

The Interaction Effect of Economic Freedom and Economic Development on Corruption in US States

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Abstract

The empirical relationship between corruption and economic freedom at the country level is complex, with the relationship varying depending on whether a country is rich or poor. I find a similar relationship among states within the US. I estimate a fixed-effects Poisson regression model of state-level corruption-conviction rates and find a significant and negative interaction effect of economic freedom and economic development on corruption. For states with low levels of economic development, economic freedom increases corruption, while the opposite is true for states with high levels of economic development.

JEL Codes: H10, H11, H50, K20, O5

Keywords: economic freedom, US states, corruption, economic development

I. Introduction

Government interventions in the economy have been widely studied in the economics literature, with the outcomes of these interventions being well documented. One such outcome is corruption. Standard economic models predict that increased government intervention can lead to more corruption. Many studies have empirically examined this relationship and have generally found supportive evidence. However, there are some conflicting findings that suggest the relationship may depend on other factors.

For example, studies have found that economic freedom may increase corruption in poor countries, rather than decreasing it. Hence, a country's level of economic development can change the way economic freedom affects corruption. This finding has yet to motivate a similar study of the relationship between economic freedom and corruption across US states. Though the poorest states in the US are substantially better off than the poorest country, there is still wide

variation in economic development levels across states. Therefore, it is still possible to empirically assess whether economic freedom's effect on corruption depends on a state's level of economic development.

In this paper, I estimate a fixed-effects model of state-level corruption, and I include an interaction term between economic freedom and economic development. I use the Fraser Institute's summary index of economic freedom to measure economic freedom and gross domestic product (GDP) per capita to measure economic development. Following the literature, I transform corruption convictions into a rate, which motivates my choice of a Poisson regression since it is a common method for modeling counts and rates. My paper is the first to examine whether the aforementioned relationship between corruption (on one side) and economic freedom interacted with economic development (on the other) is present in US states.

I begin by reviewing the literature related to economic freedom and corruption, with emphasis on findings related to how the relationship may differ based on economic development. I then present the model, along with the data used to estimate it. Across the multiple iterations of the estimates, the effect of economic freedom on corruption does depend on states' level of economic development. Specifically, as economic development increases, economic freedom's effect on corruption goes from positive to increasingly negative. Hence, in less economically developed states, greater economic freedom may actually promote corruption, while in more economically developed states, greater economic freedom may reduce corruption.

II. Literature Review

A. Economic Freedom and Its Effects across Countries

Numerous studies have examined the effects of economic freedom across countries. Nikolaev (2014) finds that economic freedom is significantly and positively correlated with a wide variety of measures of quality of life in thirty-four OECD countries. Powell and Rodet (2012), using a cross-sectional data set of twenty-one countries, show that economic freedom is positively associated with entrepreneurship. In a similar study of twenty-nine countries, Bjørnskov and Foss (2008) find that the size of government and sound money, both of which are key components of economic freedom, are significantly related to entrepreneurial activity. Carter (2007) finds a positive relationship between economic freedom and income inequality using a panel data set of countries, though the relationship is complex and other studies

find conflicting results (Apergis, Dincer, and Payne 2014; Clark and Lawson 2008; Bennett and Nikolaev 2017). Williamson and Mathers (2011) demonstrate that economic freedom and culture are positively related to economic growth, though economic freedom is relatively more important than culture for growth.

B. Economic Freedom and Its Effects in the United States

Studies have examined the effects of economic freedom across US states. Campbell, Jauregui, and Heriot (2008) show that states with more economic freedom experience higher home-appreciation rates. Ashby and Sobel (2008) find that increases in economic freedom are correlated with higher income levels and rates of income growth. Ashby (2007) shows that among the lower forty-eight states in 2000, states with relatively higher economic freedom experience significantly higher migration inflows. Bennett and Vedder (2013) analyze the fifty states from 1979 to 2004 and find evidence that the relationship between income inequality and economic freedom may depend on the initial levels of freedom, suggesting a U-shaped relationship. Heller and Stephenson (2014) analyze the fifty states from 1981 to 2009 and find that states with higher economic freedom have higher labor force participation rates and lower unemployment rates. Jackson (2017) finds that economic freedom levels are positively related to both the reported happiness of individuals and average state levels of happiness.

C. Economic Freedom and Corruption across Countries

Several studies have empirically measured the relationship between economic freedom and corruption across countries. Saha and Su (2012) find that economic freedom reduces corruption, and the effect size increases at higher levels of economic freedom. Furthermore, they find that democracy reduces corruption only when economic freedom is high (Saha and Su 2012). Saha and Ali (2017) find a significant interaction effect of economic freedom, political freedom, and government size on reductions in corruption across a sample of North African and Middle Eastern countries. Shen and Williamson (2005) find that economic freedom increases levels of perceived corruption. Goel and Nelson (2005) find that economic freedom is more important than political freedom in reducing corruption across countries.

Though studies have found supporting evidence for the hypothesis that economic freedom reduces corruption, some have found

conflicting evidence. Yamarik and Redmon (2017) find that economic freedom has an insignificant effect on corruption yet corruption reduces economic freedom. Graeff and Mehlkop (2003) find that the effect of economic freedom, and its components, depends on whether a country is poor or rich. Pieroni and d'Agostino (2013) find that economic freedom reduces corruption in general but may increase it in poor countries and transitional economies.

