OBSERVATIONS AND ANALYSES OF POVERTY AND THE LABOR FORCE IN FLORIDA COUNTIES

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ABSTRACT

This paper has been drafted to explore employment, income, and poverty in Florida Counties under the scope of social determinants of health. We collect labor force data on all 67 counties and provide geographic representations as well as statistical analyses. We observe the relationships between labor force statistics and poverty rates among various age groups. Using ordinary least squares regressions with robust standard errors, we draw predictions from the data on how changes in labor force statistics and poverty relate to each other as well as to another immediately tangible metric-- home values. We make special consideration to identify and rationalize the presence of outliers. Finally, we demonstrate what our results would imply for the COVID-19 pandemic and the subsequent recession recovery.

1. INTRODUCTION

Economic factors, such as employment and poverty, have been established in the social sciences as determinants of health outcomes. In the development of health-maximizing public policy, it will be crucial to understand these elements, how they are dispersed, how they relate to one another, and what they imply outside of health policy. In this paper, we will discuss two important social determinants of health: the labor force and poverty. After providing a background on social determinants of health, we will begin by describing patterns across Florida counties. Then we will observe potential implications for these determinants outside of health: in the housing market. Finally, we will use our analyses to make inferences on the effect of the pandemic on Florida's economy.

2. SOCIAL DETERMINANTS OF HEALTH

Public health is sustained by people's ability to invest in their personal well-being. Therefore, one's health is related to their social-economic status which can be measured by two social determinants: poverty and labor participation. In a state of poverty, a person does not have the purchasing power to satisfy all the necessary personal needs. Without a sufficient amount of disposable income, people will be forced to make sacrifices to balance their consumption including health-related spending. As a direct source of income, employment determines a person's budget constraint. Subsequently, a population's labor participation reflects its body's overall socioeconomic status. By examining a given area's poverty and labor participation, we will be able to observe how the population maintains public health under its socioeconomic status.

3. DATA COLLECTION

POVERTY

The poverty rate is the percentage of individuals in a population who live below the designated poverty threshold. In this study, the poverty rate for the total population, individuals 18-64, and individuals 65 and older are collected for each county in Florida. The data concerning poverty rate is drawn from the 2019 American Community Survey, a yearly survey conducted by the United States Census Bureau. The survey aims to contact approximately 3.5 million housing

units. In 2019, people from 2,059,945 housing units participated in the survey's final interviews nationwide. In Florida, 196,343 units were initially selected and 109,343 partook in final interviews.

In the graph below, we plot the kernel densities for poverty rates among our 3 age groups. We see that the poverty rate of those 65 and older is less dispersed and more clustered around smaller values.
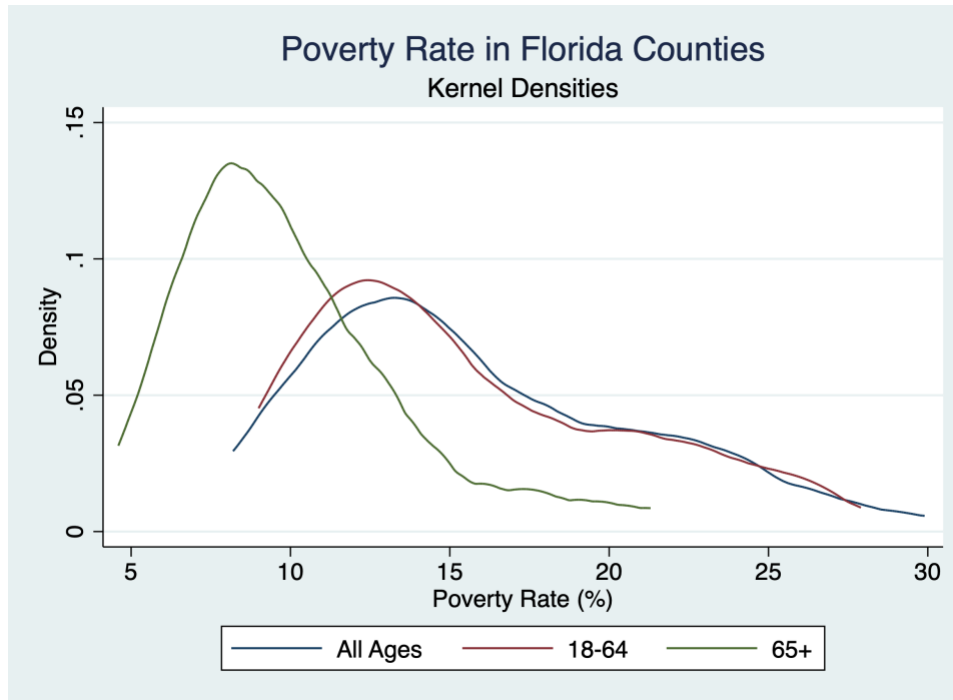
THE LABOR FORCE

