Tariffs and Taxes versus Labor Regulation: Analyzing Which Government Policies Help and Hurt Domestic Economies

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Abstract

The struggle to find the right balance between government intervention and the invisible hand of the market is familiar to all who have tried to form any semblance of economic policy. Due to the vast number of policy sectors that affect a country's economic prosperity, the same approaches can have varying degrees of success in different countries. This study takes a data set collected by the Heritage Foundation that has studied the regulatory practices of 173 countries in the areas of trade, business freedom, labor freedom and other factors that are proven to have an effect on a country's economic growth and prosperity. We hypothesize that factors such as trade policy and business regulation will have a much larger effect on a country's economic outlook, while factors such as labor regulation will have a comparatively low impact.

I. Introduction

There has been a long standing debate about the impact government interactions have on the economy. It is at the center of the divide between conservatives and liberals in every nation's political arena. This paper uses a data set created by the Heritage Foundation to address which areas of regulation have the most impact on a country's economic output. Examples of these areas include but are not limited to business regulation, labor laws, trade policies and financial regulations. The Heritage Foundation's dataset uses a scoring system to quantify the level of regulation a country has in different sectors in order to demonstrate that strict regulations are burdensome to economic growth. We take their project a step further by hypothesizing that different areas of regulation have different impacts on the economy. By doing this, we hope to demonstrate that some government regulation is necessary for economic prosperity. Knowing which regulatory policy is most effective is information that could be used by developing nations to more efficiently stimulate their economies and bring prosperity to their citizens. When evaluating the origins of our data set we came across this quote:

"The Index of Economic Freedom considers every component equally important in achieving the positive benefits of economic freedom" [1]

The Heritage Foundation weighs all of their variables equally because they have not evaluated the specific relationships between their variables. However, we are interested in the relationships between these independent variables to see the varying impacts of different regulations. Some of the questions that the Heritage Foundation researchers pose are "It is clear that the 12 economic freedoms interact, but the exact mechanisms of this interaction are not clearly definable: Is a minimum threshold for each one essential? Is it possible for one to maximize if others are minimized? Are they dependent or

exclusive, complements or supplements?" [1] We want our research to be able to go in to depth and answer some of these questions.

We make the argument that variables such as trade freedom and business freedom have a greater effect on a country's growth compared to labor freedom. Therefore we believe that business regulation/ infrastructure as well as trade barrier effects on goods and services will have a higher coefficient than labor regulations such as minimum wages and maximum hours. For our multiple linear regression, we examine whether the world ranking in economic freedom is more dependent on higher trade freedom than it is on higher labor freedom. We will also evaluate this by testing to see if the difference in the variable coefficients is statistically significant and seeing which variables have collinearity in the data set.

II. Literature Review

Eliana Viviano(2008) takes advantage of the decentralized enforcement of retail laws in Italy to study the relationship of entry regulations on employment levels within the industry. The passage of a law designed to reduce entry costs for small retail stores had an unintended consequence of allowing regions to determine how to authorize entry for large retail stores, creating an environment that is ideal to study the effects of different barriers to entry on unemployment. With large stores being held responsible for the lack of small retail stores in the industry, regional lawmakers across the country took different approaches to limit the power of larger businesses. Viviano demonstrates that the restrictive regulations put in place to protect jobs often have the opposite effect for a number of reasons. Stricter entry rules raise initial costs for large stores, limiting the number of jobs that could be created with new business. Additionally, while large businesses tend to drive out single employee shops, they actually encourage the expansion of small businesses by raising the amount of salaried workers in those businesses. While this study is not adequate to predict long term trends, it does show that regulations can have unintended negative and even opposite effects when not executed with care.[2]

Bruce Ian Carlin (2009) strives to find the optimal amount of regulation required for financial markets to thrive based on the relationship between public trust, social capital and regulation levels. The authors are successful in explaining why the same regulatory policies can have different results in countries due to variations in the stages of the economy, the public's trust, and trust amongst market actors. Trust is known to be a driver of growth and it can be a product of government interaction in the form of regulation and enforcement or it can arise from the cultural practices and social norms of a country. This paper studies these origins using game theory and builds several models to demonstrate

that using regulation as a substitute for trust is not an effective way to promote economic growth. The paper also demonstrates that when regulation is used as a complement to the public's trust, it can be very effective. Additionally, the paper emphasizes that both social capital and public trust are factors that can be nurtured in growing economies without the presence of government regulation, as it is in everyone's best interests to realize their incentives and build their reputation. It is a model built on many qualitative factors but the use of game theory to build behavioral models goes a long way in showing the various ways regulation can interact with public trust and social capital to affect economic growth.[4]

Our topic focuses on the powerful effects of trade liberalization, a notion that is confirmed by Farai Manwa (2016) as she studies a region of the world where little literature exists on economic policies and uses two different regression models to compare the effects of trade policy in countries belonging to the South African Custom Union. As proxies for trade liberalization, the authors use average tariff rates in one model and trade ratios in the other and look at their interactions with labor productivity, physical capital and human capital, as well as the overall effect on GDP per capita. The study concluded that compared to the rest of the custom union, South Africa benefited greatest from trade liberalization policies compared to other regulatory measures. [5]

The present literature examines the effects of government interactions such as trade policy or financial regulation on economic growth on an individual basis while this dataset allows us to include multiple facets of government interaction at once. These papers are written with the goal of finding the right amount of government interaction to allow for maximum growth while discouraging reactionary policies that never work out in the long run. Our paper seeks to further that by showing that certain policy combinations have stronger effects on economic growth to discourage the notion that all regulatory burdens are equally weighted. We are trying to prove that barriers to trade and business entry have much more adverse effects on the economy as opposed to mandated minimum wages, union laws and worker safety regulations which are often blamed for stagnating growth.

