The Effect of Trade Barriers and Governmental Regulation on Overall Economic Well-Being

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Abstract

Barriers to trade and other market regulations have long been thought to inhibit the ability of a nation's economy to grow and prosper. We test this hypothesis using a multiple regression model and data from The Heritage Foundation and United Nations related to trade freedom and general economic regulation on a by-country basis to fully discern the impact of governmental regulation on a country's GDP per capita. We find that GDP per capita rises significantly as a nation's business freedom and trade freedom grow and that a nation's status as developing or developed has additional bearing on GDP per capita. This provides strong confirmation for our hypothesis that deregulated economies experience higher levels of economic prosperity as measured by GDP per capita than their regulated counterparts and indicates that a market-specific look should be taken to fully understand the nuances of the results of different types of economic regulation.

Introduction

The fine tuning of trade barriers and regulations is a never-ending process that countries and their leaders try to perfect, but the exact balance needed between regulation and economic freedom may never be fully decided upon. That said, the relation between trade rules or regulation and economic well-being as measured by GDP per capita for individual countries can be looked at for a much broader idea of what helps countries grow an economy and what does not. Free trade is widely thought to be prerequisite for sustained economic success, but many countries feel the need to promote domestic production by enforcing barriers and regulations on imported goods and regulating different aspects of the economy as a whole. The same is true of regulation in other sectors of the economy, such as the labor and business markets: lawmakers are often compelled to protect the interests of various stakeholders at the expense of economic freedom. Overall, we will look at the impact of regulations and trade barriers on GDP per capita as we analyze whether the blanket statement that completely free trade and deregulated markets are always the most beneficial for an economy is true or if regulation in some or all sectors is of help as well.

This research is important because it gives guidance as to how much is too much and how little is too little when it comes to regulations and barriers. It shows the overall, broad trend relating trade freedom and economic regulations and to GDP per capita for a country. Using data from The Heritage Foundation's *Index of Economic Freedom* and the United Nations, we analyze this relation. The *Index of Economic Freedom* is broken into four major groupings: rule of law, government size, regulatory efficiency, and market openness. Each of these groupings is composed of multiple country-level variables. Our study focuses on the section for regulatory efficiency and market openness, and within this the variables trade freedom, business freedom, investment freedom, and labor freedom (The Heritage Foundation, 2019). By using these measurements as the independent variables and GDP per capita as the dependent variable for individual countries, we analyze what (if any) correlations or trends we can find from the data. We hypothesize that the overall trend will show a positive relationship between economic freedom and economic well-being as measured by GDP per capita. This hypothesis operates off of the free market assumption that economies do best when they are left to run themselves and work through peaks and valleys naturally. Thus, allowing trade, business, investment, and labor to happen freely without regulations or interruption should result in the optimal economic conditions for countries.

Literature Review

The Economic Freedom of the World (EFW) index consists of twelve categories which are foreign aid and intergovernmental organizations, crises, democracy, political and human rights and civil liberties, history/deep roots, inequality, ideology, migration, natural resources and geography, income and

growth, economic freedom, and other (Lawson, 2019). This index was first published in 1992 by James Gwartney, Walter Block, and Robert Lawson as a sort of response or challenging of the utopian book *1984*. These men set out to create an index that could give insight into the right combination of variables to describe economic freedom. So, as the index was used for other papers, an astounding two thirds of studies showed that the independent variables as listed previously were correlated in a "good way" with economic freedom. With this, the question arose of "how do you attain more economic freedom?" This question would lead to intense analysis of each independent variable to try to figure out what exactly resulted in more economic freedom. For the impact of foreign aid on economic freedom it was found that there was a negative correlation between the two, but there was very little confidence in the result from the data. For the impact of democracy on economic freedom, this time there was a positive average correlation, but once again with a high standard error there was little confidence in the results. Next, when examining political and human rights with economic freedom there were significant results showing a positive correlation between these rights and economic freedom. Furthermore, the impact of inequality on economic freedom was once again shown to be negative with confidence. The further research that has come from the EFW index has given much insight into what specifically results in higher economic freedom. While we do not examine this directly, we look at economic freedom as an independent variable for GDP per capita of individual countries.

