Socioeconomic Determinants of Veteran Homelessness

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I. INTRODUCTION

For many, veterans are those individuals who have selflessly sacrificed for the freedom and benefit of our country. While many may agree, a more official definition by Title 38 of the Code of Federal Regulations defines a veteran as "a person who served in the active military, naval, or air service and who was discharged or released under conditions other than dishonorable."

Moreover, homelessness is defined as the state of not having a permanent dwelling, or by which one is living in an area designated as an emergency shelter, an area not meant for human habitation, or transitional housing. Homelessness may be an indicator for the overall economic health of society, often being tied to socioeconomic variables such as poverty levels, unemployment rates, income inequality, and/or substance abuse. Research shows that homelessness increases in times of financial crises, as illustrated in the article "Number of Homeless Families Climbing Due to Recession," from the Center on Budget and Policy Priorities. Approximately 11% of the adult homeless population are veterans, according to the National Coalition for Homeless Veterans (NCHV). This is interesting to note, as data from the U.S. Census Bureau illustrates that only 6% of the United States population is made up of veterans. The NCHV details America's homeless veterans as having served in World War II, the Korean War, Cold War, Vietnam War, Grenada, Panama, Lebanon, Persian Gulf War, Afghanistan and Iraq (OEF/OIF), and the military's anti-drug cultivation efforts in South America. As stated by the NCHV, "Nearly half of homeless veterans served during the Vietnam era. Two-thirds served our country for at least three years, and one-third were stationed in a war zone."

With this in mind, this study will delve into several socioeconomic factors and how they correlate with the differences in the percentages of homeless veterans between states in the United States.

II. SAMPLE

There are forty-nine observations in my sample, each corresponding to the fifty states of the United States of America, excluding Hawaii. Hawaii was found to be an outlier, and was thus excluded. The years that correspond with the time the data were recorded is between the years of 2015-2017 and is explained explicitly for each variable below.

III. DEPENDENT VARIABLE

Veteran Homelessness rate: *(Vet_HR)*

The dependent variable for this study is the percentage of homeless veterans, including both sheltered and unsheltered, amongst states. This is calculated by taking the number of homeless veterans and dividing it by the state's veteran population. The data for this variable is obtained from 2016 Point in time (PIT) Estimate of Homeless Veterans by state from the U.S. Department of Housing and Urban Development (HUD).

IV. INDEPENDENT VARIABLES[1]

Unemployment Rate of Veterans by State: *(Vet_UR)*

To understand the differences in veteran homelessness amongst states, this study will be utilizing the unemployment rate of veterans (18 years and over), by state, from 2016 annual averages by the Bureau of Labor Statistics from the United States Department of Labor.

Unemployment rate reflects the health of the economy to a certain degree. With higher levels of unemployment, it is expected that consumer consumption decreases while prolonged

[1] Other variables considered but ultimately left out of this study were *Gini Index of Income Inequality, Religious Affiliation Rate of Veterans by State, and Estimated Expenditures for Public Schools 2015-2016.* The data associated with these variables were not properly representative and/or accurate for the sample.

unemployment may impact an erosion of useful talents or skills. More so, prolonged unemployment leads toward lower overall income and the lack of ability to pay for an education or training required to re-enter the workforce. This only exacerbates the difficulties of affording a home or shelter, which segues into higher homelessness rates.

VA Expenditures: *(VA_Expend.)*

Veterans' benefits refer to a wide range of remunerations, including monthly life insurance, disability checks, health care, home loans, and education through the GI bill, among others. Total 2016 state level Veterans Affairs (VA) expenditures will be included in this study, and have been collected by the National Center for Veterans Analysis and Statistics, Department of Veterans Affairs. The expenditures for each state will be divided by the number of veterans in that state to account for differences in state's size.

