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Economic Freedom, Race, and Health Disparities: Evidence from US States

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Abstract

The social determinants of health include the communities in which people reside. Associated with geographic areas are public policies that influence a variety of economic and social outcomes. The group of public policies associated with economic freedom have been found to be positively related to a number of economic and social outcomes. In this paper, we investigate the impact of economic freedom on self-reported health and racial health disparities. We use propensity score matching to construct a control group of whites who can be compared to blacks in the 2011 BRFSS. After accounting for confounding variables and possible selection, we find evidence that economic freedom is associated with lower levels of self reported health for the population overall. After allowing for the effects of economic freedom to differ by race, we find that higher levels of economic freedom mitigate the observed gap in health status.

JEL Codes: I12; I18; J22; R5
Key Words: economic freedom, health disparities

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Introduction

Health disparities represent a major public health concern in the United States. Disparities can reflect the inability of groups to attain good health status because of race, age, geographic location, or other individual characteristics. A large body of research examines racial disparities in health outcomes such as life expectancy, self-rated health, and diabetes. The theoretical and empirical literature identified several pathways through which race might influence health status, nearly all of which are individual level pathways. We hypothesize that state economic freedom might be a macro pathway that helps to explain some of the unexplained variation in racial health inequities. Economic freedom has shown to be positively correlated with income, education, poverty reduction, and many other factors normally associated with disparities in health.

This paper contributes to the large literature documenting and analyzing economic explanations for racial health disparities (Do et al., 2008, 2012) and the growing literature focused on the impact of economic freedom on well-being (Gropper et al., 2011; Belasen and Hafer, 2012; Gehring, 2013). We analyze the relationship between economic freedom and self-reported health status for a large, representative sample of the population over the age of 18 in each U.S. state. In addition to the overall relationship between economic freedom and health status, we assess the extent to which economic freedom mitigates or exacerbates black-white health disparities. Our individual-level data comes from the 2011 Behavioral Risk Factor Surveillance System (BRFSS), which contains information on economic and demographic characteristics of individuals as well as health-related questions. We use propensity score matching (PSM) in order to better deal with confounding variables and possible selection issues influencing health status. This is the first paper in the health disparities literature to analyze the relationship between economic freedom and health outcomes.

We find that the higher the level of economic freedom in a state, the lower the self-reported health status of residents of that state. These results hold for our full sample as well as the PSM matched sub-sample. With respect to racial disparities in health status, we find that

the gap in self-reported health between whites and blacks narrows as a result of economic freedom, but only in the matched sub-sample. In addition to highlighting the importance of addressing unobserved heterogeneity and selection concerns when analyzing racial health disparities within the United States, these results support the findings of Compton et al. (2014) and Hoover et al. (2015) who show that economic freedom does not affect all groups within society similarly.

Racial Disparities in Health Status

Healthy People 2020, a long-term federal government program aimed at improving health in the US, defines a health disparity as a *particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage* (Centers for Disease Control, 2015). Health disparities, also called health inequalities, adversely affects groups people who experience greater obstacles in attaining good health based on such characteristics as age, sex, race/ethnicity, religion, income, education, and geographic location. Racial disparities in health status are well documented in the literature for a number of health outcomes, including: overall life expectancy (Olshansky et al., 2012); age- and cause-specific mortality rates (DeSantis et al., 2011; Siegel et al., 2014; Alexander et al., 2008; Trivedi et al., 2006); self-rated health (Cagney et al., 2005; Sudano and Baker, 2006; Beck et al., 2014); and chronic conditions such as asthma (Gold and Wright, 2005; Haselkorn et al., 2008) and diabetes (Peek et al., 2007).

Despite considerable reductions in mortality and morbidity, health inequalities are still a major public health concern because they remain widespread and persistent across the United States. Orsi et al. (2010) examined racial disparities in 15 health status indicators from 1990 to 2005 and found that disparities between non-Hispanic Black and non-Hispanic White populations existed for nearly all indicators and actually widened for 6 of the 15 indicators. They concluded that, despite many policy initiatives, little progress toward

meeting the *Healthy People 2010* goal of eliminating health disparities in the United States was made over this period. Indeed, eliminating health disparities remains one of the four overarching goals of *Healthy People 2020* (Centers for Disease Control, 2015).