Continuing with the theme of creating an index, Douglas A. Irwin examined the correlation between trade restrictions and the deadweight loss the United States suffers from tariffs (Irwin, 2010). This is done for a span of time when tariffs were the main policy in international trade. The normally used import-weighted average tariff is highly correlated to the trade restrictiveness index. The import-weighted average tariff on average understates the trade restrictiveness index by 75%. The paper also gives estimates of deadweight loss from US tariffs yearly. The estimates propose that deadweight losses were a large 1% of GDP after the Civil War, and the losses decreased to 0.1% at the end of World War II. They say that this decline is a result of removing and lowering of many tariffs on imports. Since trade is historically a small part of the US economy, tariffs tend to have less of an impact on the economy than restrictions such as import quotas and import licenses. The era in which deadweight losses were up to 1% was in a time of high trade protectionism, and by the time they had lowered to 0.1% it was a period of trade liberalization. The average tariff post-Civil War, a time of high protectionism, was about 30%. Once again, this paper supports our hypothesis that increased tariffs and trade restrictions is detrimental to the economy and GDP growth, and as more freedoms are given for international trade, the economy grows as does GDP for the country.

While there is plenty of research dealing with economic freedom and its impact as well as research into investment in human capital and that's impact, the two have rarely been looked at with each other. Horst Feldmann examines the effect of economic freedom on human capital investment (Feldmann, 2017). Feldmann hypothesizes that greater economic freedom will result in greater investment in human capital, as there is likely a higher return on investment in this scenario than when there are fewer economic freedoms. This is compared to how investment in physical capital increases with more economic freedoms. Furthermore, with more economic freedom, those who invest in human capital keep more of their return on their investment and it is easier to invest (both just like physical capital). Interestingly, this paper utilizes the Economic Freedom of the World index, as mentioned in the first literature review. (This conveniently strengthens the validity and usefulness of the index.) This study finds that there is significant positive correlation between economic freedom and investment in human capital. Under the assumption that investment in human capital should lead to increase in GDP, this study once again supports our hypothesis.

Our goal for this paper is to give a broad view on the relationship between economic regulations and GDP per capita of a country. We hypothesize that greater economic freedoms will result in higher GDP per capita, and the literature we have reviewed leads us to believe that our hypothesis will be correct. Two of these pieces of literature explained the development of an index regarding some sort of economic freedom, and then continued to give support as to why the index is a useful and significant source for measuring a country's economic freedom. Both gave hard evidence of the index being used and giving positive results, which agree with our hypothesis. The third study we reviewed not only gave us more confidence in our hypothesis by its findings, but also validated one of the indexes we had reviewed previously. Our paper is unique because it examines various subsets of economic freedom and analyzes which have the greatest impact on GDP. Using these findings hopefully we can give similar information to what Lawson found with the EWG index and what had the greatest impact on economic freedom, but this time for GDP per capita rather than economic freedom.

Data

All data is sourced from The Heritage Foundation, a policy think tank based in Washington D.C. which calculates and publishes an annual index on the economic freedom of each country, and the United Nations (data on developed vs. developing nations). As specified later, our multiple regression analysis will use several of the sub-indices that The Heritage Foundation uses to calculate its final economic freedom index numbers each year. The ways that these sub-indices are calculated are outlined transparently and in great detail within a report published by The Heritage Foundation each year, and the

determinants of each variable are verifiable and quantitative in nature. This ensures that there will be no variables included in our analysis that are skewed by opinion or researcher bias, as each figure is calculated based on real economic and statistical metrics collected on a by-country basis each year. We will use data from the year 2017, giving us country-level data adding up to 187 observations.

For the purposes of our analysis, we will consider GDP per capita as our dependent variable and four indices developed by The Heritage Foundation as our independent variables: business freedom, investment freedom, trade freedom, and labor freedom. Each of these variables is measured on a scale from 0-100 with 100 indicating a perfectly free market and 0 indicating a completely regulated or unfree market. Business freedom captures the "extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses". It is generated from a variety of related subfactors from each country, including number of procedures needed to start a business, the cost and time of obtaining a business license, and 11 other factors. Investment freedom refers to constraints associated with the flow of investment capital within a country. It is generated as a composite of a nation's treatment or screening of foreign investment, foreign investment code, restrictions on land ownership, capital controls, and other factors related to investment. Labor freedom captures factors influencing the operation of a country's labor market, including mandatory severance pay, difficulty to hire additional workers, and ratio of minimum wage to average value added per worker. Trade freedom measures "the extent of tariff and nontariff barriers that affect imports and exports of goods and services" and is calculated based on trade-weighted average tariff rate and rate of non-tariff barriers. Between these four factors, we have a suitable proxy for regulation with which to test the impact of a government's level of control on the economy's ability to grow and develop.