D. Economic Freedom and Corruption in the United States

Some studies have empirically examined the relationship between economic freedom (and similar concepts) and corruption across states within the US. Apergis, Dincer, and Payne (2012) find that economic freedom has a significant negative effect on corruption in states. Fisman and Gatti (2002) find that larger federal transfers are correlated with higher public conviction rates in states. Dincer and Gunalp (2020) find that federal regulations increase corruption in states. Bologna (2017) finds that in states with lower-quality institutions, more corruption is correlated with more competition. As institutional quality increases, corruption tends to increase (Bologna 2017). Johnson et al. (2014) find that the negative impacts of corruption on economic growth are smaller in states with more regulation and less economic freedom. Choudhury (2021) finds a positive correlation between regulation and corruption in states from 1990 to 2013, though she also finds evidence that regulation is endogenous and that the relationship might not be causal.

III. Method

I estimate the following model of corruption:

$$(1) \quad \begin{aligned} CORRUPTION_{i,t} &= ECONFREED_{i,t}\beta_1 + ECONDEV_{i,t}\beta_2 \\ &+ (ECONFREED \times ECONDEV)_{i,t}\beta_3 + \mathbf{x}_{i,t}\boldsymbol{\beta}_k \\ &+ v_i + \delta_t + \epsilon_{i,t} \end{aligned}$$

Here, $CORRUPTION_{i,t}$ is the measure of corruption in the i th state in year t . $CORRUPTION$ is measured as a rate per 100,000; therefore, I estimate (1) as a Poisson regression.¹ $ECONFREED_{i,t}$ is

¹ Instead of linear regression, Poisson regression, which is a type of generalized linear model, is often used to model variables that are counts or rates. Ordinary least squares (OLS) assumes that values can either be continuously positive or continuously negative. This is not the case for dependent variables that are counts or

the i th state's level of economic freedom in year t , and $ECONDEV_{i,t}$ is the i th state's level of economic development in year t . To measure whether the effect of economic freedom on corruption depends on the state's level of economic development, I include an interaction term between freedom and development, denoted $(ECONFREED \times ECONDEV)_{i,t}$. Next, $\mathbf{x}_{i,t}$ is a vector of additional control variables, ν_i are state-level fixed effects, and δ_t is a series of binary year indicator variables to control for time-related fixed effects. Hence, (1) is estimated as a two-way fixed-effects model with $\epsilon_{i,t}$ as the error term. Model (1) is estimated with robust standard errors. The β 's are slope coefficients.

Following model (1), the effect of a marginal increase in economic freedom ($ECONFREED$) on corruption ($CORRUPTION$) depends on the level of economic development ($ECONDEV$). The effect can be expressed as the first derivative of corruption with respect to economic freedom as shown in (1a):

(1a)

$$\frac{\partial CORRUPTION_{i,t}}{\partial ECONFREED_{i,t}} = \beta_1 + ECONDEV_{i,t}\beta_3$$

Based on the relevant literature, the estimate for β_1 is expected to be positive, while the estimate for β_3 is expected to be negative. This would support the hypothesis that economic freedom may increase corruption in states with low economic development while the effect of a marginal increase in economic freedom declines at higher levels of economic development. Moreover, the marginal effect would become negative as a state's level of economic development becomes sufficiently large.

IV. Data

To estimate (1), I use data from several sources, including the Department of Justice, the Fraser Institute, the Bureau of Economic Analysis, the Census Bureau, the Bureau of Labor Statistics, the World Inequality Database, the Federal Bureau of Investigation's Uniform Crime Reporting database, the MIT Election Data and Science Lab, and the Department of Homeland Security. In this section, I describe

rates, which have a lower bound of zero and cannot be negative. For Poisson regression, it is assumed that the dependent variable has a lower bound of zero and follows a Poisson distribution.

the data and variables. I also provide a summary table of the variables and their sources (table 1).

Table 1. Variables, their definitions, and their sources

VARIABLE	DEFINITION	SOURCE
Dependent variable		
Corruption Convictions	Number of federal public corruption convictions, per 100,000 government employees	Department of Justice
Key variables		
Economic Freedom	Index of economic freedom for US states	Fraser Institute
GDP per Capita	Gross domestic (state) product divided by the total population. Inflation adjusted to 2020 dollar values.	Bureau of Economic Analysis
In (GDP per Capita)	The natural log of GDP per Capita	
Other controls		
Population	Number of residents	Census Bureau
In (Population)	The natural log of the number of residents	
Unemployment Rate	Percentage of the labor force that is unemployed	Bureau of Labor Statistics
Income Inequality	Percentage of total income earned by residents in the top 1% of the income distribution	World Inequality Database
Violent Crime	Violent crimes per 100,000 residents	Federal Bureau of Investigation's Uniform Crime Reporting database
Population with at Least a Bachelor's Degree	Percentage of residents with at least a bachelor's degree	Census Bureau
Population Age under 25	Percentage of residents that are under 25 years old	Census Bureau
Population Age Between 25 and 65	Percentage of residents that are between 25 and 65 years old	Census Bureau
Population Age over 65	Percentage of residents that are over 65 years old	Census Bureau
Republican Votes	Percentage of total Senate votes for Republican candidate	MIT Election Data and Science Lab
Democratic Votes	Percentage of total Senate votes for Democratic candidate	MIT Election Data and Science Lab
Other Votes	Percentage of total Senate votes for other candidate	MIT Election Data and Science Lab
Newly Naturalized Citizen	Percentage of residents who are newly naturalized citizens	Department of Homeland Security

A. Measure of Corruption

To measure corruption at the state level, I use the number of public corruption convictions. These data are reported annually to Congress, pursuant to Section 603 of the Ethics in Government Act of 1978, in a Department of Justice report. The number of corruption convictions by district and state can be found in the annual reports for 1978 through 2021. These data have been used in previous studies of state-level corruption (Glaeser and Saks 2006; Johnson, LaFountain, and Yamarik 2011; Apergis, Dincer, and Payne 2010; Smith 2016). Like several of these studies, I deflate the number of corruption convictions by converting the number to a rate. Many of these studies adjust corruption convictions by the state population. Instead, I convert the corruption-convictions variable to a rate measuring corruption convictions per 100,000 government employees in the state. I collected data related to the number of government employees from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages database. This approach is like the ones used by Walker and Calcagno (2013), Fisman and Gatti (2002), and Goel and Nelson (1998).

