Michel Stahli

Professor Klein

16 December 2019

Final research paper for Applied Econometrics course, with minor edits in the conclusion made on January 15th, 2021

Does the Human Freedom, and Economic Freedom of the state someone is born in affect a person's likelihood of obtaining a college degree?

While most research regarding economic freedom focuses on links to income, growth, entrepreneurship, etc., few papers investigate the relationship between economic freedom and education, particularly in the context of US states. The bulk of such research tends to be focused on country comparisons. Greater economic freedom is certainly thought to improve human welfare. Stroup (2007) found this to be the case specifically in countries with strong democratic governments. Roberts and Olson (2013) show students living in countries with the highest scores in economic freedom also tend to stay in school the longest. They also show that countries with more economic freedom tend to have more top tier universities as well. However, as researchers and policy makers strive for increasing the number of citizens with a college degree, particularly for certain ethnic groups, finding a relationship between economic freedom and a person's likelihood of obtaining a college degree might be more useful for the future.

An inverse relationship was found by Mulholland and Hernández-Julián (2019) by using a spatial Durbin model. That is, people in the US with a college degree are to some extent attracted to move to states with higher levels of economic freedom, (though this extent was stronger for secondary education). Mulholland and Hernández-Julián also found states with higher government expenditures have a net in-migration of people with college experience.

Though they used government expenditures as a percent of gross state product in their model, this still begs the question of how to deal with the gray area of interactions between education, economic freedom, and income.

For instance, increases in economic freedom in a state results in an increase in real per capita gross state product (Hall, Lacombe, and Shaughnessy, 2019). Per capita income and education have a positive impact on economic freedom, and they all have a negative impact on corruption (Apergis, Dincer, and Payne, 2012). In fact, states that are more educated have less corruption in their governments (Glaeser and Saks, 2006). It's also foreseeable that there is a positive correlation between income and education. Economic freedom is a good instrument for entrepreneurship in income regressions (Wiseman and Young, 2013). However, economic freedom may be endogenous to other variables, as has been the case when measuring its effect on GDP between countries (Acemoglu et al. 2001, 2002).

We aim to shed light on these relationships by exploring the question: Does the human freedom, and economic freedom of the state someone is born in affect a person's likelihood of obtaining a college degree? This will help with building up a potentially causal association. Given the research that has been done in the context of countries, (Stroup 2007), (Roberts and Olson, 2013), and the relation between economic freedom and GDP (Acemoglu et al. 2001, 2002), we expect there to be a positive, statistically significant relationship. To do this we used 2016 data from the US Census Bureau for our dependent variable of college obtainment. We then merged the Census Bureau's birthplace data with different freedom index scores from the Fraser Institute and the Cato Institute, to run a linear probability model with these scores in focus.

Surprisingly, we observed a negative relationship between the level of freedom in the state respondents were born in and the likelihood of college degree obtainment at a one percent

significance level. That is, respondents born in states with more overall freedom and economic freedom were less likely to obtain a college degree.

Data Summary:

All data apart from the overall state freedom and economic state freedom is from IPUMS USA's American Community Survey (ACS) from 2016. From this data, variables on education, birthplace, race, language spoken at home, sex, age, wage and salary income, and metropolitan status are used. For the dependent variable college obtainment, 4 years of college or more is used to count as "College Degree Obtainment."

We use the log of wage and salary income in our regression. Also, we believe ethnicity will have to be accounted for in particular. Only 15% of Hispanic adults have a college degree by age 25 (National Center for Education Statistics, 2017). On the opposite extreme, 54% of Asian American adults have college degrees. Thus we have race dummy variables for white, black, Hispanic, Native Americans, Chinese, Japanese, multiple races, and other races. A dummy variable for whether or not English was spoken at home was included, and dummy variables for urban and rural, female and male as well.

For economic freedom we use 2016 data from the Cato Institute's Freedom in 50 States index, and the Fraser Institute's Economic Freedom of North America (EFNA) index to compare. We call these Cato Economic Freedom and Fraser Economic Freedom.
For overall freedom we use 2016 data from the Cato Institute's Freedom in 50 States index as well. We call this Cato Overall Freedom. The Freedom in 50 States data score gives the average standard deviations a particular state differs from others in the given category.