Overall, the descriptive statistics for our dataset seem to indicate that most nations are in the mid-to-upper tier of economic freedom. We will outline the key descriptive statistics by variable to give a holistic picture of the initial state of each:

Figure 1: Descriptive Statistics

	Observations	Mean	St. Dev.	Min	Max
GDPperCapita	183	20,680.51	23,945.71	651.9	160,526
trade	183	75.94	11.83	0	90
labor	184	58.89	14.65	5	92.6
investment	184	57.26	23.28	0	95
business	184	64.77	14.83	5	96.3

Trade Freedom: Our data has 183 useable country-level points, with a mean score of 75.94 and standard deviation of 11.83. The mean is high and indicates a generally high level of trade freedom, and the relatively low standard deviation indicates a general openness to trade. The minimum is 0 and maximum is 90.

Investment Freedom: There are 184 usable observations of the investment freedom variable, with a mean of 57.26 and standard deviation of 23.28. It is immediately evident that there is more fluctuation in investment freedom globally than trade freedom, and a lower average baseline for investment freedom as well. The minimum is 0 and the maximum is 95.

Business Freedom: Business freedom has 185 usable observations, a mean of 64.77, and a standard deviation of 14.83. This means that most countries have a relatively high degree of business freedom with a relatively low standard deviation. The max was 96.3 and minimum was 5.

Labor Freedom: Labor freedom has 184 observations with a mean of 58.89 and standard deviation of 14.65, making it very similar to business freedom. The minimum is 5 and the maximum is 92.6.

GDP per Capita: There are observations of GDP per capita, with a mean of 20,680.51 and a standard deviation of 23,945.71 with a minimum of 651.9 and maximum of 160,526. GDP per capita is reported in Purchasing Price Parity (PPP) adjusted dollars to give the most accurate results.

Our data satisfies the Gauss-Markov condition of linearity because the dependent variable, GDP per capita, is assumed to be a linear function of the four indices we have selected as independent variables. This is verified by the form of our regression equation, which is expressed as follows:

$$GDP\,per Capita = \beta_0 + \beta_1 Trade Freedom + \beta_2 Investment Freedom + \beta_3 Labor Freedom + \beta_4 Business Freedom + u$$

Assumption two of Gauss-Markov is also satisfied because the data collected is the entire population of possible data points and, therefore, also an adequate random sample. We have information on each explanatory variable for each country in the world, thereby eliminating the need to ensure that an adequately randomized sample was collected. This would have been a factor if we had selected a subset of nations to work with, but using the entire population eliminates this consideration. Assumption three of Gauss-Markov states that no regressor has a perfect correlation with any other regressors in the model. We can verify this assumption by calculating the correlation coefficient values between each of our four independent variables (Appendix A).

The ranges of these coefficients run from 0.29 (between investment freedom and labor freedom) to 0.63 (between trade freedom and business freedom), proving that no two regressors exhibit perfect collinearity. It is permissible to have high correlation between any two variables, but not perfect linearity.

Because our model has no value of 1.00 for correlation between the variables, it satisfies assumption three (Appendix B). Assumption four states that there the model must exhibit exogeneity, meaning that the expectation of the error term u conditional on each regressor is equal to 0. We can assure that this assumption is not violated by determining whether or not the variables contained within the model are endogenous. If the explanatory variables are deemed to be endogenous, they are therefore correlated with the error term and the assumption is violated. Our variables are not endogenous and therefore satisfy assumption four of Gauss-Markov. The final assumption of Gauss-Markov is homoscedasticity, that the error term has the same variance across all values for all independent variables. The consistency of our error term across all variables satisfies this condition, as shown by the clustering of our residual values around the 0 line in (Appendix C).

Results

Initially, we construct a Simple regression model to understand the relationship between GDP per Capita and a singular independent variable; in this case, we utilize the *trade* variable from the dataset.

$$\text{SLR: } GDPperCapita = \beta_0 + \beta_1 trade$$

$$GDPperCapita = 1119.269trade - 70912.17$$

The simple regression equation tells us that for every one-unit increase in Trade Freedom score, GDP per capita rises by 1119.27. Considering statistical significance, the results yield a 0.27 R^2 value. From this, we can conclude that around 27% of the variation of the dependent variable can be explained by the model. This provides a strong foundation for future model specification by proving that even Trade Freedom alone has a strong explanatory effect on GDP per capita, and one that is unquestionably large enough in magnitude to be economically significant. A single-point increase in the trade index leading to a $1,119 increase in GDP per capita is compelling reason to continue with our existing data and variables.