Studies show that higher awareness of a particular, negative issue, helps to reduce its presence. While there are many programs and charities aimed toward helping veterans, whether it be with physical and mental issues or economic difficulties, there is not any single organization that is as inclusive to aiding all types of veterans in some way as government expenditures are. For instance, the Wounded Warrior Project is an organization that provides free programs and services to address the mental and physical health needs of wounded warriors, along with career and benefits counseling. However, the project only serves "veterans and service members who incurred a physical or mental injury, illness, or wound, co-incident to their military service on or after September 11, 2001 and their families." Thus, including per state data from this organization would not be representative of the total care given to all veterans, specifically those who served before September 11, 2001. Hence, in this study, awareness is reflected in the ratio between total VA expenditures for a specific state, and that state's veteran population. The data includes total expenditure by each state, breaking each figure down between allocation towards compensation

and pension, construction, education and vocational employment, loan guaranty, general operating expenses, insurance, medical care, and unique patients. Thus, this variable helps to study the relationship between states that spend more towards veterans' benefits and its related homelessness levels. It is hence theorized that, the higher the expenditures, the lower the rate of homelessness within that state.

Percent of Veteran Households with Children, per State: *(Vet_Child)*

This data was collected by the National Center for Veterans Analysis and Statistics from the U.S. Department of Veterans Affairs and details the 2017 percentage of veteran households that have children in each state.

It is postulated that the states with the higher children in households' percentages, would be less likely to have higher veterans' homelessness rates. This is based off the research detailed in an October 2015 article by the Scientific American Mind, which reveals that parents' minds are neurologically altered once they have children. The article says that areas such as the hypothalamus, thalamus, and prefrontal cortex are altered in ways that: increase the production of attachment hormones, such as dopamine and oxytocin; enhances perception of baby's needs, and upgrades a parent's perception of what a baby's behavior and primitive language is trying to tell them. Hence, this variable can be said to be a motivator for individuals to not only care for themselves, but for their offspring, which reduces their chances of becoming homeless, due to the added responsibility and socio-biological change.

Veteran Suicide Rate by State: *(Vet_SuicideR)*

This data was collected from the Department of Veterans Affairs, from a report released in 2016 on the rate of veteran suicides in each state. It is used as a proxy for substance abuse and mental illness, which are closely correlated to suicide rates. Based upon information form the

National Coalition for Homeless Veterans, the majority of homeless veterans, “are single; live in urban areas; and suffer from mental illness, alcohol and/or substance abuse, or co-occurring disorders.” Thus, I hypothesize that as veteran suicide rates increase, so too would their homelessness rates.

Overall State Unemployment Rate: *(State_UR)*

The overall unemployment rate for a given state may influence the ability of a veteran to find work. Therefore, this study uses data collected from the Bureau of Labor Statistics from the United States Department of Labor for the year 2016. The unemployment rate is reflective of each states’ unemployment rate for the civilian noninstitutional population (16 years and over). As with the veteran unemployment rate, I predict that higher levels of state unemployment will correlate with higher homelessness rates, as the more difficult it is to be employed, the more difficult it is to have a home, or place of reliable, permanent shelter.

State Real GDP per Capita: *(RGDP_PerC)*

This study utilizes data collected from the United States Bureau of Economic Analysis for the year 2016 and represents each state’s per capita real GDP (in chained 2009 dollars). As FocusEconomics, a leading provider of economic analysis and forecasts states, “GDP per capita is an important indicator of economic performance and a useful unit to make cross-county comparisons of average living standards and economic wellbeing." Henceforth, I surmise that as the real GDP per capita of each state increases, homelessness rates of veterans would decrease, as higher standards of living, as represented by the GDP per capita, would indicate a lower chance of homelessness rates in that state.