III. Data

Our data set comes from the Heritage Foundation's 2018 Economic Freedom Index Research. Each year they post a comprehensive guide along with their data set and descriptions for how each variable is calculated. They have measured how four main categories of economic freedom (Rule of Law, Government Size, Regulatory Efficiency, and Open Markets) affect a country's overall Economic Freedom and in turn their prosperity as a nation. For the research project, the Heritage Foundation did its own data collection and has a 0-100 ranking system for each of the variables in each category. The

data used for the Index were collected by the World Bank, International Labour Organization, U.S Department of Commerce, and official government publications. Within our data set we also have information on GDP per capita, inflation, public debt, and unemployment. These variable can also be used as supplementary information to further the assumptions we are making about world ranking and the six independent variables we are looking at.

For the purpose of our research we decided to look specifically into the 3 Regulatory Efficiency variables: business freedom, labor freedom, monetary freedom and the 3 Open Markets variables: trade freedom, investment freedom, and financial freedom. We are looking at how changes in these variables over a five year period change a country's overall world ranking and are also looking at whether certain independent variables have a larger effect than others on this dependent variable (*yearchangeworldrank*). Business Freedom is calculated by combining 13 sub factors such as number of days it take to obtain a license, minimum capital needed to start a business, overhead costs, etc. These factors are then averaged and converted into a 0-100 score by dividing the subfactor average by the subfactor observation and multiplying by 50:

$$Sub\text{-}factor\ Score_i = 50 \times (Sub\text{-}factor_{average}/Sub\text{-}factor_i)\ ^{1}$$

The Labour Freedom variable is calculated with the same formula as above but with 7 quantitative sub-factors which include minimum wage ratio, mandatory severance and legally mandated notice period, etc. Investment Freedom and Financial Freedom were both calculated by starting with a score of 100 and deducting points for various restriction that limited capital mobility. For Investment Freedom some of the restrictions examined are burdensome bureaucracy, investment laws, land ownership restrictions, etc. For Financial Freedom, these restrictions include government controlled central bank, limits to financial institutions, weak fraud prevention, etc.

The Trade Freedom variable looks at tariff and nontariff barriers and the equation used for the index is:

$$Trade\ Freedom_i = 100(Tariff_{max} - Tariff_i)/(Tariff_{max} - Tariff_{min}) - NTB_i\ ^{1}$$

This calculates the weighted average tariff rate and then subtracts the non-tariff barrier as a penalty depending on how severely they are used to limit trade. The non-tariff barrier data is calculated by examining the levels of quantity restrictions, price restrictions, customs restrictions, etc. for all goods and services entering the country. The last variable we focus on is Monetary Freedom which the

Heritage Foundation calculates by looking at the interactions between inflation, price control and price stability, using these two equations:

1. *Weighted Avg. Inflationi = ϑ1 INflationit + ϑ2 INflationit + ϑ3 Inflationit - 2* [1]
2. *Monetary Freedomi = 100 - α √Weighted Avg. Inflationi – PC penalty* [1]

They use the average inflation rate from the past 3 years to gain a better understanding of the baseline monetary policy in a particular country.

After some initial observations we decided to avoid a potential collinearity problem as well as make our data more normalized by looking at all of our variables in terms of percent change. We compare our data looking at how our independent variables affected the Heritage Foundation's Economic Freedom ranking over a five year time span from 2013-2018.

Variable	Mean	Std. Dev,	Min	Max
businessfreedom	65.53	14.08	27.2	96.3
laborfreedom	59.37	14.11	20	92.6
monetaryfreedom	76.59	9.82	0	91.6
tradefreedom	76.54	10.28	48.4	90
investmentfreedom	58.55	22.17	0	95
financialfreedom	49.59	18.96	10	90

Variable	Mean	Std. Dev,	Min	Max
yearchangebusfree	-.0454	.2705	-2.277	.2819
yearchangetradefree	-.0303	.1511	-1.596	.2225

yearchangeinvestfree	-.1434	.3596	-2	1
yearchangemonfree	-.02660	.1191	-.5307	1
yearchangefinancefree	-.0146	.1543	-1	.5
yearchangelaborfre	.0046	.2359	-2.295	.4321
yearchangegdppercapital	-.514	.538	-3.62	.681

When observing our summary statistics before we calculated percent changes over five years, the fact that monetary freedom and trade freedom have very similar averages as well as similar standard deviations and maximums leads us to think there might be a relationship between these variables. When looking at our new variables with percent changes we made the observation that change in investment freedom and change in business freedom had the highest averages. This could be due to investment and business being more volatile in the short run while labor, trade and monetary policies take longer to implement due to their delicate political nature. The large increase in investment freedom is a change likely due to the increasingly free flow of capital across countries in this global economy. Foreign Direct Investment, particularly in the R&D sector, has been increasing across the globe (Guimon 2013). Additionally, the change in labor freedom has a positive mean, indicating labor laws have gotten stricter as time goes on. This is not surprising, as countries advance in development, they begin to invest in their human capital, leading to more demands from the skilled labor force (Ashenfelter 1999). The fact that it is still a relatively small number reflects the fact that labor laws tend to face opposition from business groups. Trade freedom continues to increase globally, as the majority of countries take part in uni- and multilateral trade deals wherever they may be available (World Trade Statistical Review 2018).

To verify that the coefficients of our multiple linear regression equation and our ordinary least squares regression line give us the best linear unbiased estimate (BLUE) we have to make sure that our data meets the 5 main Gauss Markov Assumptions.

Assumption I. Linearity. Our multiple linear regression model is linear in parameters and is specified as:

yearchangeworldrank = -.323 -6.34yearchangebusfree - 36.25yearchangelaborfree - 6.09yearchangemonfreedom - 29.48yearchangetradefree - 12.75yearchangeinvestfree - 17.38 yearchangefinancefree

Which follows the same linear format as :

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + u$$

Therefore our data set meets this first assumption.