Next, we conduct a multiple regression test and formulate the multiple regression equation with Investment Freedom, Trade Freedom, and Business Freedom as independent variables and GDP per capita as the primary dependent variable.

$$\text{MLR3: } GDPperCapita = \beta_0 + \beta_1 trade + \beta_2 investment + \beta_3 business + u$$

$$GDPperCapita = -62565.27 + 578.091trade + 143.79investment + 461.91business$$

We single out the regression coefficients of the independent variables to measure the precise effect on the dependent variable. The Investment Freedom variable holds a coefficient of 143.79, which indicates that there is in fact, a positive relationship between investment freedom and GDP per capita. More specifically, we find that with a one-unit change in Investment Freedom, we expect that GDP per

capita will increase or decrease by 143.79. Examining the Trade Freedom variable's coefficient , we see that it is positive with a value of 578.09. This tells us that with a one-unit change in Trade Freedom, GDP per capita increases/decreases by 578.09. The Business Freedom variable reveals a positive coefficient of 461.91. With this, we can say that for every one-unit increase in Business Freedom, GDP per Capita increases by 461.91.

To test the statistical significance, we observe the P-values for each explanatory variable in the equation. For Trade Freedom, Investment Freedom and Business freedom, the P-values are .001, .042, .000 respectively. Considering an alpha value of .05, we fail to reject our hypothesis given each P-value is less than alpha of .05. In addition to confirming significance, from our tests we compute an R2 value of 0.37. From this, we can conclude that around 37% of the variation of the dependent variable can be explained by the model. This gives very encouraging results that point to the significance of trade freedom and business freedom in particular, hinting that it may only be true that freedom in certain sectors of the economy is beneficial for economic health while others need not be free for an economy to prosper.

Within our specification process, we also considered an additional multiple regression model that takes into account labor freedom and government expenditure in addition to the explanatory variables in MLR3.

MLR2*: GDPperCapita* = $\beta_0 + \beta_1 trade + \beta_2 labor + \beta_3 investment + \beta_4 business + \beta_5$ *govtexpenditure*

GDPperCapita = -64363.45 + 549.97*trade* -15.60*labor* + 154.57*Investment* + 439.56*business*

+169.97*govtexpenditure.*

When examining this model with respect to *labor* and *govtexpenditure (*government expenditure as a percentage of GDP, introduced to try and capture the effect of government spending on GDP per capita)*,* we find that labor is negatively correlated with GDP per capita, with a coefficient value of -15.60. The *govtexpenditure* variable exhibits a positive coefficient value of 169.97. The R-Squared value for this test is 0.3835, which tells us that 38.35% of the variation of the dependent variable can be explained by the model. In addition to interpreting the coefficients and the R^2 value, we must further test the statistical significance of our results by observing the p-values. For Business Freedom, Trade Freedom, Investment Freedom, and Labor Freedom, the p-values are: .001, .001, .029, .884 respectively. With an alpha value of .05, we have enough evidence to support our hypothesis with respect to Business Freedom, Trade Freedom, Investment Freedom (P-value<.05) and reject our hypothesis for Labor Freedom (P-value>.05).

A third Multiple Regression equation is formulated (MLR1) taking into account the effect of Trade, Labor, and Investment on GDP per Capita. The model yields similar but less significant results compared to models MLR2 and MLR3.

$$\text{MLR1: } GDP\,perCapita = \beta_0 + \beta_1 trade + \beta_2 labor + \beta_3 investment + u$$

$$GDPperCapita = -61990.28 + 808.35 trade + 144.12 labor + 203.01 investment$$

From this model, it is clear that labor freedom is not nearly as economically significant as either investment freedom or trade freedom. For this reason, it will be excluded from future iterations of the model. While an increase of 144.12 in GDP per capita per unit increase in labor freedom is of relatively large magnitude in a vacuum, we find it to be statistically insignificant at all levels (as shown in Figure 2 below) while trade and business freedom are significant even at 1%. This seems to indicate that the level of regulation existing in a nation's labor market is not nearly as important to economic prosperity as trade and business freedom, a conclusion that is logical given the presence of labor restrictions across the developed world relative to the lower-GDP per capita developing world.

When drawing conclusions from our results, it is important to consider any possible omitted variables that could lead to bias. There certainly are variables not present in the model that could have led to higher correlation and significance for our study. If variables such as education were to be included, the model might have exhibited both a higher degree of collinearity with the stated explanatory variables and higher correlation with respect to the dependent variable.