B. Measure of Economic Freedom

To measure economic freedom, I use the Fraser Institute's Economic Freedom of North America index, specifically the summary measure for US states (Stansel et al. 2022). The measure is an average of three components, each of which captures an aspect of economic freedom: government spending, taxation, and labor market freedom. The Economic Freedom of North America index ranges from zero to ten, with zero denoting the lowest possible level of economic freedom and ten the highest. This measure of economic freedom has been used to study the relationship between economic freedom and corruption (Apergis, Dincer, and Payne 2012; Johnson et al. 2014). There are several noteworthy limitations of this index. The index does not incorporate measures of the strength of property rights or of the legal system (Murphy 2016). Furthermore, the index is largely driven by the size of government (Murphy 2016). As Murphy (2016) notes, 78 percent of the index consists of measures related to government size, such as government spending and government employment.

Bearing these limitations in mind, I separately estimate model (1) using an alternative measure of economic freedom as a robustness check. The alternative measure is the Cato Institute's Freedom in the 50 States index of economic freedom (Ruger and Sorens 2021).

This index of overall economic freedom is created by summing the values of two underlying subindices, one related to fiscal policy and the other related to regulatory policy. The fiscal policy subindex incorporates measures of state and local taxes, government consumption, government employment, government debt, and state and local financial assets (Ruger and Sorens 2021). The regulatory policy subindex incorporates measures of land-use freedom, environmental policy, health insurance restrictions, labor market and occupational constraints, and miscellaneous other regulations (Ruger and Sorens 2021). I specifically use the chained overall economic freedom index, which allows for intertemporal comparisons (Ruger and Sorens 2021). The Freedom in the 50 States index, along with the Fraser Institute's index, has been similarly used in previous research (McCannon and Hall 2021).

C. Measure of Economic Development

To measure economic development, I use GDP per capita. State-level GDP comes from the Bureau of Economic Analysis. To convert it to a per capita measure, I divide GDP by the state-level population, which was collected from the Census Bureau. I adjust GDP per capita for inflation to 2020 dollar values using the Bureau of Labor Statistics' Inflation Calculator. The natural log of inflation-adjusted GDP per capita is included in (1). GDP per capita has been widely used as a proxy for economic development (Chang and Li 2019; Læg Reid and Povitkina 2018; Anton 2019).

D. Other Key Controls

I include several other control variables in the model of corruption. I briefly describe them below.

State Population

The first control in the set of other controls is the state's population, which I collected from the Census Bureau. The natural log of the state's population is included as a control in (1).

Unemployment

The second control is the state's unemployment rate, which was collected from the Department of Labor. This is simply the percentage of the labor force that is unemployed.

Income Inequality

The third control is a proxy for income inequality, which I measure as the percentage of the state's total income that is earned by residents in

the top 1 percent of the income distribution. I collected this variable from the World Inequality Database. The database does not contain values for 2020. To impute the missing values for 2020 I simply used the values for 2019. This measure has been used as a proxy for income inequality in several studies (Fang, Miller, and Yeh 2015; Garbinti, Goupille-Lebret, and Piketty 2018).

Crime

The fourth variable is a measure for crime, specifically the violent crime rate per 100,000 residents. The annual number of violent crimes at the state level was collected from the Federal Bureau of Investigation's Uniform Crime Reporting database. To convert it to a rate, I divided the number of crimes by the state's population, then multiplied the ratio by 100,000.

Education Attainment

The fifth variable is the percentage of the population with at least a bachelor's degree, which I collected from the Census Bureau.

Age

The sixth, seventh, and eighth variables form a set of three mutually exclusive and exhaustive variables measuring the age distribution of the state's population. The first measures the percentage of residents that are under twenty-five years old, the second measures the percentage between twenty-five and sixty-five years old, and the third measures the percentage over sixty-five. I collected these variables from the Census Bureau.

Political Views

The ninth, tenth, and eleventh variables form a set of three mutually exclusive and exhaustive variables proxying for the political views of the state. I collected these data from MIT's Election Data and Science Lab. The specific data set contains the state-level constituency for Senate elections since 1976. Every two years, a third of the Senate's membership is elected. Thus, data are unavailable for every year. To impute values for the intermittent years, I use linear interpolation, which is a common method to replace missing values in time series (Dell'Anno 2020; Nyström 2008). The first variable in this set of three measures the percentage of total Senate votes that went to the Republican candidate, the second variable measures the percentage that went to the Democratic candidate, and the third measures the percentage that went to other candidates.

Naturalized Citizens

The final control variable measures the percentage of the state's population who are newly naturalized citizens. These data come from the Department of Homeland Security.

E. Analysis Data Set

The analysis data set is a panel data set of all fifty states from 2004 to 2019. The data set includes eight hundred records, including the fifty states across sixteen years. The descriptive statistics are presented in table 2. The average rate of corruption convictions is 4.33 for every 100,000 government employees. The yearly average is plotted in figure 1. The mean economic freedom measure is 6.04, and the mean GDP per capita is \$50,766.49 (the natural log is 15.16). The yearly averages for both are shown in figures 2 and 3, respectively.