The EFNA data gives raw calculated scores on a scale from 1 to 10, which we converted into standard deviations for ease of comparison. EFNA's scoring is calculated using data on

government spending, taxes, and labor-market freedom. In general, a higher score means individuals and markets operate and are determined with less interference from the government. Cato Institute's freedom scores use a similar basis. Their overall freedom score is based on fiscal policy, regulatory policy, and personal freedom. Fiscal policy, which the economic freedom score is based on, is divided into state taxation, local taxation, government consumption and investment, government employment, government debt, and cash and security assets.

We only use respondents over the age of 25, as most people who plan to do so will have completed their Bachelor's Degree by then. We also excluded any respondents not born in a U.S. state.

Table 1: Summary Statistics from the 2016 American Community Survey, Cato Institute, and Fraser Institute

Variable	Average	Minimum	Maximum
Completed a College Degree	0.318		
Female	0.519		
Male*	0.481		
Urban	0.851		
Rural*	0.149		
English Spoken at Home	0.939		
English Not Spoken at Home*	0.061		
White	0.800		
Black	0.101		
Native American	0.010		
Chinese	0.003		
Japanese	0.002		
Hispanic	0.063		
Other*	0.007		
Multiple Races	0.014		
Cato Economic Freedom	0.000	-0.828	0.356
Fraser Economic Freedom	-0.100	-2.451	1.978
Cato Overall Freedom	-0.034	-0.813	0.481
Age	53.815	25	96
Wage and Salary Income	$31,881.20	0	$714,000
Number of Observations		1,869,868	

Table 1 shows the averages for all variables and the minimum and maximum scores for non-dummy variables. Note that our freedom scores are in standard deviations. We can see that the Fraser Economic Freedom score has a much lower minimum and a much higher maximum, which must have to do with the difference in scoring. Also, we note that the two Cato Institute scores have very similar means, maxes, and minimums.

In fact, the correlation between Cato Economic Freedom and Cato Overall Freedom was 0.982, which should be kept in mind in the regressions. As a comparison, the correlation between

Cato Economic Freedom and Fraser Economic Freedom was 0.859. 31.8% of respondents in our sample completed a college degree.

Figure 1: Average Overall Freedom (Cato Institute) and College Degree Obtainment

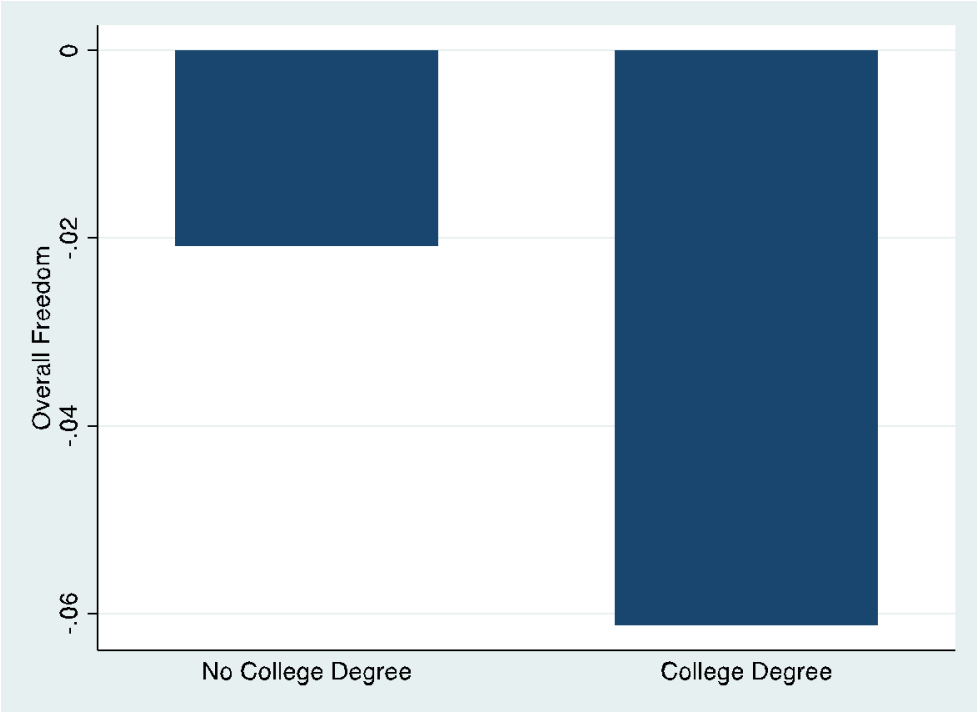

Figure 1 illustrates the average overall freedom standard deviation score in a comparison between those who obtained college degrees and those who did not. This implies an unexpected negative relationship between freedom in the state a person is born in and their likelihood to obtain a college degree. Though from this graph we cannot see by how much and if the relationship still holds when other variables are accounted for.