V. SUMMARY STATISTICS AND CORRELATION MATRIX

	Vet_HR	*Vet_UR*	*Vet_SuicideR*	*VA_Expend*	*Vet_Child*	*State_UR*	*RGDP_PerC*
Mean	0.1669	4.07	41.81	802.52	30.7	4.68	48519.5
Standard Error	0.0126	0.158	1.54	18.36	0.436	0.139	1266.5
Median	0.1427	4	39.2	806.86	30.878	4.8	47633
Mode	#N/A	3.57	37.8	#N/A	#N/A	4.8	#N/A
Standard Deviation	0.0887	1.104	10.77	128.5	3.052	0.9696	8865.2
Sample Variance	0.0079	1.218	116.02	16522.5	9.31	0.9401	78592626.01
Kurtosis	5.27	-0.143	-0.328	2.44	-0.05	-0.468	-0.778
Skewness	2.052	-0.024	0.265	0.817	0.4595	0.0396	0.33
Range	0.457	5.039	47	685.24	13.64	4	33179
Minimum	0.0659	1.59	21.6	588.6	25.3	2.9	32102
Maximum	0.523	6.63	68.6	1273.88	38.94	6.9	65281
Sum	8.18	199.4	2048.6	39323.3	1506.5	229.2	2377455
Count	49	49	49	49	49	49	49

Variable Definitions:

Vet_HR: Percent Veteran Homelessness Rate:
(#Homeless veterans/ State veteran population)*100

Vet_UR: Percent Veteran Unemployment Rate

Vet_SuicideR: Percent Veteran Suicide Rates by state

VA_Expend: VA Expenditures per 100 veterans per state.

Vet_Child: Percent Veteran households with children:
(Veteran households with children/State veteran population)*100

State_UR: Percent State Unemployment Rate

RGDP_PerC: Real GDP per Capita by State

Correlation Matrix:

	Vet_HR	*Vet_UR*	*Vet_SuicideR*	*Vet_Child*	*VA_Expend*	*State_UR*	*RGDP_PerC*
Vet_HR	1						
Vet_UR	0.101	1					
Vet_SuicideR	0.228	-0.252	1				
Vet_Child	-0.196	-0.051	-0.006	1			
VA_Expend	0.038	0.089	0.335	0.327	1		
State_UR	0.042	0.254	-0.015	-0.026	0.293	1	
RGDP_PerC	0.245	0.09	-0.408	-0.089	-0.389	-0.111	1

The correlation matrix shows that each of the variables generally have a low correlation with one another. Several variables show a slight, but not significant, negative correlation with one another, like the veteran unemployment rate and veteran suicide rate. Overall, the matrix shows low correlation values between the variables.

VI. REGRESSION AND RESULTS

I decided to run three models, with three independent variables, instead of one with six independent variables, to directly see the influence different independent variables would have in each scenario, if any. In all three models Veteran Suicide Rate is held constant.

Model 1:

Model one includes the independent variables: Veteran Unemployment Rate, Veteran Suicide Rate, and VA Expenditures. It excludes the variables: Percent of Veteran Households with Children, per state, Overall State Unemployment Rate, and State Real GDP per Capita.

Regression Statistics	
Multiple R	0.29
R Square	0.084
Adjusted R Square	0.023
Standard Error	0.088
Observations	49

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.032	0.010609	1.381	0.261
Residual	45	0.35	0.007681		
Total	48	0.38			

	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*
Intercept	0.047	0.097	0.486	**0.629**	-0.148	0.24
Vet_UR	0.0148	0.0121	1.226	**0.226**	-0.0095	0.039
Vet_SuicideR	0.00248	0.0013	1.897	**0.064**	-0.00015	0.00511
VA_Expend	-5.5E-05	0.0001	-0.516	**0.609**	-0.00027	0.00016

RESULTS:

Unemployment Rate of Veterans by State

With a p-value of 0.226, which is greater than 0.05 and .1, the null hypothesis that there is no linear relationship between veteran unemployment rate and the veteran homelessness rate cannot be rejected. Thus, this variable can be considered not statistically significant.

Veteran Suicide Rate by State

At the 90% confidence level, the null hypothesis that there is no linear relationship between veteran suicide rate by state and veteran homelessness can be rejected, as the p-value is 0.064, which is less than 0.1. Thus, this variable can be considered statistically significant. The coefficient is 0.00248, therefore a one percentage point increase in the suicide rate is associated with an increase in the homelessness rate by about 0.0025. This supports the initial hypothesis that an increase in suicide rates will correlate with an increase in veteran homelessness rates. This may be due to the fact that the suicide rate amongst veterans acts as a proxy for mental illness and/or substance abuse, which are two leading causes of homelessness amongst veterans, according to the National Coalition for Homeless Veterans.