Table 2. Descriptive statistics

VARIABLES	MEAN	STD
Dependent variable		
Corruption Convictions ^a	4.3260	3.7439
Key variables		
Economic Freedom	6.0378	0.9237
GDP per Capita ^c	50,776.4900	9,731.3300
ln (GDP per Capita) ^c	10.8176	0.1861
Economic Freedom X ln (GDP per Capita)	65.3220	10.1240
Other controls		
Population	6,227,538.9000	6,898,862.8100
ln (Population)	15.1596	1.0121
Unemployment ^b	5.6538	2.1114
Income Inequality ^b	18.0529	4.6419
Violent Crime ^a	378.3102	153.8075
Population with at Least a Bachelor's Degree ^b	19.6166	19.0982
Population Age under 25 ^b	37.1679	37.1880
Population Age between 25 and 65 ^b	51.2916	1.6755
Population Age over 65 ^b	11.5405	11.3185
Republican Votes ^b	49.0171	11.8436
Democratic Votes ^b	46.3743	12.3814
Other Votes ^b	5.0188	7.6469
Newly Naturalized Citizen ^b	0.1546	0.1170

Notes: N = 800, for 50 states across 16 years.

^a Per 100,000

^b Percentage

^c Inflation adjusted to 2020 dollar values

Figure 1 plots the average measure of economic freedom across the fifty states from 2004 to 2019. There was a decline in the average from 2006 to 2010. After 2010, the trend reversed and began increasing until 2015, when the average leveled off.

Figure 1. Average measure of economic freedom across the fifty states from 2004 to 2019

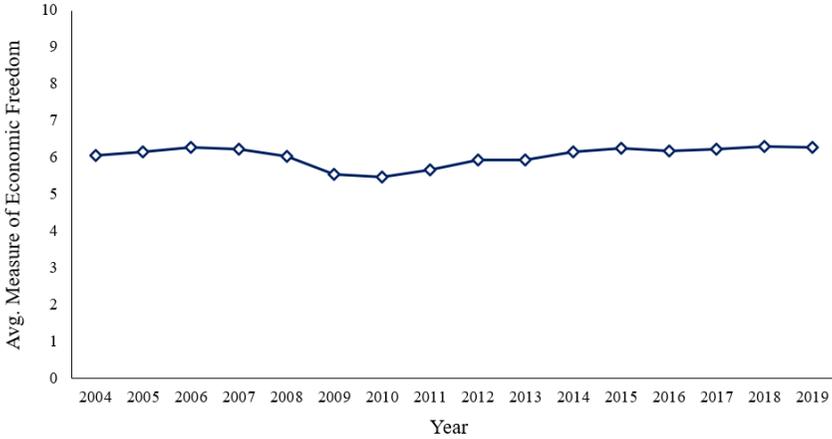


Figure 2 plots the average corruption-conviction rate across the fifty states from 2004 to 2019. There was a slight increase in the average from 2004 to 2007. After 2007, the average began a downward trend.

Figure 2. Average corruption convictions (per 100,000 government employees) across the fifty states from 2004 to 2019

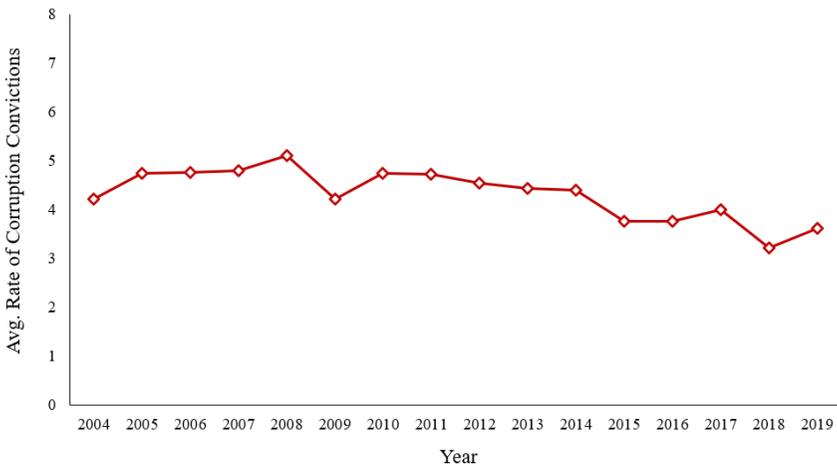
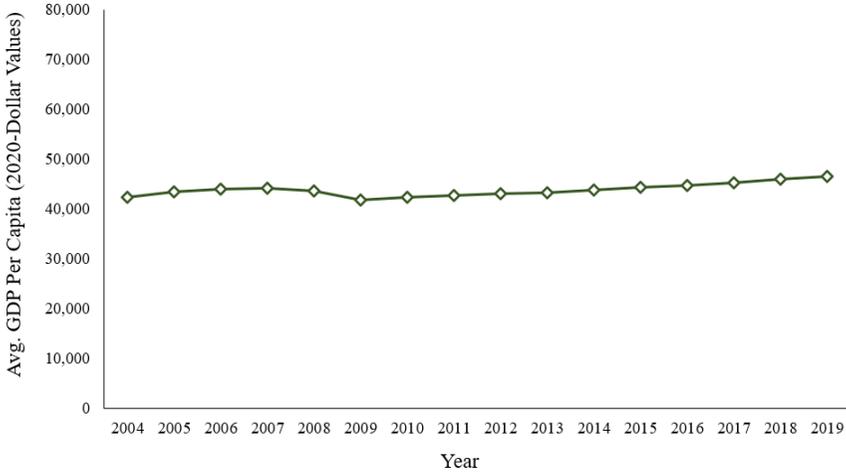


Figure 3 plots the average inflation-adjusted GDP per capita across the fifty states from 2004 to 2019. There was a slight increase in the average from 2004 to 2007. From 2007 to 2009, the average declined. After 2009, the average began a steady upward trend.