Assumption II. Randomness. We can assume the randomness of our sample based on the observations being 173 well over the minimum sample size of 100 for significance in statistical analysis. The Heritage Foundation also verifies that their data was collected in an unbiased accurate manner that supports randomness, reinforce that the data we are using meets this assumption.

Assumption III. No Perfect Collinearity. For this assumption we are testing to make sure that none of the independent variables are constant and/ or there are no linear relationships between any of our six x values. After running simple linear regressions for each of the 6 variables as well as our multiple linear regression we were able to see that none of our variables had the exact same coefficient.

Independent Variable	Coef.	Std. Err.	t	p>|t|	95% confidence interval	Correlation Coefficient
yearchangebusfree	-6.34	10.36	-0.61	0.541	-26.79 - 14.11	.1874 = R^2
yearchangetradefree	-29.48	10.56	-2.97	0.006***	-50.33 - -8.62	‘’
yearchangeinvestfree	-12.75	5.05	-2.52	0.013**	-22.73 - -2.77	“
yearchangemonfree	-6.09	5.05	-0.45	0.656	-32.99 - 20.81	“
yearchangefinancefree	-17.38	11.92	-1.46	0.147	-40.92 - 6.15	“
yearchangelaborfree	-36.25	10.62	-3.41	0.001***	-57.22 - -15.28	“
yearchangegdppercap	2.42	4.08	0.59	0.555	-5.66 - 10.49	“
constant	-3.23	2.61	-1.24	0.218	-8.37 - 1.92	“

Assumption IV. Zero Conditional Mean / Exogeneity. This assumption is violated if there is a correlation in the data between our independent variables and the error term (u). We want our variables to be exogenous so that they will influence the dependent variable without being impacted by the error term. For our simple linear regression we know that this assumption is most likely violated because the other variables (business freedom, monetary freedom, labor freedom, etc.) that are affecting the dependent variable of *yearchangeworldrank* in our multiple linear regression are excluded and therefore included in the error term. For our multiple linear regression there is also still a strong probability that this assumption is violated because the other variables that we didn't use from the Heritage Foundation's overall Economic Freedom calculation are still affecting world rank and included in the error term.

Assumption V. Homoskedasticity. This particular assumption does not affect the unbiasedness of our estimators but it is still important. Given that our data passes all 5 of these conditions including MLR. 5 we can conclude that our OLS estimators have the smallest variance for absolutely all linear and unbiased betas. We want our variables to have the same relative scatter to assure that our multiple linear regression test works well for the data set. We can make this informal assumption by looking at the scatter plots and the residuals for each variable. When looking at our scatter plots (Appendix Figure 8) it is initially hard to see the trends because our line of best fit has a shallow slope. However, the residuals still appear to be even above and below the line so running tests such as the White Test, the Bartlett Test, the Box's M Test, etc. are probably not necessary.

IV. Results

After checking these five assumptions we ran our two linear regression tests starting with the simple linear regression model. Our estimated Simple Linear Regression:

Yearchangeworldrank = 2.28 - 2.21(yearchangegdppercap)

For our simple regression model, we originally used world rank as our dependent variable while using *yearchangetradefree* as our independent variable in order to demonstrate the strong correlation free trade has with strong economic growth. After we changed our model to examine the effect of these policies over time, we elected to use our simple regression to identify *yearchangegdppercap* as a control variable to demonstrate that the change in GDP per capita cannot be held solely responsible for the change in world ranking on the Economic Freedom Index. This allows us to continue with our analysis with evidence that the independent variables we use in our multiple regression model do in fact have an impact of the change in world ranking over a five year period.

Independent Variable	Coefficient	Std. Err.	t	p>|t|	95% confidence interval
yearchangegdppercap	-2.21	3.36	-0.66	0.512	-8.85 - -4.43
constant	-2.28	2.35	-0.97	0.334	-6.92 - 2.36

We conducted a two tailed hypothesis test to determine whether *yearchangegdppercap* was significant at a 5% level.

Ho: $\beta 1 = 0$ and Ha: $\beta 1 \neq 0$

- T-stat = -.66 < 1.96 (two tail test)
- .512 > .05 so we fail to reject the null hypothesis

Because we fail to reject the null hypothesis, we can say that *yearchangegdppercap* is not significant at a 5% level, and can continue on to our multiple regression model (Figure 6).

Our estimated Multiple Linear Regression:

yearchangeworldrank = -3.23 - 6.34(yearchangebusfree) 0 29.48(yearchangetradefree) - 12.75(yearchangeinvestfree) - 6.09(yearchangemonfree) - 17.38(yearchangefinancialfree) - 36.25(yearchangelaborfree) +2.42(yearchangegdppercap)

Independent Variable	Coef.	Std. Err.	t	p>|t|	95% confidence interval
yearchangebusfree	-6.34	10.36	-0.61	0.541	-26.79 - 14.11
yearchangetradefree	-29.48	10.56	-2.97	0.006***	-50.33 - -8.62
yearchangeinvestfree	-12.75	5.05	-2.52	0.013**	-22.73 - -2.77
yearchangemonfree	-6.09	5.05	-0.45	0.656	-32.99 - 20.81
yearchangefinancefree	-17.38	11.92	-1.46	0.147	-40.92 - 6.15

yearchangelaborfree	-36.25	10.62	-3.41	0.001***	-57.22 - -15.28
yearchangegdppercap	2.42	4.08	0.59	0.555	-5.66 - 10.49
constant	-3.23	2.61	-1.24	0.218	-8.37 - 1.92

* = significant at the 10% level ** = significant at the 5% and 10% level ***= significant at the 1% and 5% and 10% level

This model shows that there is a negative relationship between all of our independent variables and our dependent variable, with the exception of *yearchangegdppercap*. Due to the nature of the index, while larger numbers in our independent variables are reflective of more freedom, the final ranking is calculated with 1 being the highest rank, or most economically free country. This leads to a negative sign indicating a positive relationship between the level of a country's freedom in a particular area and its world ranking. This does not apply to *yearchangegdppercap*.