In our analysis of the labor force in Florida, we collect data on 3 commonly used metrics: the unemployment rate (U-3), labor force participation rate, and employment-population ratio.

The unemployment rate represents the number of unemployed people as a percentage of the labor force. In this study, the unemployment rate for the total population is collected for each county in Florida. The data concerning unemployment rate made available through the Bureau of Labor Statistics. In 2019, there were a total of 164,170,718 people in the labor force nationwide. In Florida alone, there were 10,324,622 people in the labor force.

The labor force participation (LFP) rate refers to the portion of the US civilian non-institutionalized population aged 16 years and older that is either employed or actively seeking

employment. In this report, data regarding Florida's LFP rate is drawn from the 2019 American Community Survey (ACS) 5-Year Estimates conducted by the United States Census Bureau

The Employment-Population Ratio is defined as the ratio of total citizen employment to the citizen noninstitutional population aged 16 and older. This can also be more easily described as the portion of the work-eligible population that is employed. Primarily, it is utilized to measure job holdings as a way to track job creation growth. The data regarding the Employment-Population Ratio was taken from the 2019 ACS 5-Year Estimates from the Census Bureau.

The histograms below describe the distribution of these metric across the state of Florida in 2019. Descriptive statistics and further analysis will be featured at the end of this section.
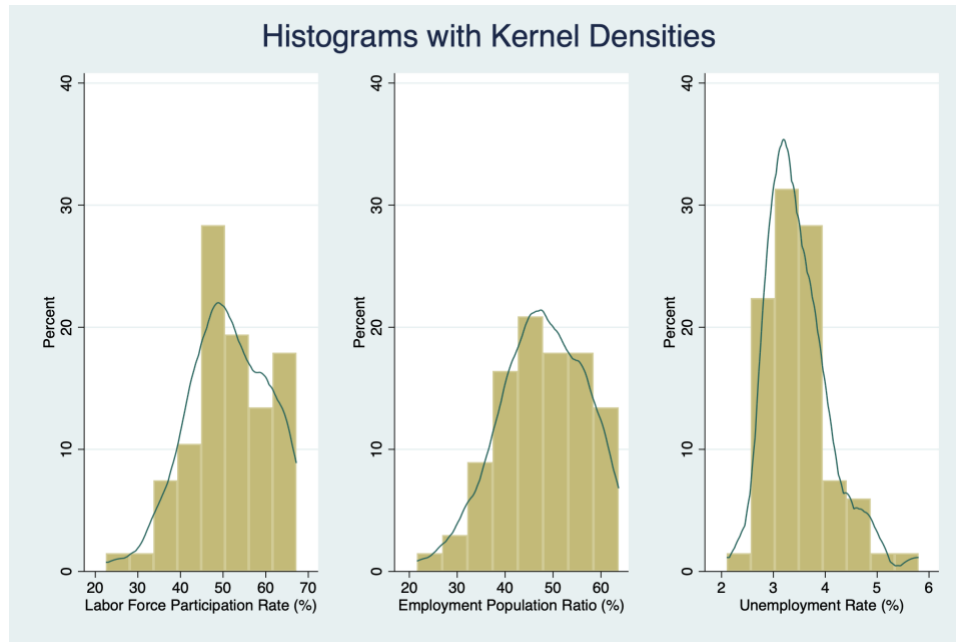
MEDIAN HOUSING VALUE

The median housing value is the price in the very middle of the data set, with exactly half of the houses priced for less and half priced for more. In this study, the median housing value was collected for each county in Florida. The data concerning median housing value was drawn from the 2019 American Community Survey 1-Year Estimates.