Figure 2: Average Economic Freedom (EFNA) and College Degree Obtainment

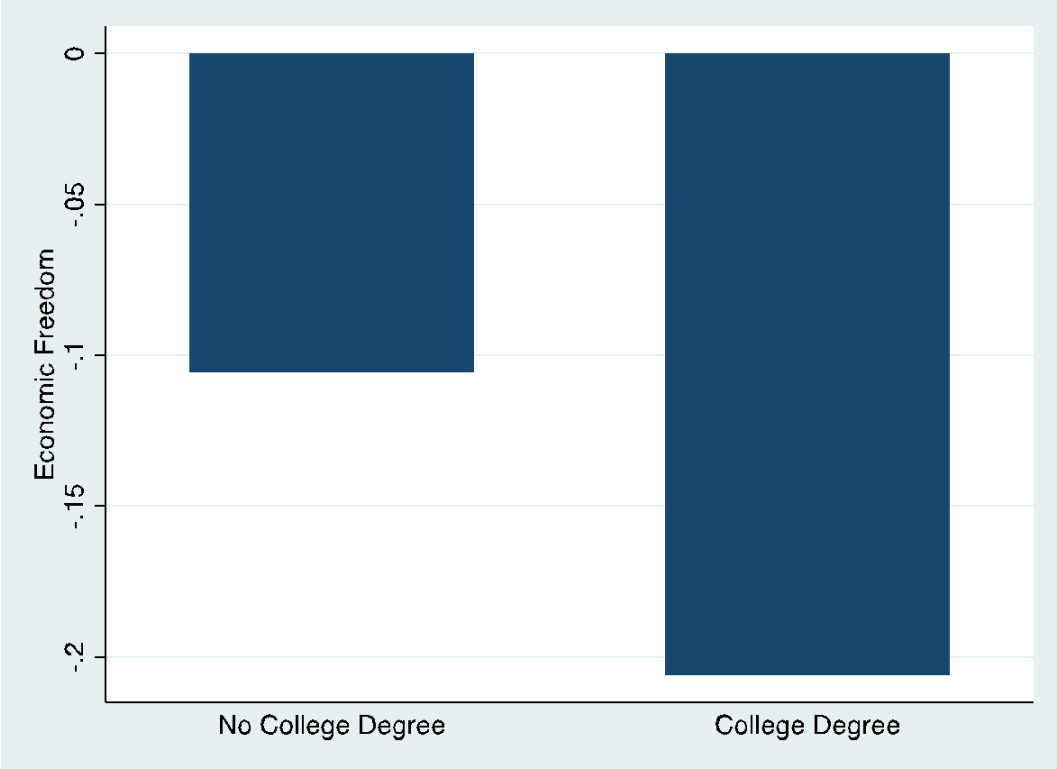

Figure 2 shows a similar relationship as in Figure 1, but with the Fraser Institute's freedom standard deviation score. The magnitude and significance of this relationship will have to be seen in the regressions.

Empirical Regression Equations:
A linear probability model (LPM) was used to estimate the effects of the different freedom measurements on the likelihood of college degree obtainment.

Cato Overall Freedom
$college_i = \beta_0 + \beta_1 \mathbf{overcato}_i + \beta_2 female_i + \beta_3 urban_i + \beta_4 english_i + \beta_5 white_i + \beta_6\ black_i + \beta_7 native_i + \beta_8 chinese_i + \beta_9 japanese_i + \beta_{10} hispanic_i + \beta_{11} multirace_i + \beta_{12} age_i + \beta_{13} logincwage_i + \varepsilon_i$

Cato Economic Freedom
$college_i = \beta_0 + \beta_1 \mathbf{econcato}_i + \beta_2 female_i + \beta_3 urban_i + \beta_4 english_i + \beta_5 white_i + \beta_6\ black_i + \beta_7 native_i + \beta_8 chinese_i + \beta_9 japanese_i + \beta_{10} hispanic_i + \beta_{11} multirace_i + \beta_{12} age_i + \beta_{13} logincwage_i + \varepsilon_i$