The STATA output table for our multiple regression shows that only three of our six independent variables were significant at the 5% level. *Yearchangetradefree, yearchangeinvestfree* and *yearchangelaborfree* all have p-values less than .05 while the rest of the variables do not come close to hitting this mark. Because we used percent changes in freedom scores, the coefficients for each variable indicate the increase in world rank for a 100% change in a freedom score. For example, a 100% increase in the labor freedom score would cause a country to jump up 36.25 spots in the world ranking, while 100% increases in the trade and investment freedom would increase a country's world ranking by 29.48 and 12.75 points respectively. Unfortunately, our other three variables were not significant in this model and we can only speculate as to why that is. For business freedom, the factors used to calculate the score

Include operating costs such as electricity and license fees and processing times. This type of data may not be of the best quality across all of our countries due to operating costs likely differing across regions within countries. Additionally, this variable may be affected by the government integrity score that we did not include, since corruption is likely to play a large role in the processing of business licenses in many countries. With financial freedom, the data may also not be the most robust. In poorer countries, banks are less established and are likely not used by a significant portion of the population.

V. Extensions

After observing our initial results we decided to add another control variable to help further test what kind of effect our independent variables are having on the change in world ranking that we calculated from 2013 to 2018. We found a data set from the United Nations University (UNU-WIDER). We used data from 126 countries and examined whether including the Gini coefficient affected our multiple linear regression to see if we could explain some of the change in world ranking using income inequality. Our new control variable (*gini*) is significant at the 15% level showing that a variable separate that is not from the Heritage Foundation ranking directly still has a correlation with the change in world ranking overall. This shows that while some of our variables still have a significant impact, looking at income inequality can also potentially explain the change over time. By adding another control variable we are able to see how resilient our model is to external factors. Adding Gini coefficient brought all of our independent variable coefficients closer to zero (less significant in terms of their effect on change in world ranking) except for *yearchangetradefree* which yielded a larger impact on our dependent variable.

Independent Variable	Coef.	Std. Err.	t	p>|t|	95% confidence interval
yearchangebusfree	-2.1195	10.9493	-0.19	0.624	-23.8080 – 19.56
yearchangetradefree	-37.8085	10.1237	-3.73	0.000***	-57.8617 - -17.7553
yearchangeinvestfree	-16.1305	6.5198	-2.47	0.015**	-29.0450 - -3.21606
yearchangemonfree	10.0467	13.8662	0.72	0.470	-17.4196 – 37.5130
yearchangefinancefree	-7.8117	12.4837	-0.63	0.533	-32.5494 – 16.9160
yearchangelaborfree	-34.22	11.21	-3.05	0.003***	-57.8617 - -17.7553
yearchangegdppercap	2.4657	5.0115	-.49	0.624	-12.3926 – 7.4611
gini	-.2869	.1889	-1.52	.132	-.6611 - .0874

constant	7.4669	7.6137	.98	.3290	-7.6143 – 22.5481

* = significant at the 10% level ** = significant at the 5% and 10% level ***= significant at the 1% and 5% and 10% level

We also did another simple linear regression and hypothesis test to see if the change in world ranking could be explained by our second control variable. This is important as it examines whether external factors such as income inequality can be responsible for our dependent variable instead of the 6 independent variables we use in our multiple linear regression.

Independent Variable	Coefficient	Std. Err.	t	p>|t|	95% confidence interval
gini	-.2154	.1960	-1.10	.274	-.6033 - .1723
constant	9.0790	7.7765	1.17	.245	-.6313 - 24.4708

We conducted a two tailed hypothesis test to determine whether *gini* was significant at a 5% level.

Ho: *β1 = 0 and* ***Ha****: β1 ≠ 0*

- T-stat = -.1.10 < 1.96 (two tail test)
- .274 > .05 so we fail to reject the null hypothesis

Because we failed to reject the null hypothesis for our Gini coefficient variable we can reaffirm that it is not our control variable but our 6 independent freedom variables that are affecting the change in world ranking provided by the Heritage Foundation.

Using this new model that includes two control variables we proceeded to do F - tests to see if restricting the amount of variables used in our multiple linear regression could improve some of our p-values. When looking at our summary statistics we made the observation that there might be a relationship between monetary freedom and trade freedom based on their coefficients and the effect that interest rates and exchange rates have such a large impact on world trade. After performing an T-test in STATA with these two variables (Appendix Figure 4) we were able to reject the null hypothesis that these variables had no effect on each other with a t-value of 7.26 and a p-value of .0011. This allows us to assume that an unrestricted model fits our data better than a restricted model without *yearchangemonfree* and *yearchangetradefree*.

Ho: *β2 = β4 = 0*

Ha: *Ho is not true*

Unrestricted Model:

$$yearchangeworldrank = \beta 0 + \beta 1(yearchangebusfree) + \beta 2(yearchangetradefree) + \beta 3(yearchangeinvestfree) + \beta 4(yearchangemonfree) + \beta 5(yearchangefinancialfree) + \beta 6(yearchangelaborfree) + \beta 7(yearchangegdppercap) + \beta 8(gini)$$

Restricted Model:

$$yearchangeworldrank = \beta 0 + \beta 1(yearchangebusfree) + \beta 3(yearchangeinvestfree) + \beta 5(yearchangefinancialfree) + \beta 6(yearchangelaborfree) + \beta 7(yearchangegdppercap) + \beta 8(gini)$$

After this we did another F-test on some of our less significant variables to see if dropping them from the model would improve our restricted model. After performing our F-test for *yearchangebusfree*, *yearchangegdppercap*, and *yearchangefinancefree* we obtained a f-statistic of 0.26 and a p-value of .8560. Therefore, we fail to reject the null hypothesis and can conclude that these variables can be dropped to form a more restricted model that fits our data set better. Using our restricted model without *yearchangebusfree*, *yearchangegdppercap* (one of our controls), and *yearchangefinancefree*, some of our remaining independent variables became more significant. The t value for *yearchangetradefree* increased (in distance from 0) from -3.73 to -3.75, for *yearchangeinvestfree* from -2.47 to -2.75, and for *yearchangelaborfree* from -3.05 to -3.25. This makes change in investment freedom policy's effect on change of the world rank significant at the 1% level instead of just at the 5% level.

