Intersectionality and Suicide Over the Business Cycle

Suicide in its many motives and forms of execution, can reasonably be considered a part of the human condition. Ukrainian psychoanalyst Gregory Zilboorg (1975) stated, “suicide is as old as the human race, it is probably as old as murder and almost as old as natural death”. According to the World Health Organization (WHO), there are over 800,000 suicides per year with one suicide occurring every 40 seconds. WHO also made mention that many attempts are made and even a large number of deaths by suicide are not recorded as such.

The purpose of this research is to quantitatively understand the impact of economic downturns on the suicide rate of different ethnic and gender cohorts. The examination of the changes in the suicide rate over the Great Recession is measured by corresponding changes in the unemployment rate by region. This paper will examine suicide and unemployment rates at the state level. The state level of analysis was chosen to determine if there are characteristics of local environments beyond the experience of individuals that might affect the suicide count. This paper will build on the existing research on the effects of business cycles on suicide mortality.

This paper tests the seminal work by Christopher Ruhm (2000) in which he examines mortality data during the period of 1972 – 1991 in effort to determine if short run economic downturns have a negative relationship with the top 10 causes of mortality during that period. He uses state level data across all races and genders controlling for education levels, age and ethnicity characteristics (percent of population that is black or Hispanic), as well as per capita personal incomes. It was determined that eight of the highest causes of mortality demonstrated a countercyclical pattern with unemployment (the exceptions being cancer and suicide).

Of interest to this paper is the contribution to the analysis of economics and mortality, in particular, the pattern of suicide rates before, during and after The Great Recession for four population subgroups: black males, black females, white males and white females.

1. Introduction

Social scientists around the world have sought to determine how business cycle fluctuations affect mortality. Trends in mortality rates over economic downturns have yielded mixed results that have largely been dependent upon the method and time frame of analysis. In particular, suicide mortality has demonstrated asymmetries over the business cycle that has warranted international interest. Researchers have found that economic recessions also have a positive impact on suicide rates internationally and that suicide as it relates to populations, can be seen as a manifestation of psychosocial stress. Increased stress levels are observed during an economic downturn, particularly in reference to workers' mental health. The impacts of economic downturns (recessions) are generally born from increased levels of unemployment, which is linked to mood disorders, depression, dysthymia[1] and suicide (Oyesanya et al., 2015).

Granados (2005) found that from 1980-1997, suicides in Spain demonstrated a countercyclical pattern for females (weakly) and males (strongly). Neumayer (2004) discovered that most mortality rates (including suicide) showed a decrease over economic downturns from 1972-1991 in Germany. Brenner (1979) applied the countercyclical theory most predominant in the U.S., to economic activity in England and Whales from 1936-1976 and found that there was indeed a negative correlation between unemployment and suicide but lagged one year. These differences in results can be attributed to downturn severity, cultural, demographic, or even methodological differences, but the question that has sought to be answered is similar: do changes in short run economic conditions impact the decisions of individuals to die by suicide.

1.1 Suicide by the numbers

During The Great Depression, national annual unemployment hit a record high of 22.9% in the year 1932, across all races, ages and genders. Mortality statistics indicate that of the top 6 causes of death, suicide was the only one to exhibit a countercyclical pattern that peaked with unemployment in the most recessionary years. The Great Depression in the United States revealed direct and indirect correlations between economic indicators and population health. Mortality statistics indicate that all-cause mortality decreased during the times of recessions

[1] Persistent Depressive Disorder (Dysthymia) is a less severe form of major depression that is related to chronic stress and trauma.
"Persistent Depressive Disorder (Dysthymia)." *Psychology Today*, Sussex Publishers, www.psychologytoday.com/us/conditions/persistent-depressive-disorder-dysthymia.

around the Great Depression and indeed during the height of the Great Depression (1921,1930-1933 and 1938) (Granados and Roux, 2009). The one exception to this observed decrease was suicide mortality. The countercyclical nature of mortality and morbidity during economic downturns has been observed and attributed to the inability to engage in activities that increase the risk of death (Ruhm, 2000). Suicide is not subjected to diminished risk as a result of a decrease in resources (in fact it has been argued that the lack of resources contributes to increased suicide mortality with regard to mental health services for low income white Americans (Chow et al., 2003)).