Figure 2: SLR & MLRs 1-3

Independent Variable	SLR	MLR1	MLR2	MLR3
trade	1119.27*** (s.e. 148.67)	808.35*** (s.e. 158.85)	549.97*** (s.e. 164.86)	578.09*** (s.e. 164.32)
labor	--	144.12 (s.e. 100.25)	-15.60 (s.e. 106.57)	--
investment	--	203.01*** (s.e. 71.20)	154.56** (s.e. 70.37)	143.79** (s.e. 70.25)
business	--	--	439.56*** (s.e. 127.29)	461.91*** (s.e. 113.76)
govtexpenditure	--	--	169.97* (s.e. 101.30)	--
intercept	70912.17 *** (s.e. 11471.89)	-61990.28*** (s.e. 10716.78)	-64363.45*** (s.e. 10384.48)	-62576.27*** (s.e. 9993.93)

R^2	.2666	.3226	.3835	.3733

*Significant at 10%, **5%, ***1%

All considered, we adopt MLR3 as our working model for future tuning. While it does not have the highest R^2 value of all models, it does consider the most statistically significant of our variables and exclude some that were not significant at either any level (labor freedom) or only significant at 10% (govtexpenditure)

Extensions

To test for joint significance between models, we calculated the F-statistic. More specifically, we examined if *labor* and *govtexpenditure* were jointly significant at a 5% confidence level when they were removed from the model, leaving only *trade*, *investment*, and *business* as the independent variables for *GDPperCapita*. The calculations are shown below:

Unrestricted

$$GDPperCapita = \beta_0 + \beta_1 trade + \beta_2 labor + \beta_3 investment + \beta_4 business + \beta_5 govtexpenditure$$

Restricted

$$GDPperCapita = \beta_0 + \beta_1 trade + \beta_3 investment + \beta_4 business$$

$$H_0: \beta_2 = \beta_5 = 0$$

$$H_1: H_0 \text{ is false}$$

$$F = \frac{(R_{UR}{}^2 - R_R{}^2)/q}{(1 - R_{UR}{}^2)/(n - k - 1)}$$

$$F = \frac{(0.3835 - 0.3733)/2}{(1 - 0.3835)/(180 - 5 - 1)} = 1.439$$

At 5%: $F_{6, 180} = 2.10$

$2.10 > 1.439$, fail to reject H_0

As shown, we fail to reject H_0 meaning that *labor* and *govtexpenditure* are jointly insignificant at a 5% confidence level. So, removing both of the variables from the model is not detrimental to our regression.

We also tested for multicollinearity for the restricted model looking at the variance inflation factor (VIF) for the three independent variables. VIF for each of the variables were all under two, which more than satisfies the standard level of the VIF being less than ten for there not to be collinearity (Appendix E).

To further tune the model, we alter its functional form to a double-log format. This accomplishes a useful goal for our dependent variable, GDP per capita, by scaling our coefficients down to a more workable size and allowing for easier interpretation of the coefficients. It additionally helps to normalize the dependent variable, which was previously skewed to the right (indicating that the mean GDP per capita exceeds the median GDP per capita, likely because of large outlier values from nations with GDP per capita values that far exceed normal values). The skewness of GDP per capita prior to taking the log was a robust 2.43, but making the adjustment to a new functional form drops the value to a much smaller -0.22 -- indicating a nearly normal distribution. A normal distribution of the dependent variable itself is not a requirement in a regression model, but it is a beneficial side-effect of the change. We can now interpret our coefficients by percentages rather than score units, making it easier to provide comprehensible results.

Adjusting the functional form to a double-log format also made a positive impact on the results of the model. This is reflected in the output below for the new model:

$$MLR4: logGDPperCapita = \beta_0 + \beta_1 logtrade + \beta_2 loginvestment + \beta_3 logbusiness + u$$

logGDPperCapita	logtrade	loginvesment	logbusiness	R^2	$adj.R^2$	Observations
-12.08*** (s.e. 2.10)	2.77*** (s.e. 0.59)	0.25* (s.e. 0.14)	2.01*** (s.e. 0.34)	0.48	0.47	175

*Significant at 10%, **5%, ***1%

Applying the new functional form reduces *loginvestment* to significance at the 10% level (a t-statistic of 1.79 and 175 total observations) but maintains 1% significance for the other two variables (t-statistics of 4.66 for *logtrade* and 5.91 for *logbusiness*). The significance of these variables is once again affirmed by p-values of $p > |t| = 0.000$ for *logtrade*, $p > |t| = 0.000$ for *logbusiness*, and $p > |t| = 0.075$ for *loginvestment*. Logically, these new coefficient results indicate that a 1% increase in a nation's trade freedom score will result in a 2.77% increase in GDP per capita, a 1% increase in a business freedom score will result in a 2.01% increase in GDP per capita, and a 1% increase in investment freedom will result in a 0.25% increase in GDP per capita. It is clear that 2+% increases in GDP per capita per percent increase in a freedom index is economically significant, and it is now more apparent that investment is a smaller determinant in a nation's GDP per capita, and that there is a clear benefit to a nation having increased freedom in trade and in its business environment. We find a new R^2 value of 0.48 and adjusted R^2 of 0.47, marked improvements on the performance of the previous model. This indicates

that 48% of the variance in *logGDPperCapita* is explained by our model, a number that holds strong even in the adjusted R^2 version.