The histogram below shows the distribution of median home values across Florida counties. We see that the largest portion of counties (over 35%) have median home values around $100,000. There is also a long right tail which includes values approaching $500,000.

This distribution clearly demonstrates that there are large outliers with substantially higher home values than the rest of Florida. Further discussion of these outliers and the distribution of home values will be featured in next section.
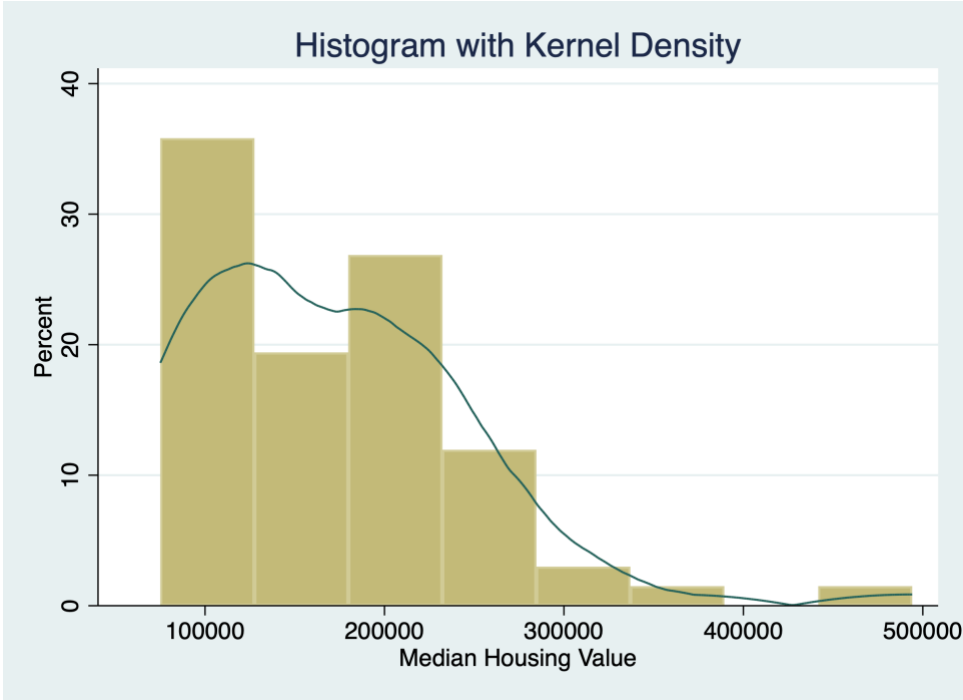
DESCRIPTIVE STATISTICS

In the table below, we present descriptive statistics for our 7 variables: poverty (3), labor force participation rate, employment-population ratio, unemployment rate, and median housing value.

	N	min	median	max	mean	sd
Poverty (All)	67	8.2	14.6	29.9	15.91493	5.119459
Poverty (18-64)	67	9	13.7	27.9	15.63284	4.92684
Poverty (65+)	67	4.6	9.2	21.3	10.05224	3.585381
Labor Force Participation Rate	67	22.5	51.1	67.2	51.25672	9.531943
Employment-Population Ratio	67	21.6	47	63.7	47.82985	8.999765
Unemployment Rate	67	2.1	3.4	5.8	3.480597	.6325127

|	N	min	median	max	mean	sd
Median Housing Value	67	75100	162100	494100	170685.1	78030.98
N	67					