A substantial literature now exists that not only documents the extent of health disparities but also considers why such disparities exist and persist in spite of policy initiatives to lessen or eliminate them. One conclusion to be drawn from this literature is that illuminating and disentangling the causes of the persistence in health disparities, including racial disparities, has been difficult. The primary explanation for racial disparities in health is the strong link between socioeconomic status (SES) and health. The idea is that there are well-documented and strong links between health and SES and well-documented differences in SES across racial/ethnic groups so it stands to reason that racial differences in SES should explain the racial disparities in health (Do et al., 2012).

One strand of the disparities literature focuses first on elucidating the mechanisms underlying the association between SES and health and then on using this link to explain observed racial health inequalities. Mulatu and Schooler (2002), Farmer and Ferraro (2005), and Beck et al. (2014), provide nice discussions of current thinking on the relationships between SES and health as well as race, SES and health. Blacks typically have lower education levels than whites, have higher unemployment rates, and are more likely to experience poverty at all ages (Beck et al., 2014). These differences in SES between whites and blacks, coupled with the well-established link between SES and health, provide one explanation for racial health disparities. However, even after controlling for individual differences in SES, health disparities remain, indicating that other important contributors exist. For example, Lantz et al. (2001) posit that the higher prevalence of risky health behaviors like smoking and drinking among those of lower SES contributes to health disparities, including racial disparities. Other contributors include racial differences in stress (Sternthal et al., 2011; Geronimus et al., 2010) and racial residential segregation (Do et al., 2008; Schulz et al., 2002).

Another strand of the disparities literature seeks to establish a causal link between SES

and health outcomes. This has proven to be difficult because overcoming reverse causality in the statistical analyses is a formidable challenge. The competing hypotheses underlying the reverse causality are sometimes called the *social causation* hypothesis and the *social drift* or *health selection* hypothesis (Mulatu and Schooler, 2002). The *social causation* hypothesis states that SES affects through many mechanisms such as differential health behaviors, differential exposure to stress, and differences in job demands and work conditions. The *social drift* hypothesis states poor health status causes subsequently lower level of SES, perhaps because people in poor health are less productive and people in poor health devote more of their financial resources to health care. Even if establishing a causal link between SES and health is daunting, enough evidence has been accumulated supporting a strong associative link between SES and health and racial disparities in health. What is not settled in the literature is the extent to which SES eliminates the racial gap in health status and what factors contribute to the residual variation in health status between whites and blacks after accounting for the SES effect.

Farmer and Ferraro (2005) and Do et al. (2012) both tackle this issue of explaining residual variation in health status using different empirical approaches. Farmer and Ferraro (2005) interact race with SES to evaluate two competing mechanisms for the relationship between race, SES and health. The first mechanism is the *minority poverty* hypothesis. The idea is that black people who live in poverty are uniquely disadvantaged in attaining good health because of the combination of poverty and race. The second mechanism is the *diminishing returns* hypothesis. The idea here is that minorities do not experience the same returns as whites from higher SES. In this case the greatest racial disparity in health occurs at the highest SES levels. Farmer and Ferraro (2005) find significant interactions between race and education and race and employment status when explaining health outcomes. The findings with respect to education and race offer some support for the *diminishing returns* hypothesis. In a related paper, Do et al. (2012) use propensity score matching to more fully adjust for SES differences across racial groups. They argue that incorporating the

propensity score weight should achieve covariate balance between whites and blacks and that this improved balance should reduce some of the residual variation in the racial health gap.

The empirical analysis in this paper is similar to both Farmer and Ferraro (2005) and Do et al. (2012). Like Farmer and Ferraro (2005), we seek to learn more about interactive relationships affecting the observed racial disparities in health but we posit that macro-level pathways, in addition to individual level pathways, may explain some of the disparity. In particular, we hypothesis that economic freedom in conjunction with SES and interacted with race may help to explain some of the residual variation in racial disparities. Like Do et al. (2012), we use propensity score matching to construct comparison groups to analyze health status across whites and blacks.

