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IS THERE THE THREAT OF DUTCH DISEASE IN THE UNITED STATES? A LOOK AT THE IMPACTS OF NATURAL RESOURCE EXPORTS ON THE NUMBER OF DOMESTIC MANUFACTURING JOBS

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By

Andrew Miskell

B.A., Southern Illinois University, 2011

A Research Paper
Submitted in Partial Fulfillment of the Requirements of
Masters of Arts

Department of Economics
In the Graduate School
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RESEARCH PAPER APPROVAL

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Approved by:

Dr. Subhash C. Sharma, Chair

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Southern Illinois University Carbondale

04/09/2013

An Abstract of the Research Paper of

Andrew Miskell, for the Masters of Arts degree in Economics, presented on 04/09/2013, at Southern Illinois University Carbondale

Title: IS THERE THE THREAT OF DUTCH DISEASE IN THE UNITED STATES? A LOOK AT THE IMPACTS OF NATURAL RESOURCE EXPORTS ON THE NUMBER OF DOMESTIC MANUFACTURING JOBS

Major Professor: Dr. Scott Gilbert

This paper intends on investigating the potential relationship that exists between the number of manufacturing jobs in the United States and the exportation of natural resources. It will stress how the increase seen in the exporting of America's natural resources over a thirty-three year period from 1980 to 2012, has coincided with significant job loss in the manufacturing sector. Specifically, this paper will show through a cross-sectional analysis of the United States that there has been a negative, linear, and significant relationship between these items of interest.

Keywords: Dutch Disease, Natural Resources, Manufacturing Sector, Real GDP

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Introduction

An opinion that most economists have in the field of development economics, is that for a country to thrive and prosper, there has to be growth and stability in that nation's manufacturing sector. As infrastructure is put into place and a nation's manufacturing sector grows, then that particular nation begins to see a surplus in several goods that have trade value with other nations, which allows for the opportunity to open up cash inflows and increased exports for the fledgling nation . The ability to have an abundance of tradable goods in an open economy is an important ingredient in the country's economic growth process, because if they have the ability to produce goods that other nations desire, this gives the neophyte country the chance to trade their own goods and export them to other lands in an exchange for things of value on the global marketplace, such as foreign currency or valuable commodities that cannot be found within the fledgling country.

These exports are integral for the development of jobs within the country and are an important component in the desire to lower income inequality and create personal wealth. By creating a need for workers who were previously unemployed, these newly employed workers now have the chance to live above subsistence wages, and can have a boost in their own quality of life. These individuals will now have the ability to send their children to schools, receive healthcare that was previously too expensive, and be able to purchase food, rather than spending all of their time growing it to survive. The increase in purchasing power creates a healthier economy; for now not only is there a need from the exports sector, there is now a newly created need for goods within the growing republic by these same employed individuals that now have the chance to purchase goods for themselves and their families. All of this is just

one of the components needed to get a young economy out of the starting blocks when it comes to being a global player in the export sector, but what about a nation that has already become highly developed and is/are some of the leaders in the world's economy?

Extensive research has been done concerning underdeveloped and developing nations that suffer from different economic maladies, like Dutch Disease (Rajan & Subramanian, 2011, and Javaid 2011), but there has not been nearly as much work done concerning the United States, which is a large scale economy and is presumably a healthy one. Can a nation like the United States begin to backslide, economically speaking, if we begin to shift our resources away from manufacturing and infrastructure and into other areas, like natural resource exports? The shifting could be due to a multitude of things, ranging from a shifting of our own resources, like human or fiscal capital, into a different field that we may find to be more profitable, or it could be a different underlying issue, such as, a trade imbalance with another global provider of goods that has also been accused of deflating its' own national currency in order for it to gain a foothold in the global marketplace.

The presumption is that as a country's exports of natural resources increase, there should be an increase in gross domestic product and the opportunity to have a potential increase in personal wealth. As one sector grows though, another will most likely begin to suffer, and that is what I intend on examining. My paper will consider what kind of results happen to manufacturing jobs within the United States when I examine the change in the amount of natural resources being exported from the U.S. Judging by the number of variables that could be taking place at any one given time, there will be a need for several coefficients, in order to look for any particular resource that could be having a greater effect on a shrinking

manufacturing workforce. The subsequent sections will look to give background information, along with a literature review, which will be followed by the methodology and results, then by an additional discussion and any problems or non-included variables, with the end of the paper having concluding remarks and reflections on the research that was done.