Suicide also exhibits a countercyclical pattern in other major recessions as well. For instance, the recessions linked to the 1973 oil Crisis, the 1979 oil crisis and the disinflation recession of 1980-1982 (Pritchard, 1989) all have demonstrated the same countercyclical pattern between suicide and the business cycle. Though the magnitudes were different, suicides and unemployment demonstrated a positive relationship through each recessionary period.

In recent years, suicide has consistently been one of the top 10 causes of mortality in the United States (CDC). Increasing suicide incidence has come to the forefront as an international health priority. With the most recent high-profile suicide cases (Robin Williams, Kate Spade and Anthony Bourdain)[2], black adolescent suicide rate increases and increases amongst white middle-aged men, greater attention is being given to the phenomenon. National suicide rates were previously in decline from 1986-1998 and have since been in steady incline from 1999-2016 (NCHS). According to the National Institute of Mental Health, 44,965 people died by suicide in the United States in the year 2016, more than doubling the homicide incidence of 19,362 in that same year (NIMH). Also, in the year 2016, suicide rates increased in every state with the exception of Nevada. These increases in suicide rates in America are sparking a larger debate on the origin of suicide ideation and possible preventive measures.

1.2 Intersectionalities and Differences in Suicide Ideation

What can be considered an epidemic by magnitude, has a disproportionate effect on different demographics within society, namely gender and ethnicity. With regard to gender in particular, it has been noted that failure to control for gender differences or combining males and

[2] "High-Profile Celebrity Suicides Leave Media Examining Coverage." *CBS News*, CBS Interactive, 13 June 2018, www.cbsnews.com/news/kate-spade-anthony-bourdain-suicide-media-examines-reporting/.

females in the same model could produce results that are misleading (Kposowa, 2000). Although African Americans have a lower suicide rate than other ethnic groups, gender differences within the African American race are similar to those of other ethnicities with higher completed suicide rates (Willis et al., 2002). Gender differences in suicide have been attributed to differences in causal and preventive factors. In western societies, differences in suicide rates have been attributed to socially constructed ideas of masculinity and femininity (Payne et al., 2008). For men, these include conceptions of masculinity, social isolation and poor mental health treatment (Appleby, 2000). The degradation of "hegemonic masculinity"[3] has left some men exhibiting masculine norms in other ways, such as violence which increases the risk for suicide ideation (Genuchi, 2018). Female causes tend to be more rooted in psychosocial disorders, and preventive factors include changes in gender roles and the presence of young children (Möller-Leimkühler, 2003; Hawton, 2000). Previous studies have shown that in most industrialized Western countries, males have a higher rate of completed suicides whereas females have a higher rate of attempted suicides (Lester, 1992; Canetto and Sakinofsky, 1998; Spicer and Miller, 2000; Möller-Leimkühler, 2002). This phenomenon is what is known as the "gender paradox in suicide" and is one of the leading topics in explaining the causal differences between male and female suicide rates. Many studies have concluded that suicide ideation in males and females differs in the method of deliberate self-harm. Males tend to choose a more violent means of self-harm, which reflects a greater suicidal intent (e.g. use of firearms, jumping, hanging, etc.). Females are most likely to convey some sort of distress or to modify the behavior of others (Hawton, 2000), and therefore choose methods that are less intrusive (e.g. poisoning, cutting, etc.).