Ho: *β1 = β5 = β7 =0*

Ha: *Ho is not true*

Unrestricted Model:

$$yearchangeworldrank = \beta 0 + \beta 1(yearchangebusfree) + \beta 2(yearchangetradefree) + \beta 3(yearchangeinvestfree) + \beta 4(yearchangemonfree) + \beta 5(yearchangefinancialfree) + \beta 6(yearchangelaborfree) + \beta 7(yearchangegdppercap) + \beta 8(gini)$$

Restricted Model:

$$yearchangeworldrank = \beta 0 + \beta 2(yearchangetradefree) + \beta 3(yearchangeinvestfree) + \beta 4(yearchangemonfree) + \beta 6(yearchangelaborfree) + \beta 8(gini)$$

To show the normality of our independent variable we generated histograms. We wanted to do this to assure the accuracy of our models to further back up the claims we have made. These graphs are depicted in the Appendix as figure 7 and show which of our variables appear normally distributed and which do not.

V. Conclusions

We started this study with the goal to prove that not all government regulations have the same impact on a country's economic prosperity. The existing literature on the relationship between government regulations and economic growth tends to focus on isolated regulatory policies to push certain agendas. Our project aimed to examined multiple aspects of government policy at one time and we were able to do this due to the Heritage Foundation's Economic Freedom Index. Our project differed from their work in that they weigh all of their independent variables equally when calculating economic freedom. We challenged the notion the all regulatory policies have the same impact on economic growth and made this challenge the foundation of our project, hypothesizing that business and trade policies impact economic growth much more than labor laws.

In order to effectively use the dataset provided by the Heritage Foundation, we first had to prove that their ranking system was in fact a product of their independent variables, and not just a reflection of an external factor such as GDP per capita or income inequality. Our initial simple regression served to prove that the five year change in GDP per capita does not have a significant impact on a country's world rank, allowing us to continue onto our multiple regression model. After establishing this, we concluded from our multiple linear regression that the 5 year percent change in the trade freedom, investment freedom and labor freedom scores all had a statistically significant effect on change in a country's world rank at the 5% significance level. We suspect the trade policies had the largest impact due to the universally accepted theories on the benefits of free trade practices. Even the slightest move away towards protectionism can have adverse effects on a country's economic prosperity as it elicits reactionary responses from trading partners. The increase in Foreign Direct Investment is likely the driving cause of more open investment policies in both developing and developed countries as the free flow of capital brings jobs and revenue with it wherever it goes. Our initial hypothesis that labor laws have the least impact while business regulations are responsible for stagnant growth proved to be incorrect. Labor freedom had a significant impact on world ranking while business regulation proved to be insignificant in our model.

Further investigation warranted the use of another control variable to reinforce the use of our data set. We employed the Gini coefficient because it is a universally accepted barometer of a country's economic status. Proving its insignificance in the model allowed us to strengthen our claims by demonstrating that the Heritage Foundation's dataset stands up to external factors and shows that our model cannot be explained simply by the income inequality level of a country. When conducting our F-tests, we found that using a restricted model without the variables *yearchangebusfree*, *yearchangegdppercap*, and *yearchangefinancefree* would give us a stronger fit for our data. In all we discovered that policy enacted for the purpose of Labor Freedom, Trade Freedom, and Investment Freedom had the largest impact of Economic Prosperity and these factors carried a larger weight in regards to moving countries up or down in the overall Heritage Foundations World Economic Freedom Ranking.

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VII. Appendix

Part A STATA Outputs

Figure 1: Original Multiple Linear Regression without Gini Coefficient

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. regress yearchangerank yearchangegdppercap yearchangebusfree yearchangetradefree yearchangeinvestfree
> yearchangemonfree yearchangefinancefree yearchangelaborfree
```

Source	SS	df	MS	Number of obs	=	168
				F(7, 160)	=	5.27
Model	15139.3879	7	2162.7697	Prob > F	=	0.0000
Residual	65630.13	160	410.188312	R-squared	=	0.1874
				Adj R-squared	=	0.1519
Total	80769.5179	167	483.649808	Root MSE	=	20.253

yearchangerank	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
yearchangegdppercap	2.415444	4.086899	0.59	0.555	-5.655778	10.48667
yearchangebusfree	-6.341869	10.35618	-0.61	0.541	-26.7943	14.11056
yearchangetradefree	-29.4761	10.56167	-2.79	0.006	-50.33436	-8.617833
yearchangeinvestfree	-12.7498	5.054162	-2.52	0.013	-22.73128	-2.76833
yearchangemonfree	-6.087185	13.62236	-0.45	0.656	-32.99001	20.81564
yearchangefinancefree	-17.38301	11.91578	-1.46	0.147	-40.91551	6.149482
yearchangelaborfree	-36.25025	10.61728	-3.41	0.001	-57.21834	-15.28216
_cons	-3.225503	2.606437	-1.24	0.218	-8.372959	1.921954

Figure 2: Extension Multiple Linear Regression with Gini Coefficient