To tune further, we add a dummy variable for whether or not a nation is developed to our regression model MLR 5 with a goal of capturing the impact of whether or not a nation is a developing or developed economy on its GDP per capita. Adding this variable (*developed*) makes *loginvestment* fully insignificant, so we opted to remove it and reported the result as MLR6 below:

$$MLR5: \ logGDPperCapita = \beta_0 + \beta_1 logtrade + \beta_2 logbusiness + \beta_3 developed + u$$

logGDPperCapita	logtrade	logbusiness	developed	R^2	$adj. R^2$	Observations
-7.02*** (s.e. 2.23)	2.17*** (s.e. 0.57)	1.62*** (s.e. 0.32)	0.84*** (s.e. 0.19)	0.49	0.48	180

*Significant at 10%, **5%, ***1%

As demonstrated, all three independent variables in this model are statistically significant at 1% by t-statistic and by p-value (with corresponding p-values of 0.000 for each of logtrade, logbusiness, and developed). This yields our strongest model yet and gives us the best tool for understanding the impact of governmental regulation and trade freedom on economic well-being.

This model features the highest R^2 of any model so far at 0.49 and maintains statistical significance even at 1% for both *logtrade* and *logbusiness*. It indicates that GDP per capita increases by 2.17% with a 1% increase in logtrade and by 1.62% with a 1% increase in logbusiness.The coefficient on the dummy variable *developed,* which is 0 for developing nations and 1 for developed nations (per the United Nations official classification) is 0.84, indicating an increase of 84% in GDP per capita when a nation moves from 0 (developing) to 1 (developed). This allows us to capture some of the variance in GDP per capita that is not government-driven by accounting for the overall nature of the economy rather than the moment-in-time look we get by examining our indices, which can change by year.

Conclusion

All things considered, we find compelling evidence that nations with lower levels of governmental regulation and fewer trade barriers experience greater economic prosperity as measured by GDP per capita. Perhaps the most interesting takeaway is that of the many variables experimented with during the model specification process, we ended up achieving the best results using only two of the original indices -- trade freedom and business freedom -- and our dummy variable indicating whether or not a nation is developed. This suggests that of all the sectors in an economy, it is most critical for a

nation to be open to international trade and easy to navigate for entrepreneurs. These variables far outshined labor freedom and investment freedom, a finding that is consistent with the fact that many nations with the highest GDP per capita have developed strict regulations in both the labor market (minimum wage laws, restrictions on hours worked, etc.) and the investment arena (regulating foreign-direct investment and foreign holdings in domestic industries). It seems that in the absence of free trade and pro-business legislation, most nations struggle to achieve economic prosperity.

With an R^2 value of nearly 0.5 for our final regression model, it is true that our regression does not fully explain GDP per capita for countries. Other variables such as education, region and climate, or even variables we tested in previous models but did not use in our final model could account for these shortcomings and give a more complete explanation of our dependent variable. However, that was not our goal in this research. We set out to examine how economic freedoms influence GDP per capita and found that trade, business, and to a lesser extent investment freedom were explanatory of the dependent variable in all models while labor freedom ended up being insignificant in all models. Future work could consider even more aspects of an economy overall, including potential indices for variables such as taxation and presence of black markets (which can arise due to underregulation). It could additionally control for more factors that influence GDP per capita, including education level, to help capture more of the variance of the independent variable within the model.

In conclusion, the research has significant implications with respect to a nation's economic policy and decision making. The primary goal of every governing entity is to maximize overall economic prosperity for its citizens. With lower barriers and fewer stringent economic policies, greater economic welfare can be achieved.

Works Cited

"Economic Freedom Index Methodology." *2019 Index of Economic Freedom*, The Heritage Foundation, 2019.

Feldmann, Horst. "Economic Freedom and Human Capital Investment." *Journal of Institutional Economics*, vol. 13, 2017, pp. 421–445.

Irwin, Douglas A. "Trade Restrictiveness and Deadweight Losses from US Tariffs." *American Economic Journal: Economic Policy*, vol. 2, Aug. 2010, pp. 111–133.

Lawson, Robert A. "The Consequences and Causes of Economic Freedom." *The Journal of Private Enterprise*, vol. 34, 2019, pp. 1–10.