Ethnic differences in suicide ideation are particularly apparent when comparing African and European Americans. Differences in how each racial cohort perceives suicide is based upon differences in cultural factors. For example, kinship and the prevalence of the extended family structure amongst most African American communities (especially in the south), has been cited as being one of the biggest protective barriers against adverse situations (i.e. economic, emotional and social hardship) (Gibbs,1997; Willis et al.,2003). Social isolation has been identified as being the greatest causal factor amongst African Americans (Stack,2000; Willis et

[3] Hegemonic Masculinity is defined as "The mythology of gender dominant within cultural representations of males, reflecting normative behavioral ideals for males in a culture in a particular period (regardless of the actual prevalence of such behavior in that society)." Oxford Reference

al.,2003). Also, amongst African Americans, a strong family unit and religiosity are imperative to maintaining social support and mental health (Compton et al, 2005). Recurrent work on the study of ethnicity and suicide between African and European Americans finds that despite being systematically disenfranchised, African Americans have the lowest suicide rate of any ethnicity in the United States (Gibbs,1997). The paradoxical nature of a low suicide rate despite a greater level of disadvantage has been credited to the social and cultural differences in how Afro-Americans respond to frustration (Henry and Short,1954). African Americans are more likely to blame others in the face of frustration as a result of systematic oppression. Euro-Americans cannot blame society for their frustration in general, so they tend to turn the blame inward (Stack, 2000).

This paper will attempt to demonstrate a link between movements in the unemployment rate over The Great Recession and changes in suicide rates for males and females by ethnicity. Using Ruhm (2000) as a basis for methodological comparison, this paper will contribute to the examination of suicide mortality by considering differences in subgroup suicide rates.

2. Data and Methodology

In the analysis of suicides over the business cycle, it is important to note that the motivations of an individual to die by suicide are not solely attributable to movements in economic indicators. Therefore, further examinations of the business cycle and corresponding fluctuations in socioeconomic indicators is required to fully undertake prevention efforts[4]. Albeit this paper does attempt to describe a framework for the association between unemployment and suicide.

A fixed effects model was used in effort to remove variation in suicide rates that arise due to time-invariant differences between states (this could include regional variations in suicide rates). There are also temporal trends that are accounted for using time fixed effects in the model. Time fixed effects were included to ensure that changes in economic activity due to exogenous determinants do not impede the model results (this could include times during and after war, in

[4] With regard to the initial psychological state of an individual who is driven to suicide due to changing financial or social circumstances.

which suicides related to post traumatic stress disorder are increased (Jukupcak et al., 2009) or from increased stress levels experienced by certain cohorts during and after increased police violence against that cohort (Aymer, 2016).

2.1 Data

This paper will be examining the demographic differences as they relate to suicide rates by state in the United States. The data used for this project was retrieved from several sources. The individual mortality data was retrieved from the National Center for Health Statistics at the Center for Disease Control[5]. This data comes from the compressed mortality files on non-public use mortality for the years 2005-2012 and has been aggregated to the state level.

The suicide rate is the total number of suicides[6] for each race and gender group divided by the subgroup population. Race/Ethnicity categories are White (non-Hispanic) and Black (non-Hispanic). Educational attainment is broken into four categories: less than high school, high school, some college and bachelor's plus for the demographic population 25 years and above. The unemployment rate is calculated as the number of workers that are unemployed in each state, over the labor force 16-64 years old. This data was retrieved from the Current Population Survey (CPS) at the Census Bureau. Gross state product was included as a region control.

2.2 Model

The regression equation is a fixed effects panel model. Subscript *i* indicates the state, *t* indicates the year and the superscript *j* indexes the subgroups. The regression equation is as follows:

$$S_{it}{}^{j} = \alpha_t + X_{it}{}^{j}\beta + Unemp_{it}{}^{j}\delta + St_i + \epsilon_{it}$$

where *S* is the natural log of the suicide rate, *X* is a vector of supplemental regressors, *Unemp* is the calculated unemployment rate for the noninstitutionalized civilian population 16 – 64, and ϵ

[5] National Center for Health Statistics Compresses Mortality File (1968-2015), as complied from data provided by the 57 vital statistics through the Vital Statistics Cooperative Program.

[6] One consideration that must be made when analyzing suicide statistics is the issue of misreporting. The difficulty in determining whether a death is intentional or accidental, requires a statement of intent (suicide note) or medical/police investigation. Even though these efforts do generally take place, misreporting can occur (systematically or otherwise). Controlling for differences in death certification allows for the impact of socioeconomic variables to remain consistent (Pescosolido and Mendelsohn, 1986).

is the error term. *St* describes the fixed effect and controls for the time invariant properties of each state and α controls for the year differences nationally.