```
. regress yearchangerank gini yearchangegdppercap yearchangebusfree yearchangetradefree yearchangeinvest
> free yearchangemonfree yearchangefinancefree yearchangelaborfree
```

Source	SS	df	MS	Number of obs	=	124
				F(8, 115)	=	4.12
Model	11209.1475	8	1401.14344	Prob > F	=	0.0002
Residual	39062.296	115	339.672139	R-squared	=	0.2230
				Adj R-squared	=	0.1689
Total	50271.4435	123	408.710923	Root MSE	=	18.43

yearchangerank	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gini	-.2868715	.1889298	-1.52	0.132	-.6611051	.087362
yearchangegdppercap	-2.465742	5.011518	-0.49	0.624	-12.39259	7.46111
yearchangebusfree	-2.119483	10.94932	-0.19	0.847	-23.80797	19.569
yearchangetradefree	-37.80851	10.12373	-3.73	0.000	-57.86166	-17.75536
yearchangeinvestfree	-16.13051	6.519789	-2.47	0.015	-29.04496	-3.216064
yearchangemonfree	10.04672	13.86623	0.72	0.470	-17.41961	37.51305
yearchangefinancefree	-7.811675	12.48368	-0.63	0.533	-32.53944	16.91608
yearchangelaborfree	-34.21751	11.20661	-3.05	0.003	-56.41564	-12.01938
_cons	7.466892	7.613679	0.98	0.329	-7.614342	22.54813

Figure 3: Restricted Model #1 with no Monetary or Trade Freedom included)

```
. regress yearchangerank yearchangegdppercap gini yearchangebusfree yearchangeinvestfree yearchangefinancefree
> yearchangelaborfree
```

Source	SS	df	MS	Number of obs	=	124
				F(6, 117)	=	2.81
Model	6327.83699	6	1054.6395	Prob > F	=	0.0137
Residual	43943.6066	117	375.586381	R-squared	=	0.1259
				Adj R-squared	=	0.0810
Total	50271.4435	123	408.710923	Root MSE	=	19.38

yearchangerank	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
yearchangegdppercap	.8769612	5.184559	0.17	0.866	-9.390786	11.14471
gini	-.2045014	.1934693	-1.06	0.293	-.5876573	.1786545
yearchangebusfree	-.0519614	11.49876	-0.00	0.996	-22.82465	22.72072
yearchangeinvestfree	-18.14184	6.651796	-2.73	0.007	-31.31537	-4.968306
yearchangefinancefree	-8.563145	13.01662	-0.66	0.512	-34.34187	17.21558
yearchangelaborfree	-31.22925	11.72432	-2.66	0.009	-54.44866	-8.009841
_cons	6.619152	7.801372	0.85	0.398	-8.831058	22.06936

Figure 4: Restricted Model #2 with no GDP per capita, Business or Investment Freedom

```
. regress yearchangerank gini yearchangetradefree yearchangeinvestfree yearchangemonfree yearchangelaborfree
```

Source	SS	df	MS	Number of obs	=	124
				F(5, 118)	=	6.57
Model	10946.9523	5	2189.39046	Prob > F	=	0.0000
Residual	39324.4913	118	333.258401	R-squared	=	0.2178
				Adj R-squared	=	0.1846
Total	50271.4435	123	408.710923	Root MSE	=	18.255

yearchangerank	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gini	-.2629283	.183514	-1.43	0.155	-.6263359	.1004794
yearchangetradefree	-36.9289	9.856465	-3.75	0.000	-56.44738	-17.41041
yearchangeinvestfree	-17.2439	6.175263	-2.79	0.006	-29.47261	-5.015201
yearchangemonfree	8.303294	13.58056	0.61	0.542	-18.58991	35.1965
yearchangelaborfree	-35.60477	10.96814	-3.25	0.002	-57.32466	-13.88487
_cons	7.622759	7.323569	1.04	0.300	-6.879902	22.12542

Figure 5: Simple Linear Regression to Test Change in GDP per Capita

```
. regress yearchangerank yearchangegdppercap
```

Source	SS	df	MS	Number of obs	=	175
				F(1, 173)	=	0.43
Model	205.286352	1	205.286352	Prob > F	=	0.5123
Residual	82354.2222	173	476.035967	R-squared	=	0.0025
				Adj R-squared	=	-0.0033
Total	82559.5086	174	474.479934	Root MSE	=	21.818

yearchangerank	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
yearchangegdppercap	-2.209435	3.364504	-0.66	0.512	-8.850196	4.431326
_cons	-2.277035	2.35064	-0.97	0.334	-6.91666	2.362591

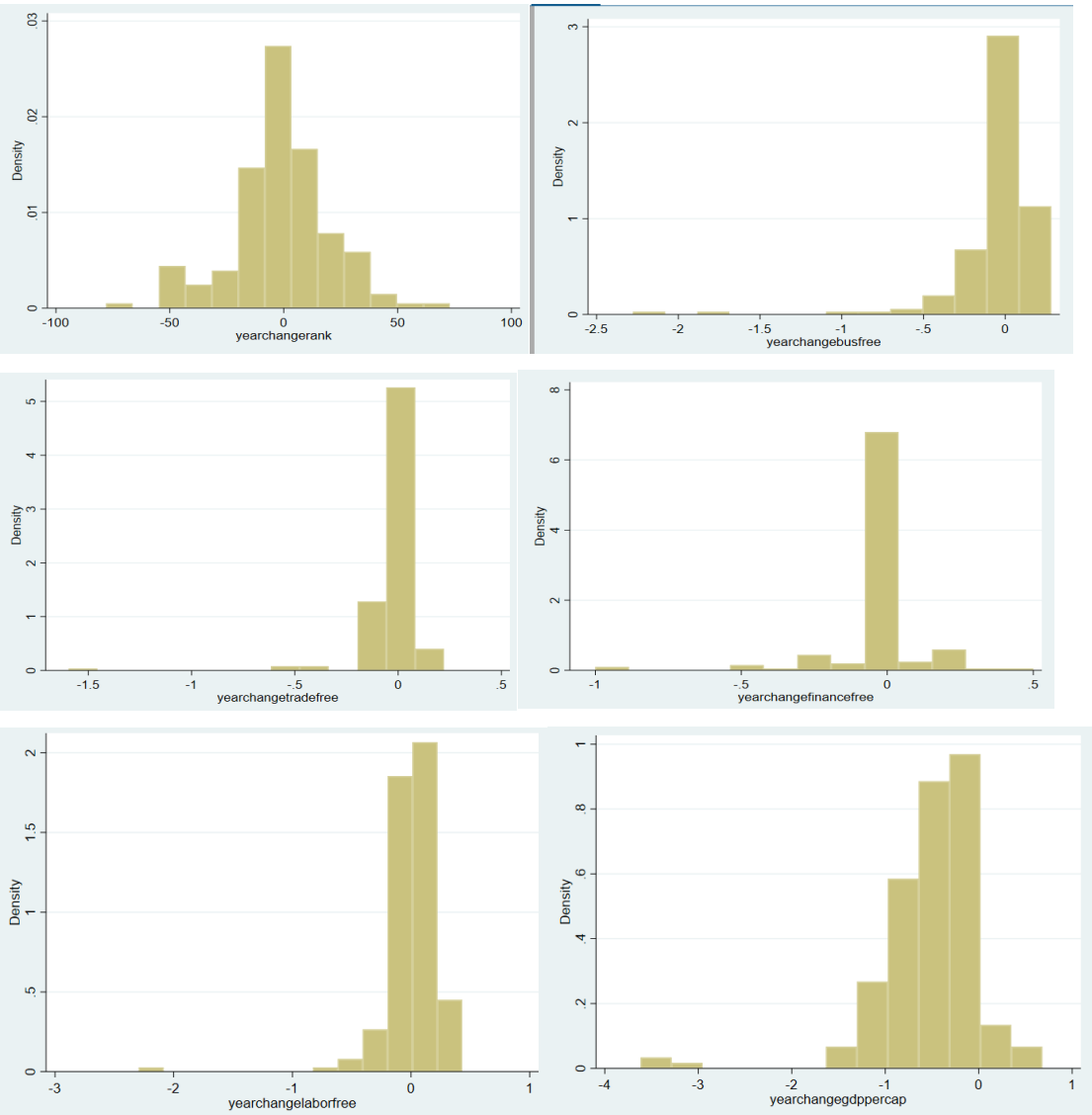
Figure 6: Simple Linear Regression to Test Gini Coefficient