Economic Freedom, Health Outcomes and Well-being

To our knowledge, there are no studies that look directly at economic freedom and health status. The literature looking at health status and health disparities at the level of US states almost uniformly focuses on individual-level characteristics. Macro-level variables, such as economic freedom, could influence health as well. Our paper fills that gap. In addition, by focusing on state-level policy our analysis can possibly contribute to better understanding the social determinants of health (SDOH). *Healthy People 2020* develops a "place-based" framework for SDOH. Within this framework there are five key areas: economic stability, education, social and community context, health and health care, and neighborhood and built environment (Centers for Disease Control, 2015).

Economic freedom clearly is related to the area of economic stability as defined by *Healthy People 2020* as economic stability includes poverty, employment, food security, and housing stability. At the international level, increases in economic freedom have been found to be a primary driver of reductions in the extreme poverty rate (Connors, 2010). Garrett

and Rhine (2011) find that U.S. states with greater economic freedom experience greater rates of employment growth. Heller and Stephenson (2014) analyze labor market data for all 50 states from 1981-2009 and generally find that higher levels of economic freedom are associated with lower unemployment and higher labor force participation. While no paper has directly looked at economic freedom and food security or housing stability, a number of papers highlight how restrictions on economic freedom such as land-use regulations drive up housing prices (Saks, 2008; Gyourko, 2009). Economic freedom might also be related to social and community context.[1].

A large and growing number of papers examine the relationship between economic freedom and subjective measures of well-being across countries and U.S. states. At the international level Ovaska and Ryo (2006), Ovaska and Takashima (2010), Bjørnskov et al. (2010), Gropper et al. (2011), and Nikolaev (2014) all find that economic freedom is positively related to various cross-country measures of subjective well-being. Belasen and Hafer (2012) finds that changes in economic freedom to subjective well-being at the level of U.S. states. These studies all look at the average level of subjective well-being, however, and do not investigate whether there are differences across different population groups within society. Gehring (2013) is one exception as he looks at whether there are differences by age or gender in terms of the effect of economic freedom on subjective well-being. He finds that the results are nearly identical for to the general results, with the exception of that secure property rights seem to not matter very much for the young while freedom to trade internationally does not contribute to female subjective well-being.

Self reported health status has been shown to be related to observable health outcomes like functional ability (Idler and Kasl, 1995), chronic conditions (Ferraro and Farmer, 1999; Cott et al., 1999), and even mortality (Idler and Kasl, 1991; Wolinsky and Johnson, 1992; Idler and Benyamini, 1997). Economic freedom can be a pathway to improved health status and outcomes because it influences SDOH. Stroup (2007) finds economic freedom to be

[1]For example, one element of social and community context is social cohesion. At the country level, Berggren and Jordahl (2006) find that economic freedom leads to greater trust and social cohesion

correlated with a large number of quality of life measures such as life expectancy, infant mortality, education, access to improved water, and vaccinations. Similarly, Esposto and Zaleski (1999) finds that economic freedom is positively related to life expectancy across countries.

In addition to being a pathway, however, economic freedom could either positively or negatively influence disparities in health if the benefits do not accrue equally to all subgroups at the same rate. For example, Mixon and Roseman (2003) find weak evidence that women benefit disproportionately from improvements in economic freedom when it comes to life expectancy. Two important recent papers on economic freedom, Compton et al. (2014) and Hoover et al. (2015), find evidence that the benefits of economic freedom are not distributed uniformly through the population. Compton et al. (2014) find that economic freedom does not improve the incomes of those in the bottom quintile, while Hoover et al. (2015) finds economic freedom to be positively related to the white-black income gap. These studies highlight why it is important to not only look at the overall effects of economic freedom but how economic freedom contributes to disparities such as income and health.

Empirical Analysis

The paper analyzes observed variation in self-reported health status using both unconditional and conditional statistical approaches. The unconditional analysis provides baseline measures of health disparities in US states. The conditional analysis, which includes propensity score matching to generate a comparison sample and regression analysis, focuses on the extent to which individual characteristics and economic freedom can explain disparities in self-reported health status across racial groups.