VA Expenditures

This variable can also be considered not statistically significant. With a p-value of 0.609, which is much greater than 0.05 or 0.1, the null hypothesis that there is no linear relationship between VA expenditures and the veteran homelessness rate cannot be rejected.

Model 2:

Model two includes the independent variables: Veteran Unemployment Rate, Veteran Suicide Rate, and Percent of Veteran Households with Children, per state. It excludes the variables: Overall State Unemployment Rate, State Real GDP per Capita, and VA Expenditures.[2]

Regression Statistics	
Multiple R	0.337
R Square	0.114
Adjusted R Square	0.0545
Standard Error	0.086
Observations	49

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.0429	0.014	1.92	0.1395
Residual	45	0.335	0.0074		
Total	48	0.377			

	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*
Intercept	0.1897	0.151	1.26	**0.215**	-0.114	0.493
Vet_UR	0.0128	0.0117	1.094	**0.28**	-0.0101	0.036
Vet_SuicideR	0.002198	0.00119	1.84	**0.072**	-0.000207	0.0046
Vet_Child	-0.00542	0.00408	-1.327	**0.191**	-0.014	0.00281

RESULTS:

Unemployment Rate of Veterans by State

With a p-value of 0.28, which is greater than 0.05, the null hypothesis that there is no linear relationship between veteran unemployment rate and the veteran homelessness rate cannot be rejected. Thus, this variable can be considered not statistically significant.

[2] Model 2 exhibits a slightly higher R^2 at .11 versus Model 1's R^2 of .08.

Veteran Suicide Rate by State

Just as in the first model, the variable of veteran suicide rate by state can be considered statistically significant at the 90% confidence level, as the p-value is 0.072, which is less than 0.1. Therefore, the null hypothesis that there is no linear relationship between veteran suicide rate by state and veteran homelessness can be rejected with 90% confidence. The coefficient is 0.002198, therefore a one percentage point increase in the suicide rate is associated with an increase in the homelessness rate by about 0.0022. This again supports the initial hypothesis that an increase in suicide rates will correlate with an increase in veteran homelessness rates. The U.S. Department of Veterans Affairs has a specific section known as the National Center for PTSD: Posttraumatic Stress Disorder, which is an ailment closely associated with increases in suicide rates. The National Center for PTSD states that, "Some people try to cope with their Posttraumatic Stress Disorder (PTSD) symptoms by drinking heavily, using drugs, or smoking too much."

Percent of veteran households with children, per state

This variable is also not significant at either the 90% or 95% confidence level. With a p-value of 0.191, which is greater than 0.1 or 0.05, the null hypothesis that there is no linear relationship between the percent of veteran households with children and the veteran homelessness rate cannot be rejected.

Model 3:

Model three includes the independent variables: Overall State Unemployment Rate, Veteran Suicide Rate, and State Real GDP per Capita. It excludes the variables: Veteran Unemployment Rate, Veteran Households with Children, per state, and VA Expenditures.

Regression Statistics	
Multiple R	0.44
R Square	0.198
Adjusted R Square	0.144
Standard Error	0.082
Observations	49

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.075	0.025	3.69	0.018
Residual	45	0.303	0.007		
Total	48	0.377			

	Coefficients	*Standard Error*	*t Stat*	***P-value***	*Lower 95%*	*Upper 95%*
Intercept	-0.21	0.12	-1.72	**0.093**	-0.47	0.037
State_UR	0.0086	0.012	0.699	**0.488**	-0.016	0.033
Vet_SuicideR	0.0033	0.0012	2.73	**0.009**	0.00086	0.0057
RGDP_PerC	4.19E-06	0.0000015	2.84	**0.0068**	1.21E-06	7.16E-06

RESULTS:

Overall State Unemployment Rate

This variable cannot be considered significant at either the 90% or 95% confidence level, as it's p-value of 0.488, which is greater than 0.1 or 0.05, means that the null hypothesis that there is no linear relationship between a state's overall unemployment rate and the veteran homelessness rate cannot be rejected.