4. ANALYSIS

GEOGRAPHIC ANALYSIS & RATIONALIZING OUTLIERS

In this section, we provide two modalities for representing data distribution: GIS mapping and boxplots. The boxplots for poverty in our 3 age groups is provided below.
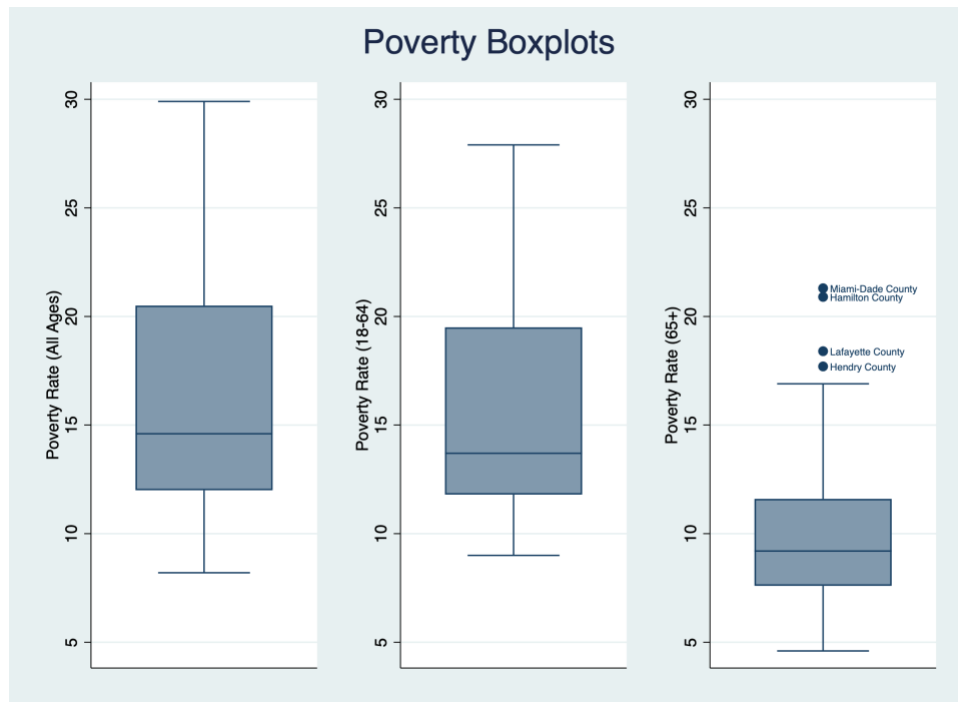
In most counties, the rate of poverty of individuals over 65 years of age was significantly less than the poverty rate for the total population and the poverty rate of those 18 to 64. The poverty rate for people over 65 is particularly high in Miami-Dade County, Hamilton County, Lafayette County, and Hendry County. Hamilton, Hendry, and Lafayette counties are small, rural counties, whereas Miami-Dade County is large and urban. Hamilton and Lafayette counties are both located in North Central Florida, while Hendry and Miami-Dade are found in the southern part of the state. The state average for poverty rate of all ages is higher than both poverty for the 18 to 64 and 65 and older age brackets, implying poverty among minors is particularly high.