Data Description

Data on individual self reported health status and other health outcomes, and other socio-demographic characteristics come from the 2011 Behavioral Risk Factor Surveillance System (BRFSS), an annual telephone survey conducted by the Centers for Disease Control and Prevention. The BRFSS contains a random representative sample of the population over the age of 18 in each U.S. state. The survey contains questions on preventative health factors, behavioral risk factors, and other economic and demographic characteristics. These data are widely used in studies of health behavior. Since self-reported health status has been found to be an independent predictor of morbidity and mortality (Centers for Disease Control and Prevention, 2008), we focus on this health status measure in our empirical analysis

The survey asks about general health, and specific healthy behaviors like participation in physical activity, which provides a relatively complete picture of self reported health. The survey also asks questions about demographic characteristics like age, gender, race, ethnicity, and marital status, and questions about economic factors like income and labor market participation. This makes the BRFSS data an ideal setting for examining health outcomes. We use data from the annual surveys 2003-2012 through and only use data for individuals who responded to the question about income.

The income variable in the BRFSS is reported in ranges. Following Humphreys and Ruseski (2007) and Humphreys and Ruseski (2011) we code the income variable at the midpoint of the range and deflate this variable using the Consumer PRice Index for All Urban Consumers (CPI-U). This procedure forces the effect of income on health-related variables to be linear. As an alternative, we could use indicator variables for income reported in each range, which would allow the effect of income on health-related variables to be non-linear. However, the variables cannot be expressed in real terms using this approach. The results reported below are not sensitive to this alternative income variable.

The number of individuals surveyed in BRFSS are large, even after excluding individuals who did not answer the income question. After dropping observations with item non-

response, the 2011 BRFSS contains information on 357,754 individual survey respondents.

The health outcome variable of interest is the self-reported health status of each individual surveyed in the BRFSS. The survey contains the following question: "Would you say that in general your health is ...". Responses and values include (1) Excellent, (2) Very good, (3) Good, (4) Fair and (5) Poor. We use the BRFSS coding scheme, so that lower numbers correspond to better self-reported health. "Don't know" and "refused" are also possible responses, but these responses are very small in the sample. Only about 0.2 % of the sample refused to answer or answered "Don't know" to the question.

The 2011 BRFSS surveyed 31,901 individuals who self-identified their race as "Black or African American" and 325,853 individuals who self-identified their race as "White." A simple two-tailed t-test of differences in means for the self-reported health status variable in the BRFSS rejects the null hypothesis that blacks and whites have equal self-reported health status. The average value for self-reported health status among whites was 2.48 and the average value among blacks was 2.85. The two-tailed t-test rejects the null of equal values at a significance level substantially smaller than 0.01. Unconditional statistical tests indicate the presence of substantial health disparities, in terms of self-reported health status, in this population. However, simple comparisons of sample means typically overstate the effects of the treatment (in this case race) on outcome variables, due to the presence of confounding variables and, in some cases, selection issues. In this case, blacks may have lower income and education levels, which may effect health. Of particular interest in this setting, they may reside in areas with reduced access to health care, and potentially in states with systematically different levels of economic freedom than whites.

Propensity Score Matching

Despite the substantial unconditional difference in self-reported health status in the BRFSS, other factors may confound the observed relationship. Income and health have a well-documented positive relationship; education and health are also positively related. Blacks

may chose to live in states with relatively low provision of health care, in areas where health care providers are not conveniently located, or in states with systematically different levels of economic freedom. Also, the BRFSS is not representative of all age groups and the blacks surveyed in the BRFSS may be relatively older than the whites in the sample.

In order to further investigate racial disparities in health outcomes, we use propensity score matching to match each black person in the 2011 BRFSS to a comparison group containing whites with similar observable characteristics. Note that we place no causal interpretation on the results presented here. We use propensity score matching to construct a control group of whites who can be compered to blacks in the 2011 BRFSS based on observable characteristics. This approach avoids problems associated with selection into the treatment group, which have been identified as important in propensity score matching, since there can be no selection into a racial group by definition. It also reduces the dimensionality problem associated with matching on many characteristics.