Fraser Economic Freedom
$college_i = \beta_0 + \beta_1 \mathbf{zefna}_i + \beta_2 female_i + \beta_3 urban_i + \beta_4 english_i + \beta_5 white_i + \beta_6\ black_i + \beta_7 native_i + \beta_8 chinese_i + \beta_9 japanese_i + \beta_{10} hispanic_i + \beta_{11} multirace_i + \beta_{12} age_i + \beta_{13} logincwage_i + \varepsilon_i$

Excluded variables: male, rural, no English at home, other (race)

Regressions:

Table 2: Linear Probability Model for College Degree Obtainment, Cato Overall

Variable	Coefficient	P-Value
Cato Overall Freedom	-0.044***	0.00
Female	0.089***	0.00
Urban	0.157***	0.00
English Spoken at Home	-0.022***	0.00
White	-0.074***	0.00
Black	-0.221***	0.00
Native	-0.244***	0.00
Chinese	0.196***	0.00
Japanese	0.085***	0.00
Hispanic	-0.270***	0.00
Multiple Races	-0.121***	0.00
Age	-0.002***	0.00
Log of Wage and Salary Income	0.117***	0.00
Number of Observations	1,869,868	
Count R^2	0.693	
R^2	0.120	
Adjusted R^2	0.120	

In Table 2 we can see that we obtain a significant negative relationship between the Cato Overall Freedom score and college degree obtainment. This would indicate a one standard deviation increase in the overall freedom of the state you were born in would make you 4.4 percentage points less likely to obtain a college degree holding all other variables constant. This result surprises us and we wish to see how the other measures fare, though we suspect they will have a similar result due to their high correlations.

Table 3: Linear Probability Model for College Degree Obtainment, Cato Economic

Variable	**Coefficient**	**P-Value**
Cato Economic Freedom	-0.0413***	0.00
Female	0.089***	0.00
Urban	0.158***	0.00
English Spoken at Home	-0.022***	0.00
White	-0.075***	0.00
Black	-0.220***	0.00
Native	-0.246***	0.00
Chinese	0.196***	0.00
Japanese	0.086***	0.00
Hispanic	-0.270***	0.00
Multiple Races	-0.121***	0.00
Age	-0.002***	0.00
Log of Wage and Salary Income	0.117***	0.00
Number of Observations	1,869,868	
Count R^2	0.693	
R^2	0.120	
Adjusted R^2	0.120	

Table 4: Linear Probability Model for College Degree Obtainment, Fraser Economic

Variable	Coefficient	P-Value
Fraser Economic Freedom	-0.006***	0.00
Female	0.089***	0.00
Urban	0.160***	0.00
English Spoken at Home	-0.023***	0.00
White	-0.080***	0.00
Black	-0.226***	0.00
Native	-0.252***	0.00
Chinese	0.197***	0.00
Japanese	0.090***	0.00
Hispanic	-0.271***	0.00
Multiple Races	-0.124***	0.00
Age	-0.002***	0.00
Log of Wage and Salary Income	0.118***	0.00
Number of Observations	1,869,868	
Count R^2	0.694	
R^2	0.120	
Adjusted R^2	0.120	

Table 3 and 4 show us nearly the same result, apart from the smaller magnitude of the Fraser coefficient in Table 4. The Cato coefficients are more than six times as large as the Fraser coefficient. This is, however, not surprising, since we observed a much higher variance within the Fraser variable than in the other two freedom measures. Count R^2 differences and other coefficient differences are virtually negligible.

Conclusion

We found there to be a statistically significant negative relationship between the economic, and overall freedom of the state you are born in, and the likelihood of obtaining a college degree. This potentially implies people born in states with more freedom are less likely to obtain college degrees, though further analysis beyond the scope of this course would be needed to further assess this. This could be due to a pull to obtain a college degree to feel a sense of

security for people in less free states, precisely because they are more restrictive. A further place of study could be reconciling this notion in more specific fields of behavioral economics and psychology, specifically on education choices, and fear-based motivating factors related to institutions.

Further looking into the different measurement techniques of the two institutes and including more relevant variables, such as the level of education of parents, and length of time lived particular states, could also make a significant difference in understanding this relationship.

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