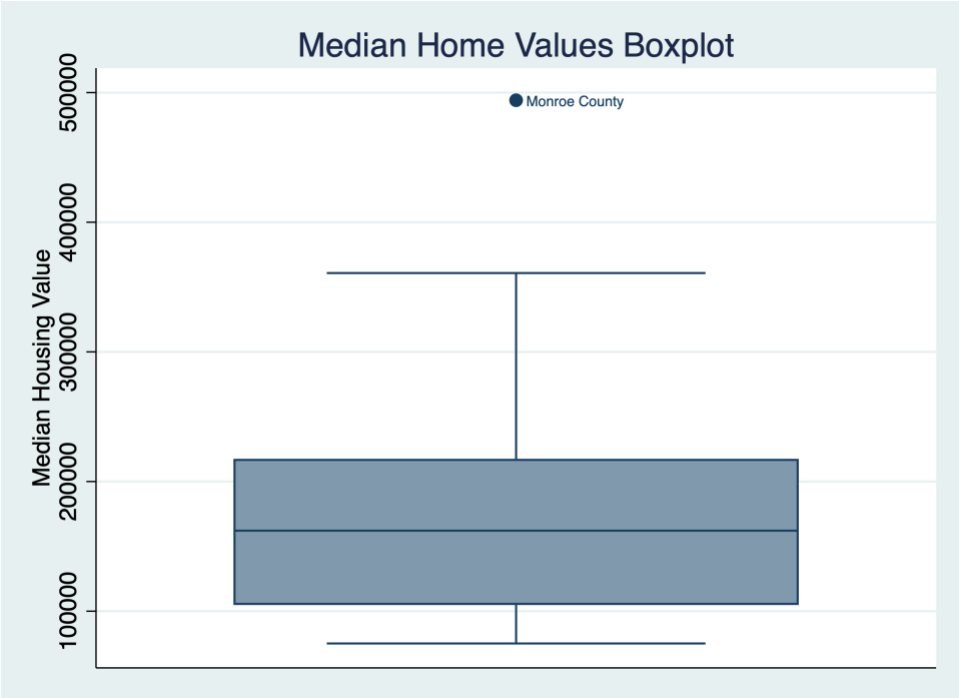The boxplots for our 3 labor force statistics are presented below.
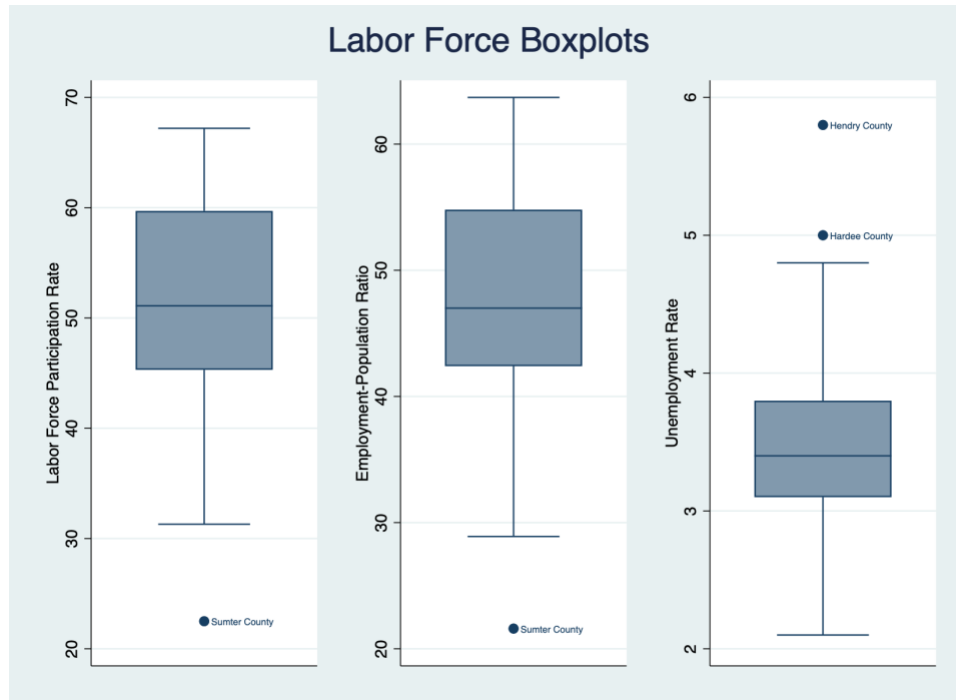
Across Florida's 67 counties, the average LFP rate is 51.25% with a median of 51.1% and a standard deviation of 9.5%. Sumter County has the State's lowest LFP rate at 22.5%, while Orange County has the State's highest at 67.2%. It's important to note that, as the LFP rate is composed of all citizens 16 year of age and older, areas with large numbers of retired citizens are likely to bear a comparatively lower LFP rate than areas with younger populations. This informs why Sumter County, the county with the oldest median age in not only Florida but the United States, has a strikingly low LFP rate of 22.5%. Conversely, more metropolitan areas, such as Orange, Broward, Miami-Dade, and Duval counties, are more likely to have higher LFP rates (60+%).

With a distribution from 21.6% to 63.7%, there is a massive distribution of the population without employment. The average EPR was found to be 47.9% with a range of 42.1%. Based on the location, the Employment-Population Ratio differed accordingly. When it came to population comparisons, the top five biggest counties in Florida, (Miami-Dade, Broward, Palm Beach, Hillsborough, and Orange County) held the largest Employment-Population ratios. The five counties with the lowest populations (Liberty, Lafayette, Franklin, Glades, and Jefferson County) displayed an opposite trend, with most ratios ranging in the 30s. Like for LFP, we see that

Sumter County is a large statistical outlier, as it maintains the largest retirement community in the world.