```
. regress yearchangerank gini
```

Source	SS	df	MS		
				Number of obs	= 126
				F(1, 124)	= 1.21
Model	486.110329	1	486.110329	Prob > F	= 0.2739
Residual	49912.7468	124	402.522152	R-squared	= 0.0096
				Adj R-squared	= 0.0017
Total	50398.8571	125	403.190857	Root MSE	= 20.063

yearchange~k	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gini	-.2153918	.1960002	-1.10	0.274	-.6033311	.1725476
_cons	9.079001	7.776504	1.17	0.245	-6.312879	24.47088

Figure 7: Histograms of our Variables to Test Normality



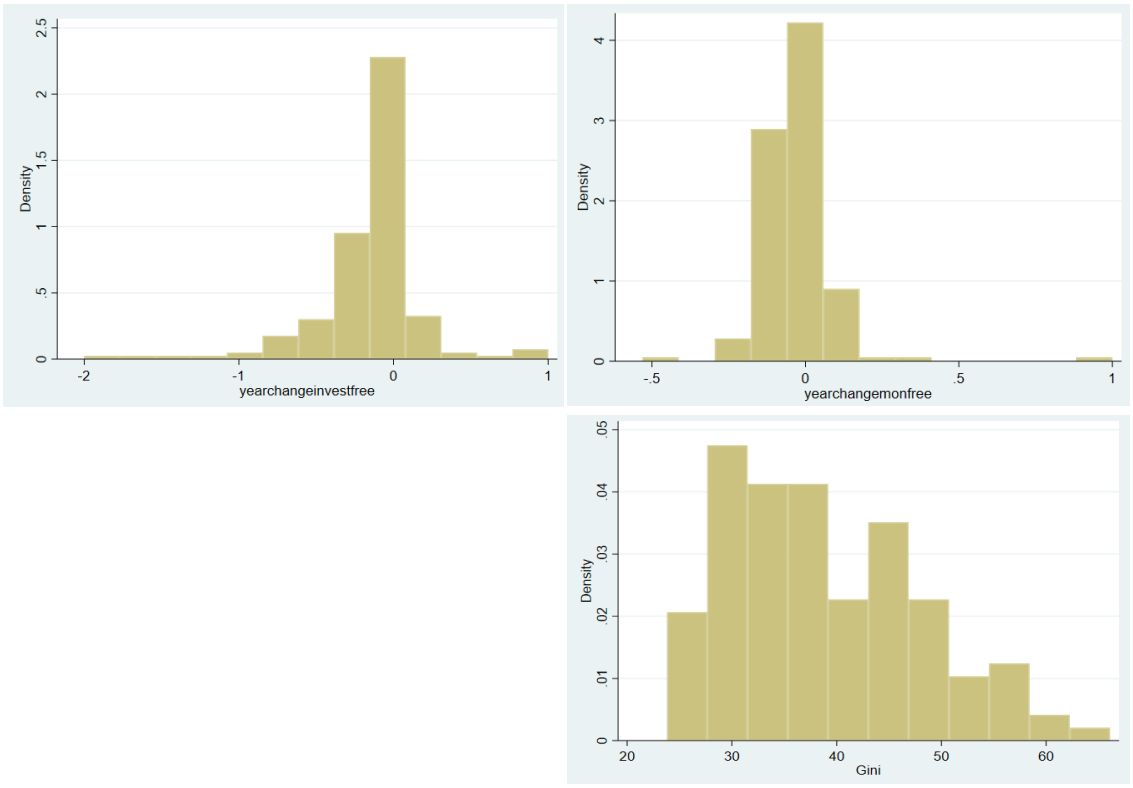
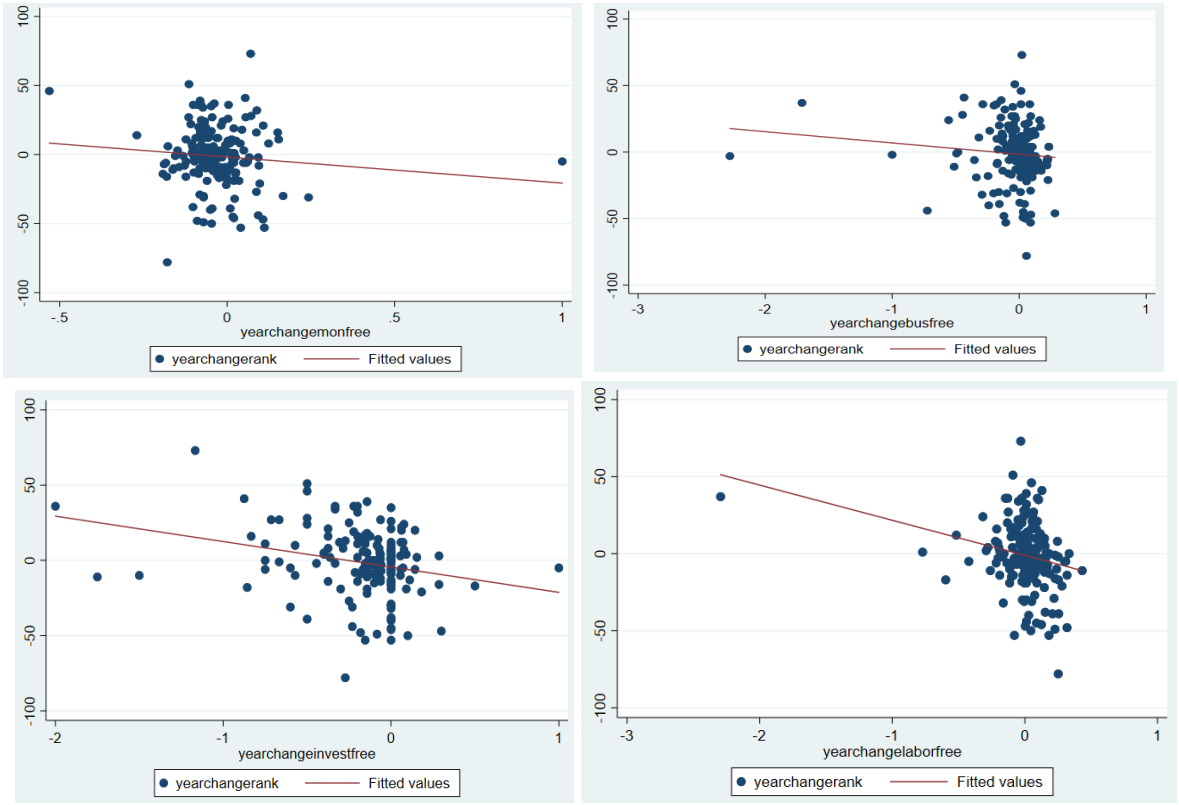