2.3 Descriptive Statistics

Table 1 provides summary statistics for the variables used in each regression. The suicide rate averages over the period 2005-2012, demonstrate the overwhelming dominance of the statistic by men of each ethnicity with white males having the highest. Noteworthy is the average unemployment rate of black and whites. Blacks have the highest unemployment rate between the two ethnicities and black males have the highest unemployment of any cohort. Figure 1[7]. displays the average suicide rate vs the average unemployment rate over the period for each subgroup. Period analysis demonstrates that black males show a procyclical pattern up until the recession and then exhibit a countercyclical pattern. The averages for black females display a countercyclical pattern throughout each year of analysis. Also, unemployment rates are higher over the period than the suicide rates. White males demonstrate a procyclical pattern over the period and white females show a countercyclical pattern with suicide rates being higher than the unemployment rates in each year, this despite having a lower unemployment rate than blacks.

These comparisons indicate that the negative effects of economic downturns (proxied by the unemployment rate), in large part, affects only white males as it relates to suicide mortality.

3. Results

Unemployment and period effects are analyzed and shown in Table 2[8]. The regression results for the combined cohort of blacks and whites and males and females are given along with the results for each subgroup. The regressand is the natural log of the suicide rate and the business cycle indicator (unemployment) was constructed as a percent.

[7] The figure has been normalized to a common y axis on both indicators.

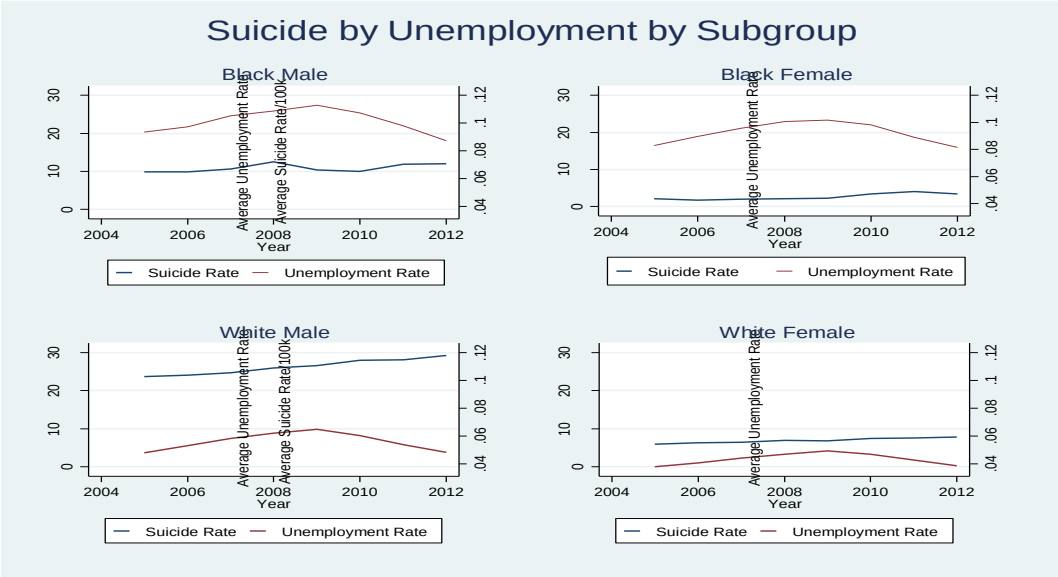
[8] Results are shown for unemployment and period interactions for each regression. All other regressor results have been suppressed.