Other research has used propensity score matching (PSM) to identify comparison groups to analyze outcomes across racial groups. Rosenbaum and Rubin (1985) discuss PSM as a method for constructing control groups Black et al. (2006) use a matching approach to analyze earnings gaps between white, black, Hispanic, and Asian respondents to the 1993 National Survey of College Graduates in order to decompose observed minority wage gaps.

In a related paper, Alonso-Villar et al. (2013) use propensity score matching to create a counterfactual distribution of employed Hispanics to investigate the effects of the tendency of Hispanics to live in specific areas in the United States, which could affect earnings. Alonso-Villar et al. (2013) match on age, education, years of US residence, and metropolitan area of residence.

In another related paper, Do et al. (2012) use propensity score approach to study black/white disparity in self-rated health. Price et al. (2011) uses propensity score matching to assess the effects of graduation from a Historically Black College of University (HBCU) on the earnings of black college graduates. The treatment in Price et al. (2011) is graduation

from an HBCU, not race.

We propensity score match blacks and whites on age, income, level of education, years of education, employment status and marital status within each state. We use nearest neighbor matching where each black in the sample is matched with one white residing in the same state with similar age, income, years of education, marital status and employment status, allowing for ties in the propensity score. Caliendo and Kopeinig (2008) contains a useful survey of practical decisions faced when implementing PSM. The 31,749 blacks with no missing values for self-reported health status and other variables were matched with 53,256 whites; we oversample whites. The large number of ties reflects the relatively large sub-sample of whites in the BRFSS. Use of a caliper produced similar results to the nearest neighbor matching procedure reported here.

Table 1 shows sample summary statistics for all 31,749 blacks and the matched sample of whites. The average self-reported health status for the matched sample of whites, 2.69, is larger than the value for the entire sub-sample of whites in the BRFSS reported above, 2.48. The PSM sub-sample of whites has worse self-reported health than the full sub-sample of whites in the BRFSS.

Table 1: Summary Statistics - Matched Sample

	White		Black	
	mean	sd	mean	sd
Health status	2.69	1.15	2.85	1.10
Age	50.73	17.51	51.41	16.13
Income (000)	39.34	33.39	37.66	33.46
Years education	13.31	2.13	13.23	2.16
Employed	0.49	0.50	0.48	0.50
Female	0.68	0.47	0.67	0.47
Married	0.31	0.46	0.32	0.47
Observations	53,256		31,749	

The other observable characteristics are similar across the two groups. Respondents in both sub-samples are just over 50 years old, unmarried, majority female, and have slightly more than a high school education. About half are currently employed. Two-tailed t-

tests reveal no statistical difference between age, income, and years of education across the two sub-samples. Tests of proportions reveal no difference in the dichotomous variables. Rosenbaum and Rubin (1985) discuss the use of t-tests as a diagnostic for the appropriateness of the matched comparison group.

Empirical Approach

Propensity score matching can be used to estimate a number of treatment effects. The idea is to estimate either the average treatment effect (ATE), which is the unconditional difference in some outcome of interest based on exposure or non-exposure to some treatment, or the average treatment effect on the treated (ATT) which is the conditional difference in the outcome of interest. Both approaches are limited because counterfactual means cannot be observed. PSM proceeds under the assumption that potential outcomes, in this case health status, are independent of the treatment conditional on a set of covariates X; this is called the conditional independence assumption (CIA) in the literature. If the CIA holds, the average treatment effect on the treated can be estimated using PSM; this process is based on the mean difference in outcomes weighted by the propensity score distribution for all observations. The propensity score distribution can be estimated using probit or logit and the set of covariates X.

One issue with estimation of ATT in this way is the calculation of the standard error on the estimated ATT. Since the propensity score is estimated, the estimated standard error on the ATT must be adjusted to account for this. Abadie and Imbens (2009) develop a method to adjust the estimated standard error on the estimate of the ATT generated by PSM.

The estimated ATT in this case is 0.154; the weighted average difference in self-reported health status between the 31,749 blacks in the 2011 BRFSS and the 53,256 matched whites is 0.154. This is the same difference as reported in Table 1, and, again, is smaller than the average difference for the entire BRFSS sample. The Abadie-Imbens robust standard error estimate is 0.0089. Base on this estimated standard error, the self-reported health status for

blacks is worse than the self-reported health status for whites; health disparities exist, even in the PSM sample.