Veteran Suicide Rate

At the 95% confidence level, the null hypothesis that there is no linear relationship between veteran suicide rate by state and veteran homelessness can be rejected, as the p-value is 0.009, which is less than 0.05. This variable can once again be considered statistically significant, but is unlike models one and two, where the veteran suicide rate was only statistically significant at the 90% confidence level. The coefficient is 0.0033, therefore a one percentage point increase in

the suicide rate is associated with an increase in the homelessness rate by about 0.003. This coincides, once more, with the initial hypothesis that an increase in suicide rates will correlate with an increase in veteran homelessness rates. This variable was used as a proxy for substance abuse, which is often a cause of homelessness for all people, not just veterans. As explained by the National Coalition for the Homeless, "Addictive disorders disrupt relationships with family and friends and often cause people to lose their jobs. For people who are already struggling to pay their bills, the onset or exacerbation of an addiction may cause them to lose their housing."

State Real GDP per Capita

With a p-value of 0.0068, which is less than .05, the null hypothesis that there is no linear relationship between state real GDP per capita and veteran homelessness can be rejected with 95% confidence. Unlike my initial hypothesis that as state real GDP per capita increases, veteran homelessness would decrease, the data shows otherwise. With a coefficient of 4.19E-06, a one percentage point increase in the real GDP per capita, per state, is associated with an increase in the homelessness rate by about 0.000004. The effect is miniscule and may be explained by external factors, such as how GDP does not take into effect income distribution, or policies that may influence economic standards of living and homelessness.

VII. CONCLUSION:

All models exhibit the independent variable: veteran suicide rates per state, as being statistically significant, with models one and two with 90% confidence, and model three at 95% confidence. This is not much of a surprise, as veteran suicide rates are highly correlated with people who suffer from mental illnesses such as PTSD. The National Center for PTSD states that "People with PTSD have more problems with drugs and alcohol both before and after getting PTSD." Seeing as this variable was used as a proxy for drug and alcohol abuse, it is significant to

point out that various research explains that drug and alcohol abuse is significantly higher amongst homeless people. According to the National Coalition for the Homeless, cities reported that one of the top items needed to combat homelessness (for the entire population, not just veterans), are additional substance abuse services. However, the report continued to point out that substance abuse is both a cause and a result of homelessness, and thus both issues need to be addressed concurrently.

Moreover, it is worth noting that the sample size of this study is relatively small, and that further research that includes a larger sample size spanning many years may influence certain independent variables' p-values when a regression is run. It would be interesting to delve into data from around the late 1980s that would include a different era of veterans in a time when data on substance abuse and mental illness were now being released. Unfortunately, after much investigation, it seems that much of the data around this time is on a national level, versus on a per state level. Regardless, this study may be further developed using data around the mid to late 1990s, after the first Gulf War from 1990-91. It is compelling to note that in the first two models, the Veteran Unemployment Rate, (Vet_UR), was almost statistically significant at the 75% and 80% confidence levels, while the Percent of veteran households with children, per state, (Vet_Child), was statistically significant at the 80% confidence level. While these findings have a great deal of variation not explained by these variables, with a larger sample, it would be intriguing to see what happens to these variables' p-values. The independent variables used in this study, whether or not they have been found to be statistically significant, are nonetheless important in analyzing the overall determinants of veteran homelessness, and the policies or programs that may be enacted or modified to affect these people.

More so, it is encouraging that recent reports from the U.S. Department of Housing and Urban Development (HUD), U.S. Department of Veterans Affairs (VA), and the U.S. Interagency

Council on Homelessness (USICH), show a significant decrease in homelessness amongst veterans, as “data revealed a 17 percent decrease in veteran homelessness between January 2015 and January 2016—quadruple the previous year's annual decline—and a 47 percent decrease since 2010.” Nevertheless, finding other determinants of veteran homelessness for future research is imperative to continue on this “positive” decent.

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Regards,

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