TABLE 1

TABLE OF REGRESSORS FOR AGGREGATED STATE DATA

Descriptive Statistics (2005 – 2012)		
VARIABLES	Mean	Standard Deviation
Suicide:*		
Black Male	10.89	7.898
Black Female	2.560	4.110
White Male	26.33	6.796
White Female	6.878	2.411
Black/White Male/Female	15.21	4.486
Unemployment:		
Black Male	10.13	2.600
Black Female	9.245	2.501
White Male	5.602	1.330
White Female	4.339	0.946
Black/White Male/Female	5.590	1.366
Education:		
Black Male:		
Less Than High School	0.168	0.0497
High School	0.326	0.0556
Some College	0.323	0.0590
Bachelors Plus	0.182	0.0543
Black Female:		
Less Than High School	0.163	0.0496
High School	0.274	0.0573
Some College	0.353	0.0548
Bachelors Plus	0.210	0.0534
White Male:		
Less Than High School	0.0965	0.0338
High School	0.295	0.0489
Some College	0.294	0.0422
Bachelors Plus	0.314	0.0626
White Female:		
Less Than High School	0.0860	0.0303
High School	0.291	0.0459
Some College	0.318	0.0429
Bachelors Plus	0.305	0.0596
Black/White Male/Female:		
Less Than High School	0.0994	0.0362
High School	0.296	0.0453
Some College	0.309	0.0406
Bachelors Plus	0.295	0.0579
Gross state Product	1.157e+06	1.398e+06
N = 400		

FIGURE 1



3.1 Analysis and Comparison of the Group Combinations

In his analysis of the overall impact of state unemployment on the suicide rate across all races and genders, Ruhm (2000) demonstrated a positive relationship between unemployment and suicide mortality. He determined that a one percentage point increase in the unemployment rate yielded a 1.27 percent increase in the suicide rate. The findings of this paper's regression is similar in that a one percentage point increase in the unemployment rate increases the suicide rate by 2.16 percent. The positive result is as expected, and the increased magnitude could indicate an increased sensitivity of suicide mortality to changes in unemployment in the more recent time frame.

3.2 Analysis and Comparison of the Subgroups

Cohort analysis demonstrates that analyzing the impact of business cycle fluctuations on suicide mortality requires intersection comparison. Black male unemployment is negatively related to the suicide rate (but insignificant). This result is important because it highlights that suicide mortality for black males is impervious to fluctuations in the unemployment rate. And despite having the highest unemployment rate of all cohorts, ceteris paribus, unemployment has an insignificant impact on the suicide mortality of black males. Black females demonstrate a

TABLE 2

FIXED – EFFECT REGRESSION COEFFICIENTS (SUPPRESSED)

	(1) All Population	(2) Black Male	(3) Black Female	(4) White Male	(5) White Female
Unemployment Rate:					
White/Black Male/Female	0.0216**				
	(0.00859)				
Black Male		-0.0353			
		(0.0405)			
Black Female			0.00498		
			(0.0348)		
White Male				0.0167*	
				(0.00851)	
White Female					0.0235
					(0.0200)
Period:					
Reference: (Recessionary: 2008-2009)					
Period 1 (Expansion 1: 2005-2007)	-0.0535	-0.989**	-0.372	-0.0767	-0.0733
	(0.0446)	(0.416)	(0.327)	(0.0533)	(0.0883)
Period 3 (Expansion 2: 2010-2012)	0.176***	0.0550	0.918***	0.162***	0.272***
	(0.0436)	(0.386)	(0.331)	(0.0510)	(0.0860)
Unemployment by Period:					
Reference: (Recessionary: 2008-2009)					
White/Black Male/Female:					
Period 1 (Expansion 1: 2005-2007)	0.00246				
	(0.00713)				
Period 3 (Expansion 2: 2010-2012)	-0.0182***				
	(0.00667)				
Black Male:					
Period 1 (Expansion 1: 2005-2007)		0.0773**			
		(0.0384)			
Period 3 (Expansion 2: 2010-2012)		-0.00651			
		(0.0354)			
Black Female:					
Period 1 (Expansion 1: 2005-2007)			0.0269		
			(0.0324)		
Period 3 (Expansion 2: 2010-2012)			-0.0708**		
			(0.0329)		
White Male:					
Period 1 (Expansion 1: 2005-2007)				0.00321	
				(0.00802)	
Period 3 (Expansion 2: 2010-2012)				-0.0156**	
				(0.00769)	
White Female:					
Period 1 (Expansion 1: 2005-2007)					0.0116
					(0.0185)
Period 3 (Expansion 2: 2010-2012)					-0.0421**
					(0.0171)
Constant	0.415	1.720	2.360	1.281	0.847
	(0.873)	(2.254)	(1.718)	(0.903)	(1.362)
Observations	400	400	400	400	400
State and Year FE	YES	YES	YES	YES	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

similar result, but positive and insignificant. Analysis of the white male results indicate that all else constant, a one percentage point increase in the unemployment rate increases the suicide rate by 1.67 percent, significant to the 10% level. White females also demonstrate a positive but insignificant association. Considering these results in combination indicates that the prior all group analysis was driven largely by white males.

