disorder will increase the suicide rate by 0.702 percentage points.

During this crisis incident, the factors that influence the suicide rate in developing countries are still the same as before this crisis happened. Meanwhile, all the factors included in this model are significantly related to the suicide rate in developed countries. It is because the crisis started in a developed country which is the United State of America, and spread all over the world. This crisis happens like wildfire as it has been initiated by the major role, Fannie Mae and Freddie Mac that buy mortgages from lenders to hold or repackage as mortgage-backed securities (Marquit & Curry, 2022). In 2004, the Federal Reserve granted a loan to these two companies hoping that it can help to stabilize the economy. In 2007, housing prices started to fall as supply outpaced demand. This situation trapped homeowners who could not afford the payments, and at the same time, they could not sell their houses. When the value of housing had dropped, banks stopped granting loans which then created the financial crisis that led to the Global Financial Crisis (Amadeo, 2022).

4.4 Comparison Before And During The Global Financial Crisis

The interesting part is on the factors that influence suicide where it shows clear differences from before and during the economic crisis for developed countries. Before the crisis happen which, the year had been chose is 2005, only the unemployment rate is not significantly related statistically with suicide rate. But during the economic crisis, all the factors is significantly related to suicide rate, including the unemployment rate. GDP per capita, mean year of schooling and alcohol use disorder is positively related to the suicide rate, while the unemployment rate is negatively correlated to the suicide rate. Meanwhile for the unemployment rate so far statistically related to the suicide rate positively for developing countries on every year that chosen for this study. The average value for unemployment does show intertwined with the result for developed countries as it shows a decreasing trend, but the regression shows a contrasting result. This situation is explained by Anderson, (2022) where unemployment happens during crises because companies had to cope with diminished demand, declining profits, and elevated debt, by laying off workers to cut costs. Potters, (2021) support that during the Global Financial Crisis, local industries fizzled out or moved out from the country that local economies contracted permanently. The local unskilled workers are extremely affected because they were unable to find jobs without moving to a new industry,

which often proved difficult due to economic, educational, or other barriers. Chen et al. (2009) found that, on average, suicide rates were negatively determined by unemployment rate in OECD countries. This finding is consistent with Snipes et al. (2011), Huang and Ho (2016), and Dooley et al. (1994) but not consistent with Chansarn (2017) and Difurio (2017).

GDP per capita is also one of the important subject on determining the suicide rate as the result suggest that there is a negative relationship statistically between both variables.This variable does show an increasing trend from 2005 to 2008 where it increased as much as USD 830.53 for developing countries and USD 10544.73 for developed countries. For both years which indicate before and during the economic crisis, GDP per capita is significantly related to suicide with negative relationship. The result suggest that GDP per capita is a protective barrier that could help decrease the suicide rates for both groups of countries. This situation can be explained with the study of Cai et. al (2021) where the economic development in China from 1990 to 2015 led to a decline of suicide rates. In the 1990s, China was notorious for its high female suicide rates in rural areas that can be explained by limited opportunities, domestic violence and family abuse, as well as easy access to lethal pesticides. However, with the economic growth of China, more and more rural women now had opportunities to receive education and participate in labour force markets that could help them escape from rural poverty and family conflicts. The result is consistent with Zhang et al. (2010) and Meda et al. (2021).

For the other factors, the mean year of schooling does not show any correlation with suicide for the developing countries from 1995 until 2008, but for developed countries showa difference result where it correlated to suicide only when on both economic crisis. This condition is relatable to what happen in India where suicide rate amongst literate people is higher compared to people with no education. Ripan Sippy, a clinical psychologist from Delhi describe that educated people have the expectation on having a decent job, but when the dofail to achieve their expectations, they would slip into deep depression which can lead to suicide (Ghosh, 2012). A high achiever is prone to commit suicide as they are afraid of to face failure, which then related to the death of Alasdair Clayre. He was described as a brilliant person as brilliant enough to be compared with Sir Isaiah Berlin as a philosophy undergraduate at Oxford, a recipient of the prestigious Prize Fellowship of All Souls College. He had commit suicide by jumping into the path of a train at an Underground station in North London because he was afraid of what reviewers might say about his book which was to be published (Goleman, 1996).

The alcohol use disorder is a very important factor as it is interrelated with suicide for both country before and during the economic crisis. The average value of alcohol use disorder for developed countries do show an increasing trend from 3.157% in 2005 to 3.165% in 2008 while for developing countries do show a slight reduction from 1.753% to 1.696%. Smith, (2019) explained that people had used alcohol as self-medication in an attempt to forget their problems. But, in the reality, it makes the issue exponentially worse which mid-to-long term alcohol abuse makes suicidal ideation both more frequent and more powerful. Olson, (2012) alcohol dependence can be a root cause of depression (addiction causing depressive symptoms) or consequence of depression (turning to alcohol for relief from depression) where a person develops dependence over time. The person suffering from depression may not even realize that their alcohol consumption is contributing to their circumstances.