We also investigate the role played by economic freedom plays in mitigating these health disparities. In order to assess the importance of economic freedom in mitigating racial health disparities, we perform a regression analysis on the matched sample. In this case, the observations include all the blacks in the sample, and the 53,256 whites that were matched through PSM. The matched observations are weighted by their propensity score.

We estimate an OLS regression model where the dependent variable is each individual's self-reported health status. Again, this variable takes on integer values between 1 (very good health) and 5 (poor health). We include the covariates that were used to perform the propensity score matching, an indicator variable equal to one if the individual is black, a measure of economic freedom, and an interaction term between the economic freedom measure and the black indicator variable. This interaction term reflects the impact of economic freedom on the self-reported health status of blacks in the sample, and allows this effect to differ by race. We cluster-correct these standard errors by state, since the economic freedom index only varies across states, and not across individuals in the sample.

Data on economic freedom by state comes from Ruger and Sorens (2013). This political economy indicator rates American states according to how the state's public policies are consistent with a classical liberal definition of individual rights. From this viewpoint, individuals "should be allowed to dispose of their lives, liberties, and property as they see fit, so long as they do not infringe on the rights of others" (Ruger and Sorens, 2013, p. 3). States that score highly on this index are those whose policies are most consistent with this viewpoint. While individuals might agree or disagree with this view of the rights people should enjoy, for our purposes it is only important that it be a valid measure of economic freedom. This is because whether high-levels of economic freedom are normatively good in a particular context is ultimately an empirical matter.[2] Recent studies have employed this

[2]For example, using GDP as a measurement does not take a normative stand on whether a particular policy related to GDP change is a good idea

measure to study the effect of more market-friendly policies on migration (Cebula and Clark, 2013; Cebula, 2014), entrepreneurship (Nikolaev et al., 2013), and corruption (Johnson et al., 2014).

The Ruger and Sorens (2013) measure of economic freedom is the third edition of this index and it measures policies that were in place two years prior. Thus the 2013 volume represents 2011 data. Similarly, the 2011 edition represented 2009 data. The lack of time series data compared to the other well-known economic freedom index by Stansel and McMahon (2013) has resulted in the index being used less frequently in the empirical literature.[3] Given the cross-sectional nature of our empirical analysis, however, we are not limited to using Stansel and McMahon (2013). Ruger and Sorens (2013) has the advantage of being a much richer and broader measure of economic freedom compared to Stansel and McMahon (2013). Stansel and McMahon (2013) uses only ten variables to rate states while Ruger and Sorens (2013) uses fifty to measure the extent to which fiscal and regulatory policies interfere with individual economic freedom at the state level.

Ruger and Sorens (2013) obtain data on all states from public sources such as the Census Bureau, Bureau of Economic Analysis, and state statues and then transform the underlying data so that higher values for each component represent more economic freedom. For example, higher levels of taxation in a state reflect less individual freedom and therefore states with higher taxes have lower levels of economic freedom, *ceteris paribus*. Similarly, states where the scale and scope of occupational licensure are greater have lower economic freedom ratings, other things being equal. The components representing economic freedom in different spheres of economic life are then aggregated to produce a composite index, scaled so that the score of zero represents the average state and +100 and -100 represent one standard deviation above and below, respectively. In 2011 the most economically free US state was North Dakota with a score of 66.6 and New York state was the least free with a score of -150.2. A full description of the index and country ratings can be found in Ruger and Sorens

[3]See Hall et al. (2015) for a survey of the dozens of studies on economic freedom at the level of US states.

(2013).

Results

Table 2 contains OLS regression results from a linear regression model explaining observed variation in self-reported health status for the full BRFSS sample and the PSM sub-sample. The results in the left column contain estimates for the full BRFSS sample of all whites and blacks. The results in the right column contain estimates for the propensity score matched sample of 53,256 whites and 31,749 blacks; again, this oversamples whites with similar observable characteristics to the blacks in the 2011 BRFSS.