Figure 3. Average GDP per capita (2020 dollar values) across the fifty states from 2004 to 2019



V. Results

The results for estimating model (1) are shown in table 3, specifically column [9]. The coefficient estimates for both economic freedom and economic development (ln (GDP per capita)) are positive and statistically significant at the 5 percent level. The coefficient estimate for the interaction term, (Economic Freedom X ln(GDP per Capita)), is negative and statistically significant at the 5 percent level. These results suggest that the effect of economic freedom on corruption depends on the state’s level of economic development. In states with lower levels of economic development, a marginal increase in economic freedom leads to higher corruption. At sufficiently high levels of economic development, however, a marginal increase in economic freedom leads to lower corruption. The estimated results for the first derivative of economic freedom on corruption, shown in (1a) earlier, are shown in (1b):

(1b)

$$\frac{\partial CORRUPTION_{i,t}}{\partial ECONFREED_{i,t}} = 5.8520 + (-0.5302) \times ECONDEV_{i,t}$$

Based on (1b), for states with economic development (ln(GDP per Capita)) levels greater than 11.04, the marginal effect of economic

freedom on corruption changes from positive to negative. The marginal effects at different levels of economic development are shown in figure 4. In states where GDP per capita is around \$40,000 (natural log is around 10.60), a one-unit increase in economic freedom is associated with an increase in public corruption convictions per 100,000 government employees of 0.23, holding all else constant. In states where GDP per capita is around \$90,000 (natural log is around 11.41), a one-unit increase in economic freedom is associated with a decrease in public corruption convictions per 100,000 government employees of 0.20, holding all else constant.

Figure 5 shows the predicted corruption-convictions rate across different levels of economic freedom, both for states with high levels of economic development (blue line) and for states with low levels of economic development (red line). High levels of economic development are defined as GDP per capita more than \$80,000, and low levels are defined as GDP per capita below \$33,000. The predicted corruption-conviction rates increase at a steeper rate for states with low levels of economic development, compared to the magnitude of the decline for states with high levels of economic development. The two lines intersect when the level of economic freedom is around 6.3. The predicted corruption-conviction rates tend to be higher in states with low levels of economic development, compared to states with high levels of economic development, when economic freedom is lower than 6.3. When economic freedom surpasses this threshold, the predicted corruption-conviction rates in states with low economic development exceed the rates in states with high economic development.

Figure 4. Marginal-effect estimates of a one-unit increase in economic freedom at different levels of GDP per capita

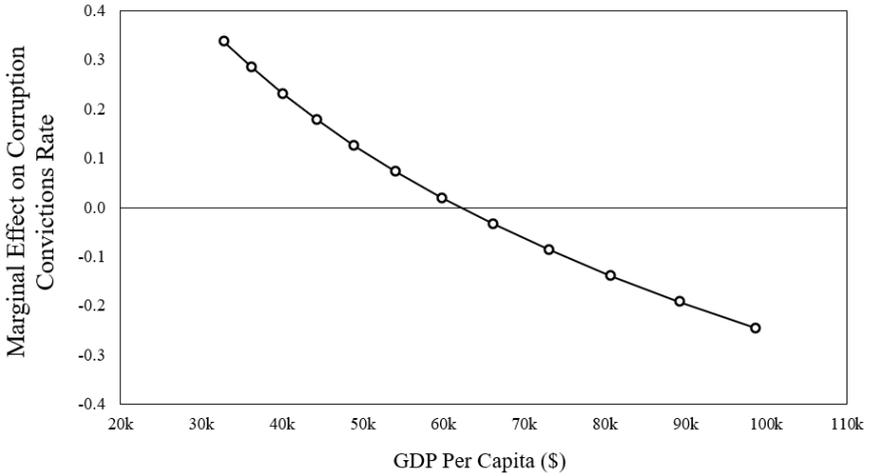


Figure 5. Predicted corruption convictions at different levels of economic freedom, with high or low levels of GDP per capita

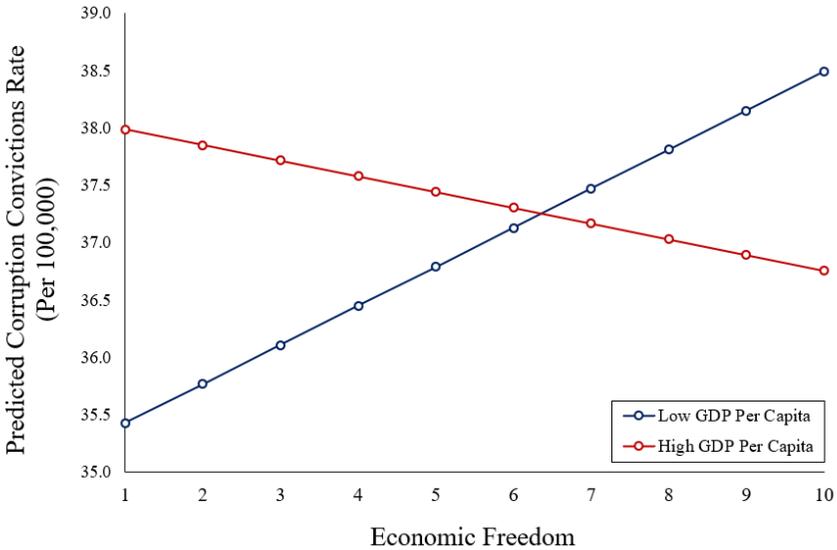


Table 3: Poisson regression estimates for model of corruption convictions per 100,000 government employees