4.5 Comparison Between The Asian Financial Crisis And The Global Financial Crisis

Comparing the impact of unemployment on suicide during the Asian Financial Crisis and the Global Financial Crisis, it shows that the Asian Financial Crisis giving a worse effect than the Global Financial Crisis. The finding shows that for developing countries, the coefficient of the unemployment rate has a slight decrease from 0.219 in 1998 to 0.179 in 2008, while for developed countries it is statistically insignificant during the 1998 crisis and negative correlation by -0.326 in 2008. This finding is similar to Huikari et al. (2019) where the Great Financial Crisis was not particularly disastrous relative to the Asian Financial Crisis. Park et al. (2013) support the argument by comparing the five high performance Asian countries during the Asian Financial Crisis and the Global Financial Crisis. They found that Asia fared much better during the Global Financial Crisis than during the Asian FinancialCrisis due to stronger fundamentals and better macroeconomic policies.

This study would assume that during the Global Financial Crisis, the government had prepared in terms of protective measures to face the crisis. For example, the United States had launched massive and multifaceted policy responses to the Great Financial Crisis, ranging from traditional fiscal stimulus to tools that policymakers invented to reduce the severity of the crisis. One of the policies that have been undertaken during the crisis is Troubled Asset Relief Program (TARP) where the U.S. Treasury purchases troubled companies' assets and stocks to stabilise the country's financial system (Blinder & Zandi, 2015). OECD countries also apply massive policy responses varying for short-term, medium-term and longer-term policy to boost the economy (Lumpkin, 2009). There is also various global financial support to help the developing countries from the giant economies. For instance, G20 had secured additional $1.1 billion for international support for developing countries to overcome the impact of the Global Financial Crisis (Response et al., 2009). Blinder and Zandi (2015) stressed that the Global Financial Crisis was worse than the Great Depression in the 1930s, but by the readiness of countries on facing the crisis by numerous and massive policy responses had lessened the effects.

5. Conclusion and Policy Implications

This study aims to examine the relationship between unemployment and suicide rate before and during two major economic crises. The concern raised as an economic crisis would affect the labour market and have the possibility to intensify the unemployment rate and could affect the suicide rate. The finding had shown that unemployment is statistically significant related to suicide in both countries but in different manners. The Asian Financial Crisis had a larger impact in developing countries where the unemployment rate is significantly positive related to suicide before and during the crisis, meanwhile for developed countries is insignificant during the same period. The correlation between unemployment rate and suicide rate during the Global Financial Crisis indicated a smaller effect on developing countries even during the crisis. At the same time, developed countries show a negative correlation between those two variables. This situation is explained well by Huikari et al. (2019) where the Great Financial Crisis was not particularly disastrous relative to previous economic crises. They showed that the Asian Financial Crisis was the most severe economic crisis compared with any earlier crises since 1970

when severity is measured according to excess suicide rates. Matsubayashi et al. (2020) explained that the suicide rates could be reduced when the local goverments increase their spending in. This study concluded that by government precautions on facing a crisis with providing protective measures could lower the suicide rates.

During a financial crisis, unemployment could be skyrocketing which then could affect people's welfare and mental health. This situation is afraid to lengthen and could increases the suicide rates. The governments have to take action to eradicate this situation from being worsened by increasing the effort to boost the economy by increasing government spending. To keep the welfare of the unemployed, the government could do generous unemployment benefit programs. This policy is significantly could reduce suicide rate where Cylus et al. (2014) poised that the more generous unemployment benefit programs reduce the impact of economic downturns on suicide. Cylus (2015) had deepened his study in the matter of impact of unemployment benefit where the findings indicated that unemployment benefits have a health promoting effects in the short-term, associated with lower suicide rates, better self-reported health and increased physical activity.

Furthermore, the government should increase the expenditure on active labour market programs (ALMP). This program provides job training, employment assistance, and employment subsidies which can encourage labour demand. According to Shibata (2014) in Japan, the relationship between government spending on ALMP and suicide is statistically negative. This factor explained about 10-32% of the change in the suicide rate from the rate in the previous year between 1991 and 2006. This program can solve the root cause, which is unemployment, where labourers in the market can find new jobs rather than lose one and be unemployed. The encouragement for the government to increase the spending on this program is supported by Reeves et al. (2015) where the greater spending on ALMP appeared to mitigate suicide risks.

This study has a number of limitations. Firstly, the suicide rate data is including the whole country suicide cases which is a limit to know the impact on working age population in a country. To find the best impact of the crisis, the working age population is the most accurate group of people to be examined on unemployment impact. Secondly, the information on other factors known to be influencing suicide by economic and social mean, such as stock market price, inflation rate, prevalence of mental illness and substance misuse, was lacking. Lastly, the classification of countries by group might be biased as proven by other researchers that a crisis might have a smaller impact on some economies than the others.

Therefore, future researchers may conduct in-depth investigation on the relationship between unemployment and suicide by focusing on working age population. This study could produce more specific outcomes as the impact may be more precise toward the exact group that would be affected. Besides that, a different research time frame may be considered, which is during COVID-19 pandemic. In this particular time, the unemployment rate has skyrocketed as business shut-down due to social isolation. This would bring a different understanding of the economic crisis that is strongly related to mental health because of social isolation. Moreover, future research may use more accurate economic factors that relate to common people, which is average income. By including this factor, it would produce more accurate effects on people's welfare that could give effects on people's mental health. Lastly, future research may include different economic and social factors that may influence suicide. By including different factors, particularly in their interacting relationship, it can help to have a better understanding on the societal factors

governing the economic-led suicide rate.

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