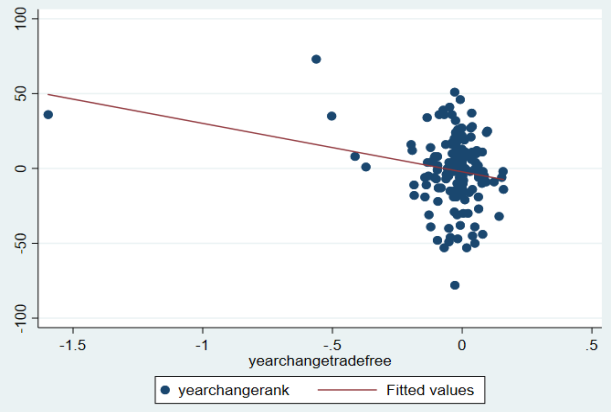


Figure 8: Scatter Plots with Lines of Best Fit for each Dependent Variable to Test Normality

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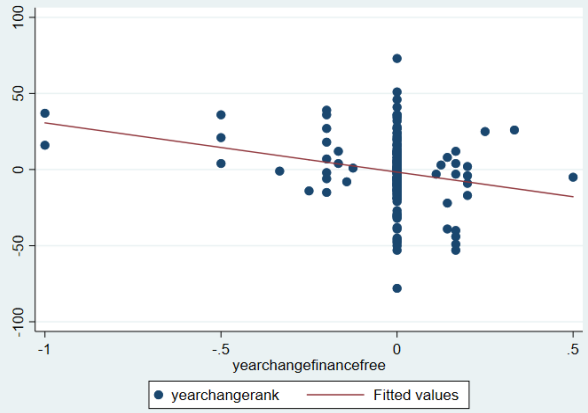
yearchangetradefree
yearchangerank
Fitted values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0
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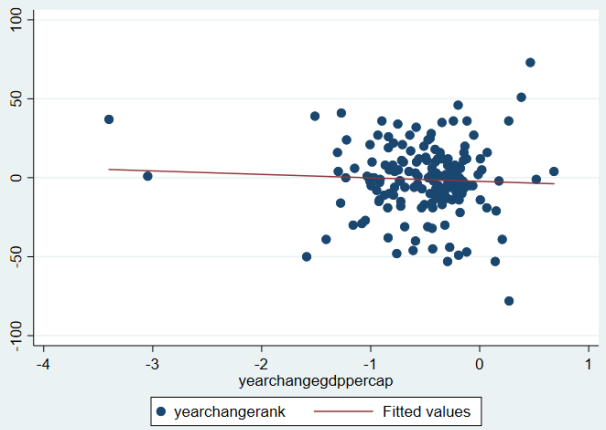
yearchangefinancefree
yearchangerank
Fitted values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-100
-4
-3
-2
-1
0
1
yearchangegdppercap
yearchangerank
Fitted values