Covariates	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Economic Freedom	4.4772* (2.4192)	4.7897** (2.4255)	5.5386** (2.4536)	6.0772*** (2.4751)	7.6256*** (2.4478)	7.9183*** (2.5521)	7.0003*** (2.5699)	5.9831** (2.6259)	5.8520** (2.6296)
ln(GDP per Capita)	2.3244 (1.5000)	2.4255* (1.5009)	3.1350*** (0.2268)	3.3827** (1.5509)	4.0241*** (1.5667)	4.3141*** (1.5740)	3.8732*** (1.5804)	3.4361** (1.5887)	3.3751** (1.5896)
Economic Freedom X ln(GDP per Capita)	-0.4070* (0.2239)	-0.4366** (0.2245)	-0.5019*** (0.2268)	-0.5531*** (0.2288)	-0.6961*** (0.2355)	-0.7238*** (0.2359)	-0.6385*** (0.2376)	-0.5422** (0.2428)	-0.5302** (0.2431)
ln(Population)	1.2495 (0.7770)	1.2495 (0.7770)	1.1408 (0.7807)	1.1322 (0.7797)	1.3845* (0.7883)	1.2650 (0.7902)	1.3178* (0.7921)	1.5959** (0.7979)	1.6334** (0.7982)
Unemployment			0.0493* (0.0261)	0.0617** (0.0270)	0.0597*** (0.0270)	0.0580** (0.0270)	0.0575** (0.0271)	0.0573** (0.0272)	0.0573** (0.0272)
Income Inequality				0.0240* (0.0139)	0.0255* (0.0139)	0.0268** (0.0139)	0.0252* (0.0139)	0.0214 (0.0142)	0.0186 (0.0144)
Violent Crime					0.0009*** (0.0004)	0.0008** (0.0004)	0.0006 (0.0004)	0.0005 (0.0004)	0.0004 (0.0004)
Population with at Least a Bachelor's Degree						-0.0370** (0.0179)	-0.0417** (0.0188)	-0.0389** (0.0189)	-0.0382** (0.0189)
Population Age under 25							0.0293 (0.0219)	0.0291 (0.0220)	0.0295 (0.0220)
Population Age over 65							0.0656*** (0.0230)	0.0654*** (0.0233)	0.0662*** (0.0233)
Republican Votes							0.0037 (0.0036)	0.0039 (0.0036)	0.0039 (0.0036)
Other Votes							-0.0126*** (0.0048)	-0.0125*** (0.0048)	-0.0125*** (0.0048)
Newly Naturalized Citizens								-0.4941 (0.5308)	
Time FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Wald Chi-Square	52.0300*** 800	54.4800*** 800	58.1400*** 800	61.0500*** 800	66.6900*** 800	70.8000*** 800	78.6700*** 800	87.2500*** 800	88.2700*** 800
N	800	800	800	800	800	800	800	800	800

Notes: The table contains the coefficient estimates, with the standard errors in parentheses. The economic freedom measure is the Fraser Institute's Economic Freedom of North America Index. *** $p \leq 0.01$; ** $0.01 < p \leq 0.05$; * $0.05 < p \leq 0.10$

To test the robustness of my results, I reestimate model (1) with the alternative measure of economic freedom, which is the Cato Institute's Freedom in the 50 States chained economic freedom index. This index, from 2004 to 2019, has a mean value of 0.010 and a standard deviation of 0.221. The minimum value in the data set is -0.755 (New York in 2008), and the maximum value is 0.487 (Florida in 2019). The regression results are summarized in table 4, column [9]. The coefficient estimates for economic freedom and the interaction effect with economic development (Economic Freedom X $\ln(\text{GDP per Capita})$) are both statistically significant at the 1 percent level. Moreover, the coefficient estimate for economic freedom is positive and the coefficient estimate for the interaction effect is negative. The estimate for economic development ($\ln(\text{GDP per capita})$) is positive but statistically insignificant. These results are consistent with those shown earlier, demonstrating that my findings are robust. Hence, these results also suggest that the effect of economic freedom on corruption depends on the state's level of economic development.

Table 4: Poisson regression estimates for model of corruption convictions per 100,000 government employees using alternative measure of economic freedom

Covariates	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Economic Freedom	37.6715*** (1.3375)	42.9108*** (11.5952)	43.5809*** (11.5978)	42.7141*** (11.6561)	50.9053*** (12.0178)	51.1473*** (12.0103)	46.0743*** (12.1744)	42.3181*** (12.2782)	42.3041*** (12.2571)
ln(GDP per Capita)	-0.0333 (0.4002)	-0.0935 (0.4022)	0.1107 (0.4397)	-0.0013 (0.4464)	-0.2275 (0.4598)	-0.2051 (0.4604)	-0.1481 (0.4624)	0.1010 (0.4866)	0.1242 (0.4872)
Economic Freedom X ln(GDP per Capita)	-3.4831*** (1.0421)	-3.9671*** (1.0659)	-4.0164*** (1.0656)	-3.9462*** (1.0707)	-4.7005*** (1.1042)	-4.7342*** (1.1037)	-4.2709*** (1.1186)	-3.9120*** (1.1287)	-3.9182*** (1.1268)
ln(Population)	1.7315** (0.7930)	1.6550** (0.7968)	1.6343** (0.7960)	1.9924*** (0.8087)	1.8866** (0.8106)	1.8731** (0.8123)	2.0420*** (0.8157)	2.0848*** (0.8156)	2.0848*** (0.8156)
Unemployment	0.0294 (0.0257)	0.0385 (0.0264)	0.0294 (0.0264)	0.0334 (0.0265)	0.0296 (0.0265)	0.0265 (0.0265)	0.0324 (0.0267)	0.0331 (0.0270)	0.0331 (0.0270)
Income Inequality	0.0206 (0.0139)	0.0206 (0.0139)	0.0206 (0.0139)	0.0220 (0.0139)	0.0227* (0.0139)	0.0227* (0.0139)	0.0207 (0.0139)	0.0208 (0.0141)	0.0176 (0.0144)
Violent Crime	0.0010*** (0.0004)	0.0009*** (0.0004)	0.0009*** (0.0004)	0.0010*** (0.0004)	0.0009*** (0.0004)	0.0009*** (0.0004)	0.0007* (0.0004)	0.0006 (0.0004)	0.0006 (0.0004)
Population with at Least a Bachelor's Degree					-0.0386** (0.0181)	-0.0425** (0.0189)	-0.0404** (0.0190)	-0.0395** (0.0190)	-0.0395** (0.0190)
Population Age under 25					0.0291 (0.0218)	0.0291 (0.0218)	0.0276 (0.0219)	0.0279 (0.0219)	0.0279 (0.0219)
Population Age over 65					0.0594*** (0.0231)	0.0594*** (0.0231)	0.0569** (0.0234)	0.0576*** (0.0235)	0.0576*** (0.0235)
Republican Votes					0.0015 (0.0056)	0.0015 (0.0056)	0.0018 (0.0056)	0.0018 (0.0056)	0.0018 (0.0056)
Other Votes					-0.0118*** (0.0048)	-0.0118*** (0.0048)	-0.0117*** (0.0048)	-0.0117*** (0.0048)	-0.0117*** (0.0048)
Newly Naturalized Citizens									-0.5637 (0.5318)
Time FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES	YES
Wald Chi-Square	58.6500*** 800	63.2300*** 800	64.6400*** 800	66.8000*** 800	73.7700*** 800	78.0900*** 800	84.6500*** 800	91.2200*** 800	92.42*** 800