3.3 Analysis and Comparison of the Subgroup Period Effect of Unemployment

Period analysis of the group combination indicates that the effect of unemployment during the recessionary period increased insignificantly from expansion 1, but a significant decrease can be seen in expansion 2 over the recessionary period. This is consistent with theory in that suicide mortality is attenuated during economic expansions.

When considering the subgroup populations, the unemployment rate had a larger effect on suicide mortality in expansion 1 where a more positive effect was demonstrated for all subgroups but significant only for black males. This result indicates that the recessionary period had an attenuating effect on the impact of unemployment on the suicide rate. In expansion 2, all subgroups yielded a negative association between unemployment and the suicide rate with significance in every group with the exception of black males. The initial fall in the impact of unemployment on suicide from expansion 1 to the recessionary period is likely to be the culprit.

4. Discussion and Future Analysis

The findings of this paper indicate that the all cohort analysis of the impact of the unemployment rate on suicide mortality is driven mostly by the impact to white males. Previous research has sought to understand the elements that impact increased mortality of whites. Case and Deaton (2015) suggest that rising mortality amongst white non-Hispanic men and women between 1999-2013 were primarily due to suicide, drug overdose and chronic liver disease. They posit that the increase in overall mortality has been caused by an increase in the risk factor of "despair". This caused by decreased mobility of whites without college degrees which has manifested itself into increased chronic pain which in turn leads to increased morbidity, substance abuse and suicide. In a follow-up piece, Case and Deaton (2017) extends the work of isolating the factors that are causing increased morbidity and mortality amongst middle-aged

white Americans. They determine that “cumulative disadvantage” over life in socioeconomic variables such as marriage, labor market, child outcomes and health, is the result of worsening labor market opportunities for uneducated whites. This increase in white suicide mortality, especially over business cycles, could also be explained by a theory developed by Khaneman and Tversky (1979) which theorizes that increased loss aversion can essentially make losses hurt more than gains feel good. The idea is that increased unemployment amongst white males is more detrimental than increased unemployment for black males, simply because it’s a “larger fall”, especially for uneducated white males who have seen larger fluctuations in unemployment due to increasing globalization and decreased labor mobility.

On the other hand, resilience is also a factor in suicide mortality. African Americans have the lowest suicide rate of any ethnic cohort and one of the highest rates of unemployment. The paradoxical nature of this relationship points to the protective factors that have largely been attributed to the cultural resilience amongst African Americans; a coping mechanism born of systematic oppression. The pillars of cultural resilience are close family relationships, supportive social networks and spiritual based coping. (Gibbs, 1997). Also, important to note is the time period in which black male suicide is procyclical with the business cycle. As previously mentioned, in the first period, from 2005-2007, black male suicide mortality was indeed procyclical until 2008, the year the recession began. Another important event happened during this period which can reasonably be portrayed as an uplifting event for most African Americans, the election of the first black president Barack Obama. This event in itself offered a new hope to a marginalized subgroup of the population, which arguably could have an attenuating effect of economic downturns on black suicide mortality.

Future analysis will test the resilience theory by analyzing within subgroups of different regions. If resilience is a factor in the paradox of black suicide mortality, those individuals within a more oppressed area should have a larger barrier created by cultural resilience. The inclusion of historical data on lynchings and slave state populations is being analyzed. Also, future analysis will consider socioeconomic variables that contribute to the decision to die by suicide. Exploration of a broader range of intersections is warranted by including variables such as marital status, education level, income inequality and age.

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