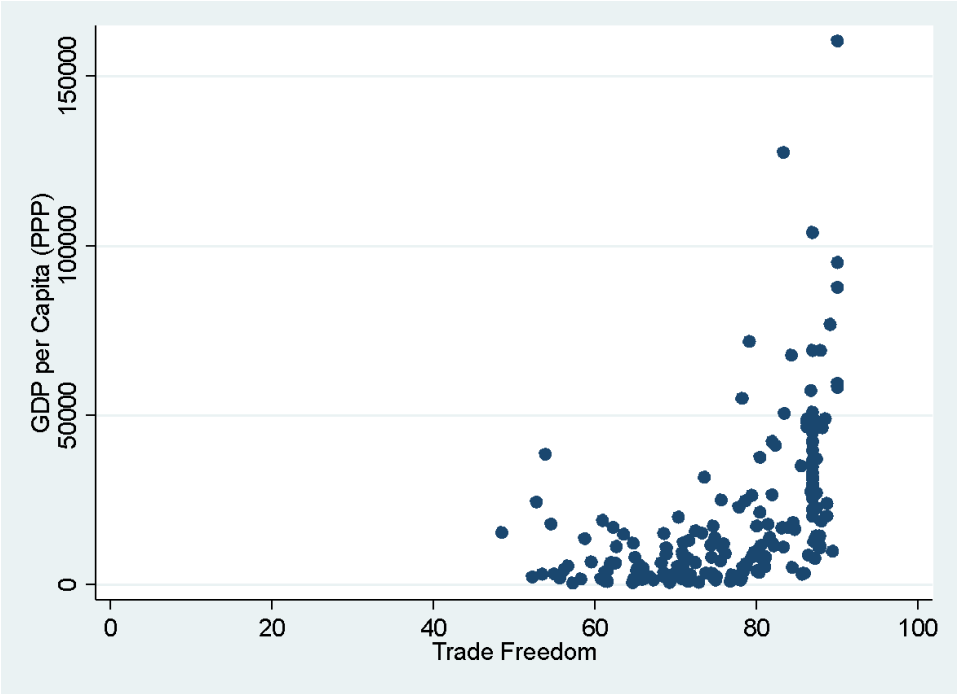
United Nations. "World Economic Situation and Prospects 2019", UN, New York, 2019.

Appendix

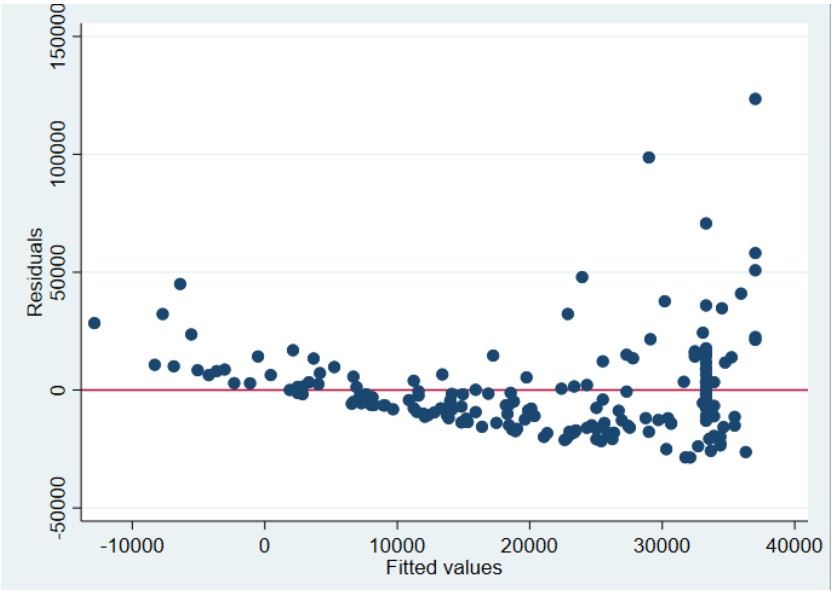
Appendix A: Correlation Table

	TradeF~m	Busine~m	Invest~m	LaborF~m
TradeFreedom	1.0000			
BusinessFr~m	0.6256	1.0000		
Investment~m	0.5700	0.5138	1.0000	
LaborFreedom	0.3866	0.5332	0.2854	1.0000

Appendix B: Simple Scatter Plot



Appendix C: Evidence of Homoskedasticity



Appendix D: SLR & MLR1-5

SLR

Source	SS	df	MS	Number of obs	=	181
				F(1, 179)	=	65.07
Model	2.7731e+10	1	2.7731e+10	Prob > F	=	0.0000
Residual	7.6282e+10	179	426158035	R-squared	=	0.2666
				Adj R-squared	=	0.2625
Total	1.0401e+11	180	577851147	Root MSE	=	20644