Notes: The table contains the coefficient estimates, with the standard errors in parentheses. The economic freedom measure is the Fraser Institute's Economic Freedom of North America Index. *** $p \leq 0.01$; ** $0.01 < p \leq 0.05$; * $0.05 < p \leq 0.10$

VI. Discussion

The economics literature contains many papers that have empirically examined the relationship between economic freedom and corruption across countries. Though many find the anticipated negative relationship between the two, there are some conflicting findings. In their 2003 paper, Graeff and Mehlkop (2003) find that economic freedom and its components have a different effect on corruption depending on whether the countries are rich or poor. Furthermore, Pieroni and d'Agostino (2013) find that economic freedom may increase corruption in poor countries, especially those with transitional economies. Hence, these findings suggest that the effect of economic freedom on corruption may depend on levels of economic development. I contributed to the literature by testing this proposition among the fifty states within the US. The results show that the marginal effect of economic freedom on corruption is positive, but it becomes increasingly negative as economic development increases. For states with low economic development, the marginal effect of an increase in economic freedom on corruption is positive, and for states with high economic development, the marginal effect is negative. Furthermore, the results are robust across different measures of economic freedom.

There are several possible explanations for these findings. States with lower levels of economic development might have high barriers to entry, which could mean that higher economic freedom and more competition may increase corrupt activities (Graeff and Mehlkop 2003). In states with low economic development, increases in economic freedom could increase competition in a market with low returns, causing some firms to seek other ways of outmaneuvering their competitors (Pieroni and d'Agostino 2013). This might not hold in more economically developed states, where there are higher expected returns from competing in the marketplace compared to using bribery and taking other corrupt actions.

Another explanation may be related to the way I measure corruption. I and many other researchers use corruption-conviction rates to proxy for corruption, but they might not be actually measuring corruption. States with higher corruption-conviction rates may have criminal and investigative institutions that are better at detecting and successfully convicting corrupt government officials. If so, it could be argued that these states are less corrupt since corrupt officials are being more effectively rooted out. This would call into question the validity of this commonly used proxy for corruption. Future research should

incorporate additional measures of corruption that do not suffer the same defects.

References

- Anton, S. G. 2019. "Leverage and Firm Growth: An Empirical Investigation of Gazelles from Emerging Europe." *International Entrepreneurship and Management Journal* 15 (1): 209–32.
- Apergis, N., O. C. Dincer, and J. E. Payne. 2010. "The Relationship between Corruption and Income Inequality in US States: Evidence from a Panel Cointegration and Error Correction Model." *Public Choice* 145: 125–35.
- Apergis, N., O. C. Dincer, and J. E. Payne. 2012. "Live Free or Bribe: On the Causal Dynamics between Economic Freedom and Corruption in US States." *European Journal of Political Economy* 28 (2): 215–26.
- Apergis, N., O. Dincer, and J. E. Payne. 2014. "Economic Freedom and Income Inequality Revisited: Evidence from a Panel Error Correction Model." *Contemporary Economic Policy* 32 (1): 67–75.
- Ashby, N. J. 2007. "Economic Freedom and Migration Flows between US States." *Southern Economic Journal* 73 (3): 677–97.
- Ashby, N. J., and R. S. Sobel. 2008. "Income Inequality and Economic Freedom in the US States." *Public Choice* 134: 329–46.
- Bennett, D. L., and B. Nikolaev. 2017. "On the Ambiguous Economic Freedom–Inequality Relationship." *Empirical Economics* 53: 717–54.
- Bennett, D. L., and R. K. Vedder. 2013. "A Dynamic Analysis of Economic Freedom and Income Inequality in the 50 US States: Empirical Evidence of a Parabolic Relationship." *Journal of Regional Analysis & Policy* 43 (1): 42–55.
- Bjørnskov, C., and N. J. Foss. 2008. "Economic Freedom and Entrepreneurial Activity: Some Cross-country Evidence." *Public Choice* 134: 307–28.
- Bologna, J. 2017. "Corruption, Product Market Competition, and Institutional Quality: Empirical Evidence from the US States." *Economic Inquiry* 55 (1): 137–59.
- Campbell, N. D., A. Jauregui, and K. C. Heriot. 2008. "Housing Prices and Economic Freedom." *Journal of Private Enterprise* 23 (2): 1–17.
- Carter, J. R. 2007. "An Empirical Note on Economic Freedom and Income Inequality." *Public Choice* 130 (1–2): 163–77.
- Chang, S. C., and M. H. Li. 2019. "Impacts of Foreign Direct Investment and Economic Development on Carbon Dioxide Emissions across Different Population Regimes." *Environmental and Resource Economics* 72 (2): 583–607.
- Choudhury, S. 2021. "Regulation and Corruption: Evidence from the United States." *Oxford Bulletin of Economics and Statistics* 83 (4): 897–934.
- Clark, J. R., and R. A. Lawson. 2008. "The Impact of Economic Growth, Tax Policy and Economic Freedom on Income Inequality." *Journal of Private Enterprise* (Fall).
- Dell'Anno, R. 2020. "Corruption around the World: An Analysis by Partial Least Squares—Structural Equation Modeling." *Public Choice* 184 (3–4): 327–50.
- Dincer, O., and B. Gunalp. 2020. "The Effects of Federal Regulations on Corruption in US States." *European Journal of Political Economy* 65: 101924.
- Fang, W., S. M. Miller, and C. C. Yeh. 2015. "The Effect of Growth Volatility on Income Inequality." *Economic Modelling* 45: 212–22.