The results for the full sample and the restricted PSM sub-sample are generally consistent, and are similar to those reported in other studies on health status in the literature. Health status worsens with age and improves with income and education. Employed individuals report better health status than unemployed people, which likely reflects the fact that health insurance is tied to employment in the US. Females and married individuals report better health status than males and unmarried people, but these parameter estimates are not statistically different from zero in the PSM sub-sample, which may indicate that these variables do not play an important role in the matching process.

The estimated parameter on the economic freedom variable is positive and significantly different from zero. The more economic freedom in a state, the worse the self-reported health status in that state, other things equal. This is the first empirical demonstration of a positive relationship between state economic freedom and self-reported health status. One of the difficulties in employing an aggregate index such as the Ruger and Sorens (2013) measure of economic freedom is that it is difficult to know exactly how economic freedom is related to the observed outcome since the index is comprised of a number of components representing an underlying concept. At the same time, however, the state-level macro environment measured by economic freedom contributes to our understanding of self-reported health status by looking beyond individual-level characteristics that affect self-reported health status.

Table 2: OLS Regression Results - Self Reported Health Status

	Full Sample	Matched Sub-Sample
Age	0.0061***	0.0104***
	(0.0003)	(0.0004)
Income (000)	-0.0055***	-0.0059***
	(0.0001)	(0.0002)
Years education	-0.0812***	-0.0704***
	(0.0019)	(0.0029)
Employed	-0.2900***	-0.3529***
	(0.0083)	(0.0112)
Female	-0.0949***	0.0132
	(0.0047)	(0.0102)
Married	-0.0342***	-0.0003
	(0.0055)	(0.0109)
Black	0.1614***	0.1218***
	(0.0098)	(0.0119)
Economic Freedom Index	0.0009***	0.0011***
	(0.0000)	(0.0002)
Black*Economic Freedom	0.0001	-0.0002
	(0.0002)	(0.0003)
Observations	356706	85005
R^2	0.183	0.194

The dependent variable is self-reported health status.

Estimated standard errors in parenthesis. Models contain state-specific intercepts.

Estimated standard errors cluster-corrected at state level.

While the mechanism by which higher levels of economic freedom lead to lower levels of self reported health status cannot be answered in the current study, the literature points to some possible pathways. Gohmann et al. (2008) find that health and social organizations decline as income freedom in a state increases. States with higher levels of economic freedom have been found to lead have more entrepreneurship (Hall and Sobel, 2008) and economic growth (Compton et al., 2011) and this dynamic change, while beneficial overall, could introduce economic uncertainty. This uncertainty, in turn, could be causing stress that is leading to reduced self-reported health status not captured by individual-level measures of employment and income. Finally, interventions in markets that restrict economic freedoms could be directly improving health outcomes in manner that improves self-reported health status. For example, Mukamel et al. (2012) find that states with more stringent regulations on nursing home providers have better nursing home outcomes. Regulations affecting the health care sector such as health insurance mandates clearly lower economic freedom but could be increasing self-reported health status.

The parameters of interest in these regression models, however, are those on the black indicator variable, and the interaction between this indicator and economic freedom. As expected from the unconditional population means, and the ATT estimated reported above, blacks report worse general health status than whites in this setting, other things equal. This is true in both the full BRFSS sample and the PSM sub-sample. However, the parameter estimate for the propensity score matched sample is smaller, suggesting that health disparities are smaller in the propensity score matched sample. Based on the estimated standard errors, the null hypothesis that the parameter on the race indicator variable in the PSM sub-sample is equal to 0.16 would be rejected at conventional significance levels.

A comparison of the estimated parameters on the income variable and the estimated parameters on the race indicator variables can provide some insight into the size of the health disparities implied by these results. In the PSM sub-sample, each additional $1,000 in income reduces health status by 0.006. The estimated parameter on the race indicator

variable is 0.122; in terms of the income equivalent, it would take about 0.122/0.006=20.3 thousand dollars in additional income to close the gap between the average white and the average black in the sample, holding all other factors constant. From Table 1, the average income in the black sub-sample was $37,600, so the $20,300 in additional income needed to close the gap in self reported health between the average black and average white in the PSM matched sub-sample represents a 54% increase in income. In dollar terms, the gap in health status in this setting is substantial.