GDPperCapi~P	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TradeFreedom	1199.269	148.6688	8.07	0.000	905.8998	1492.638
_cons	-70912.17	11471.89	-6.18	0.000	-93549.71	-48274.63

MLR1

Source	SS	df	MS	Number of obs	=	180
				F(3, 176)	=	27.94
Model	2.7220e+10	3	9.0732e+09	Prob > F	=	0.0000
Residual	5.7161e+10	176	324777900	R-squared	=	0.3226
				Adj R-squared	=	0.3110
Total	8.4380e+10	179	471399336	Root MSE	=	18022

GDPperCapitaPPP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TradeFreedom	808.3516	158.8501	5.09	0.000	494.8555	1121.848
LaborFreedom	144.1165	100.2546	1.44	0.152	-53.7394	341.9724
InvestmentFreedom	203.0132	71.20302	2.85	0.005	62.49163	343.5349
_cons	-61990.28	10716.78	-5.78	0.000	-83140.22	-40840.34

MLR2

Source	SS	df	MS	Number of obs	=	180
				F(5, 174)	=	21.65
Model	3.2364e+10	5	6.4728e+09	Prob > F	=	0.0000
Residual	5.2017e+10	174	298946362	R-squared	=	0.3835
				Adj R-squared	=	0.3658
Total	8.4380e+10	179	471399336	Root MSE	=	17290

GDPperCapitaPPP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TradeFreedom	549.9748	164.8617	3.34	0.001	224.5887	875.3609
LaborFreedom	-15.59932	106.5669	-0.15	0.884	-225.9296	194.7309
InvestmentFreedom	154.5673	70.37033	2.20	0.029	15.67801	293.4567
BusinessFreedom	439.5617	127.286	3.45	0.001	188.3384	690.7851
GovtExpenditureofGDP	169.9704	101.3049	1.68	0.095	-29.97427	369.9151
_cons	-64363.45	10384.48	-6.20	0.000	-84859.22	-43867.69

MLR3

Source	SS	df	MS	Number of obs	=	180
				F(3, 176)	=	34.95
Model	3.1502e+10	3	1.0501e+10	Prob > F	=	0.0000
Residual	5.2879e+10	176	300446533	R-squared	=	0.3733
				Adj R-squared	=	0.3626
Total	8.4380e+10	179	471399336	Root MSE	=	17333

GDPperCapitaPPP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
TradeFreedom	578.091	164.3119	3.52	0.001	253.8158	902.3662
InvestmentFreedom	143.7863	70.25073	2.05	0.042	5.144098	282.4286
BusinessFreedom	461.9142	113.7604	4.06	0.000	237.4041	686.4242
_cons	-62576.27	9993.932	-6.26	0.000	-82299.64	-42852.9

MLR 4

```
. regress logGDPperCapita logtrade logbusiness loginvestment
```

Source	SS	df	MS	Number of obs	=	175
				F(3, 171)	=	52.29
Model	122.993887	3	40.9979622	Prob > F	=	0.0000
Residual	134.080426	171	.784096057	R-squared	=	0.4784
				Adj R-squared	=	0.4693
Total	257.074312	174	1.47743858	Root MSE	=	.88549

logGDPperCa~a	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logtrade	2.772761	.5944573	4.66	0.000	1.599342	3.94618
logbusiness	2.011397	.3402683	5.91	0.000	1.33973	2.683064
loginvestment	.2539019	.1419104	1.79	0.075	-.0262199	.5340237
_cons	-12.08358	2.097257	-5.76	0.000	-16.22342	-7.943729

MLR5

```
. regress logGDPperCapita logtrade logbusiness developed
```

Source	SS	df	MS	Number of obs	=	180
				F(3, 176)	=	56.03
Model	128.013064	3	42.6710213	Prob > F	=	0.0000
Residual	134.032503	176	.761548314	R-squared	=	0.4885
				Adj R-squared	=	0.4798
Total	262.045567	179	1.46394172	Root MSE	=	.87267

logGDPperC~a	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
logtrade	2.173545	.5712086	3.81	0.000	1.046246	3.300845
logbusiness	1.623804	.3159174	5.14	0.000	1.00033	2.247277
developed	.8421699	.1882208	4.47	0.000	.4707097	1.21363
_cons	-7.018066	2.2328	-3.14	0.002	-11.42457	-2.611559

Appendix E: VIF Table

Variable	VIF	1/VIF
tradefreedom	1.72	0.582725
businessfr~m	1.57	0.636589
investment~m	1.51	0.663810
Mean VIF	1.60	