- Fisman, R., and R. Gatti. 2002. "Decentralization and Corruption: Evidence from US Federal Transfer Programs." *Public Choice* 113 (1–2): 25–35.
- Garbinti, B., J. Goupille-Lebret, and T. Piketty. 2018. "Income Inequality in France, 1900–2014: Evidence from Distributional National Accounts (DINA)." *Journal of Public Economics* 162: 63–77.
- Glaeser, E. L., and R. E. Saks. 2006. "Corruption in America." *Journal of Public Economics* 90 (6–7): 1053–72.
- Goel, R. K., and M. A. Nelson. 2005. "Economic Freedom versus Political Freedom: Cross-country Influences on Corruption." *Australian Economic Papers* 44 (2): 121–33.
- Goel, R. K., and M. A. Nelson. 1998. "Corruption and Government Size: A Disaggregated Analysis." *Public Choice* 97: 107–20.
- Graeff, P., and G. Mehlkop. 2003. "The Impact of Economic Freedom on Corruption: Different Patterns for Rich and Poor Countries." *European Journal of Political Economy* 19 (3): 605–20.
- Heller, L. R., and E. F. Stephenson. 2014. "Economic Freedom and Labor Market Conditions: Evidence from the States." *Contemporary Economic Policy* 32 (1): 56–66.
- Jackson, J. 2017. "Free to Be Happy: Economic Freedom and Happiness in US States." *Journal of Happiness Studies* 18: 1207–29.
- Johnson, N. D., C. L. LaFountain, and S. Yamarik. 2011. "Corruption Is Bad for Growth (Even in the United States)." *Public Choice* 147: 377–93.
- Johnson, N. D., W. Ruger, J. Sorens, and S. Yamarik. 2014. "Corruption, Regulation, and Growth: An Empirical Study of the United States." *Economics of Governance* 15: 51–69.
- Lægreid, O. M., and M. Povitkina. 2018. "Do Political Institutions Moderate the GDP-CO2 Relationship?" *Ecological Economics* 145: 441–50.
- Nikolaev, B. 2014. "Economic Freedom and Quality of Life: Evidence from the OECD's Your Better Life Index." *Journal of Private Enterprise* 29 (3): 61–96.
- Nyström, K. 2008. "The Institutions of Economic Freedom and Entrepreneurship: Evidence from Panel Data." *Public Choice* 136: 269–82.
- McCannon, B. C., and J. C. Hall. 2021. "Stay-at-Home Orders Were Issued Earlier in Economically Unfree States." *Southern Economic Journal* 87 (4): 1138–151.
- Murphy, R. H. 2016. "Economic Freedom of North America at State Borders." *Journal of Institutional Economics* 12 (4): 885–93.
- Pieroni, L., and G. d'Agostino. 2013. "Corruption and the Effects of Economic Freedom." *European Journal of Political Economy* 29: 54–72.
- Powell, B., and C. S. Rodet. 2012. "Praise and Profits: Cultural and Institutional Determinants of Entrepreneurship." *Journal of Private Enterprise* 27 (2): 19.
- Ruger, W. P., and J. Sorens. 2021. *Freedom in the 50 States. An Index of Personal and Economic Freedom*. 6th ed. Washington, DC: Cato Institute.
- Saha, S., and J. J. Su. 2012. "Investigating the Interaction Effect of Democracy and Economic Freedom on Corruption: A Cross-country Quantile Regression Analysis." *Economic Analysis and Policy* 42 (3): 389–96.
- Saha, S., and M. S. B. Ali. 2017. "Corruption and Economic Development: New Evidence from the Middle Eastern and North African Countries." *Economic Analysis and Policy* 54: 83–95.

- Shen, C., and J. B. Williamson. 2005. "Corruption, Democracy, Economic Freedom, and State Strength: A Cross-national Analysis." *International Journal of Comparative Sociology* 46 (4): 327–45.
- Smith, J. D. 2016. "US Political Corruption and Firm Financial Policies." *Journal of Financial Economics* 121 (2): 350–67.
- Stansel, D., J. Torra, F. McMahon, and A. Carrión-Tavárez. 2022. *Economic Freedom of North America 2022*. Vancouver, Canada: Fraser Institute.
- Walker, D. M., and P. T. Calcagno. 2013. "Casinos and Political Corruption in the United States: A Granger Causality Analysis." *Applied Economics* 45 (34): 4781–95.
- Williamson, C. R., and R. L. Mathers. 2011. "Economic Freedom, Culture, and Growth." *Public Choice* 148: 313–35.
- Yamarik, S., and C. Redmon. 2017. "Economic Freedom and Corruption: New Cross-country Panel Data Evidence." *Journal of Private Enterprise* 32 (2).