The estimated parameter on the interaction term between race and economic freedom is also of interest. The estimated parameters are not statistically different from zero in either model. However, in both models, a formal test of the joint hypothesis that both the estimated parameter on the race indicator is equal to zero and the estimated parameter on the interaction term is equal to zero is rejected at less than the 1% level. These two parameters are jointly significant, so economic freedom in the state of residence has a disproportionate effect on the health status of blacks.

Interestingly, the signs are opposite for the two models. For the overall sample, the sign is positive, suggesting that economic freedom increases the gap in health disparities. However, in the PSM sub-sample, the estimated interaction parameter is negative. The PSM sub-sample corrects for state of residence, and accounts for the fact that blacks may live in states with different characteristics than whites, and that some of these characteristics may affect health status. After accounting for these effects, greater economic freedom mitigates the observed gap in self-reported health status. Why might economic freedom reduce health disparities for blacks? A possible reason might be the more open labor markets of economically free states might affect blacks differently than whites in a manner not reflected in individual employment and income data. Scholars such as (Williams, 1982) have pointed out that labor market restrictions such as occupational licensure laws that are neutral on their face can harm blacks in practice. This could affect health status if licensed occupations have better health insurance or working conditions. Happier people also tend to be

healthier (Graham, 2008) and economic freedom is positively associated with higher levels of happiness across states (Gropper et al., 2011).

Conclusions

This paper investigates the impact of economic freedom on self-reported health and health disparities by race. To our knowledge, no previous research assessed the extent to which economic freedom represents a pathway to better health status, or how it contributes to health disparities by race. Recent scholarship by Compton et al. (2014) and Hoover et al. (2015) on the differential effects of economic freedom on income by income quintile and race, respectively, highlights the importance of looking at the effect of economic freedom on disparities. Distinguishing the effect of economic freedom on overall health status, versus the effect on specific sub-populations, is important because of persistent – and in some cases widening – racial disparities in health between whites and blacks (Orsi et al., 2010).

We use propensity score matching to construct a control group of whites who can be compared to blacks in the 2011 BRFSS based on observable characteristics and then estimate the effect of state-level economic freedom on self reported health status using OLS. This is an important addition to the health disparities literature, as blacks have lower income and education levels than whites and may reside in areas with reduced access to health care. We find evidence that even after matching blacks and whites on age, income, education, employment status, and marital status that racial health disparities are reduced compared to the entire BRFSS sample, highlighting that confounding variables and selection effects need to be accounted for when analyzing health disparities. After controlling for potentially confounding individual characteristics, we find that higher economic freedom is associated with lower health status. This result holds for the full BRFSS sample and the PSM sub-sample.

In terms of disparities in health status by race, we find evidence that controlling for

confounding variables and possible selection effects is important to answering the question of whether economic freedom has a disproportionate effect on the health status of blacks. In the full BRFSS sample we find that economic freedom increases the racial health gap. After correcting for the fact that blacks may live in different states that have different characteristics that may affect health than whites, we find that economic freedom reduces black-white health disparities.

These results have important policy implications, given the current emphasis on place-based policies such as *Healthy People 2020*. Many policies aimed at improving health disparities focus on improving the economic status of individuals in groups with poor health outcomes, in hopes that these improvements will lead to improved health. Some of these policies may have the unintended consequence of improving economic freedom. The results here suggest that improved economic freedom is associated with worse general health outcomes across the population, so the overall effectiveness of place-based policies may be reduced. This indirect channel may explain the observed persistence of poor health outcomes, despite numerous policy initiatives.

States differ in terms of economic freedom, which is positively related to a host of outcomes like economic growth, employment, and subjective well-being (Hall et al., 2015).[4] While these factors would appear to improve health outcomes, the evidence developed here suggests that they might indirectly lead to lower-levels of self reported health status for the population as a whole. While the net effect of economic freedom is negative for blacks, on the margin economic freedom reduces differences in self-reported health outcomes. Further research is needed to understand how economic freedom influences health status and why the effects differ by race.

[4]For an overview of the international literature, see Hall and Lawson (2014).

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