Based on the information on unemployment, we can the average unemployment rate among Florida counties hovers around 3.5%. Populated areas with the largest labor forces maintain unemployment rates of around 3% (such as: Broward County, Duval County, Hillsborough County, Miami-Dade County, Orange County, Palm Beach County). Less populated counties with relatively small labor forces (under 10,000 people) had the highest unemployment rate, averaging around 3.7%. Hendry and Hardee counties are both outliers with statistically high unemployment rates. Both are located in the rural Florida Heartland, whose economy is dominated by agriculture, including citrus. Over the past 15 years, Florida's citrus industry has been plagued by citrus greening, which has decreased the amount of citrus harvested over the past 15 years by 65% (Figart 2020). The rapidly deteriorating citrus industry may explain why Hendry and Hardee counties have the highest unemployment rates.

Lastly, the boxplot for median home values is presented below.

The average median housing value was $170,685 for all the counties located in Florida. Monroe County had an exceptionally high housing value with a median of $494,100, becoming an outlier in the data. Monroe County is located in south Florida and contains the prime real estate (with exceedingly high home values) of Key West. In addition, counties with high median housing values include St. Johns County, Palm Beach County, Collier County, Miami-Dade County. Most of these counties with high housing value are in the southern part of Florida and are located on the waterfront. Counties with very low median housing values include Liberty County, Glades County, and Dixie County; all of which are very rural counties with limited development.

<u>CORRELATIONS</u>

In this section, we seek to identify any possible relationships between any our variables. We present a scatterplot matrix and its corresponding correlation matrix below.

Scatterplot Matrix

	Poverty (All)	Poverty (18-64)	Poverty (65+)	Labor Force Participation Rate	Employment-Population Ratio	Unemployment Rate	Median Housing Value
Poverty (All)	1						
Poverty (18-64)	0.960***	1					
Poverty (65+)	0.652***	0.537***	1				
Labor Force Participation Rate	-0.307*	-0.396***	-0.134	1			
Employment-Population Ratio	-0.322**	-0.407***	-0.148	0.993***	1		
Unemployment Rate	0.387**	0.437***	0.184	-0.459***	-0.460***	1	
Median Housing Value	-0.658***	-0.667***	-0.351**	0.517***	0.548***	-0.506***	1
N	67	67	67	67	67	67	67

We see that nearly every variable combination has a statistically significant correlation. Poverty rates are positively associated with unemployment rates and negatively associated with LFP, EPR, and median home values. LFP is positively associated with median housing value, negatively associated with unemployment rates, and nearly 1 to 1 with EPR. EPR is negatively associated with unemployment and positively associated with median home values. Unemployment is negatively associated with median housing values.

REGRESSIONS

We now see if any of these relationships can help us to explain any of the distribution in the data. In this section, we present two sets of simple ordinary least squares (OLS) regressions. In total, we conduct 6 OLS regressions: 3 on median housing value using different poverty age groups and 1 additional regression for each poverty age group. The Breusch-Pagan/Cook-Weisburg Test shows clear signs of heteroskedasticity in most of our regressions. As a result, we present our regression results with robust standard errors.

Each regression follows the structure:

$$Y = \alpha + \sum_{i=1} \beta_i X_i + \varepsilon$$

VARIABLES	(1) Median Housing Value	(2) Median Housing Value	(3) Median Housing Value
Poverty (All)	-6,246*** (1,158)		
Poverty (18-64)		-6,189*** (1,226)	
Poverty (65+)			-4,522* (2,502)
Labor Force Participation Rate	2,876*** (543.9)	2,736*** (580.6)	3,582*** (538.4)
Unemployment Rate	-16,785** (6,752)	-17,440** (7,202)	-28,763*** (8,602)
Constant	175,384*** (45,255)	181,927*** (48,770)	125,856*** (44,060)
Observations	65	65	65
R-squared	0.640	0.618	0.526

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sumter and Monroe counties have been excluded from our home value regressions, as they are substantial outliers for labor force participation rate and median home values, respectively. From the table above, we find the poverty rates are negatively associated with home values such that counties with higher poverty face lower home values. Our coefficient for poverty rates in equation (3) is not statistically significant at the 95% confidence level and is lower than our result in equations (1) and (2), suggesting that elder poverty is not as clear a predictor of home values as poverty rates in younger age groups. Higher labor force participation is associated with higher home values, while higher unemployment rates are associated with

lower home values. The R^2 values are fairly high for panel data, explaining a significant portion of the noise in our data.

VARIABLES	(1) Poverty (All)	(2) Poverty (18-64)	(3) Poverty (65+)
Labor Force Participation Rate	-0.0883 (0.0845)	-0.128* (0.0704)	-0.0238 (0.0672)
Unemployment Rate	2.519** (0.977)	2.523*** (0.769)	0.876 (1.001)
Constant	11.67* (6.200)	13.40*** (4.972)	8.222 (5.995)
Observations	67	67	67
R-squared	0.171	0.240	0.037

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From the table above, we see that labor force participation has no statistically significant relationship with poverty rates at the 95% confidence level. The unemployment rate, however, is positively associated with poverty (not among the elderly). We see that for a one percentage point increase in the unemployment rate --holding labor force participation constant-- poverty rates increase by 2.5 percentage points. No factor (including the constant) is statistically significant for elder poverty. Since most of the people in this age group are not in the labor force and would thus not be counted toward unemployment anyway, it is fairly obvious that these factors should not predict poverty rates (in fact, the Ramsay RESET test for omitted variable bias rejected the null hypothesis in favor of the presence of omitted variable bias only in the regression on elderly poverty).

Margins plots for the 6 regressions can be found in the appendix.

5. DISCUSSION

In most Florida counties, the poverty rate for the population aged 65 and older is lower than the poverty rate for adults 18 to 64 and the total population. An interesting finding is that poverty rates were notably high in rural counties, particularly those in north Florida. We established in the analysis section that poverty is related to unemployment (at least for those 64 and younger). The recent COVID-19 pandemic has seen an unprecedented spike in unemployment. With this, we would expect a spike in poverty among those 64 and younger. Luckily, the stimulus and relief measures passed by Congress will likely dampen this otherwise drastic effect. As the economy recovers, we would expect to see poverty rates normalize over time.

In the context of the current economic crisis triggered by the COVID-19 pandemic, the LFP rate across Florida should expect a considerable decline for the years 2020 and 2021 as people exit the labor force. In particular, it is reasonable to assume that the LFP rate in coastal areas will decrease the most, as tourism-related employment comprises a significant portion of such areas' workforce.

The mean Employment-Population Ratio across the entire US is 59.2% according to the Bureau of Labor Statistics. It was startling to find that Florida's counties are well below this with a difference of 11.3%. In the context of COVID-19, these numbers would likely become skewed toward an even lower Employment-Population Ratio across different counties, as unemployment spikes and labor force participation drops.

With a spike in unemployment and poverty and a drop in labor force participation, our previous analysis would expect a noticeable drop in median home values. This is not what we have seen in the COVID-19 recession. Home values across the country have risen at rates not seen since before the Great Recession. This is born out of a classic supply-demand mismatch. When the pandemic hit, workers were kicked out of their offices and forced to work remotely. When an individual is not tied down to their current living situation by employment, they are free to move away from their workplace. Coupled with more free time to browse the housing market, demand has spiked. On the supply side, supply-chain difficulties have made housing construction more difficult (necessary resources are harder to find) and more costly.

6. CONCLUSION

In this paper, we have observed and analyzed poverty and the labor force in Florida counties. We have described and rationalized the distribution of data, giving special consideration to outliers. We also identified relationships among our variables using correlation matrices and OLS regressions. Finally, using our analysis, we described our expectations of the effects of the COVID-19 recession on poverty, the labor force, and the housing market. In the future, once the pandemic and its corresponding recession have passed, it will be important to return to verify the accuracy of these expectations.

7. REFERENCES

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US Census Bureau. (2019). *Florida Median Housing Values 2019: ACS 1-Year Estimates.* https://data.census.gov/cedsci/profile?g=0400000US12

8. APPENDIX

Median Housing Value Regression 1
Predictive Margins with 95% Confidence Intervals

Median Housing Value Regression 2
Predictive Margins with 95% Confidence Intervals

Median Housing Value Regression 3
Predictive Margins with 95% Confidence Intervals

Poverty Rate (65+) — Labor Force Participation Rate — Unemployment Rate

Poverty Regressions
Predictive Margins with 95% Confidence Intervals

Labor Force Participation Rate — Unemployment Rate