Literature Review and Background

For the past sixty-six years, the United States has been seeing an upward trend in our real gross domestic product, with it having tripled from 1947 to 1979, and more than doubled from 1980 to 2012, when we adjust using 2005 dollars (see appendix C). The growth that we have seen as a nation has rarely been rivaled by another country since the beginning of the industrial revolution. This growth can be primarily attributed to the growth and development of our manufacturing sector, which by creating many "home-grown" products, has given the United States the ability to produce goods that are desirable in both the global marketplace and within our own country. By generating these products, we have seen the number of manufacturing jobs peak at just over 19,000,000 in 1980, with this number accounting for 11.51% of the labor force at the time. Many economists continue to feel as though manufacturing exports provide the necessary tools for an economy to takeoff, and any adverse effects on the growth of these exports, could inhibit future economic growth (Rajan & Subramanian, 2009).

For the first thirty-three years after World War 2, the United States growth came from its' manufacturing sector, which made tradable goods like cars, clothing, and electronics, and along with this growth, came the financial backing for technological advancements in all of

these areas. However, in following thirty-three years as the world grew around us, we began to see global competition spring up in different countries and with this new competition, came new ideas that allowed for progressions to be made, and because of this, the world needed various natural resources in order to fuel this onslaught of technological change. The United States now found itself in a new position of strength in the field of exporting natural resources, and we could argue that the economic growth that we have been seeing since 1980 has been inflated not by a surge in our manufacturing capabilities, but rather is being aided by our abundance of natural resources that we can now use as a global currency and the technological proficiency in harvesting these resources from the earth which is making it a more cost effective process than in the past. For smaller economies, there is the worry that a condition known as Dutch Disease can occur when the developing nation sees a chance to increase its' exportation of natural resources and thus increase its' GDP, but as a consequence of this situation, there tends to be a negative effect on the number of jobs in the manufacturing sector for this country. For the most part, larger economies that are diversified do not have to fear such a condition, but there could be a new and intriguing case with the United States.

At the beginning of the 1980's, fresh off of the 1979 oil crisis with Iran, President Carter deregulated domestic oil prices, causing the price in crude oil to drop low enough to stimulate the field of domestic oil production. However, since the late 1980's we began to see a steady decline in the amount of oil being produced domestically, and during this time of fluctuation, we have seen the oil exports in the United States follow this pattern by falling by almost 80%, even with the price for a barrel of crude oil remaining relatively low up until 2003 (U.S. Energy Information Administration).

When oil is extracted from the ground, there tend to be pockets of natural gas that accompany it, and over the past thirty-three years the United States has also seen a spike in the amount of million cubic feet of natural gas that has been exported. While there has only been a 30% increase in the amount of natural gas that is being withdrawn when comparing levels in 1980 to that in 2012, during the same time period however, there has been an increase in natural gas exports by more than 3200%, from exporting 48,713 million cubic feet in 1980, to more than 1,600,000 million cubic feet being exported in 2012.

The coal industry, however, has seen a more volatile market over this period of time, with an increase in the amount being exported during the 1980's, followed by a sharp decrease from 1996 to 2006, and then an equally sharp increase over the past few years, with levels of exports trying to return to their 1980's predecessors. This volatility is most likely the result of the price of U.S. coal plummeting along the same time frame as the amount exported, with it hitting its' lowest price during 1999 to 2003. Even though the global demand market for U.S. coal has been up and down over the past thirty years, the coal production industry has been booming during this time with production increasing by around 23% since 1980 (U.S. E.I.A.).

During this time of economic and natural resource exportation boom, we have seen that the dollar, over time, has become more desirable to other countries, which helps to drive the value of the currency up, and with it, prices of other exportable goods. Research done by Thorvaldur Gylfason (2004) explored many of these facets when he examined Norway, and with it, he found that when a resource flush country begins to heavily trade these resources, their prices begin to rise, but as the prices of these commodities rise, the overall prices on other tradable goods rise, which then makes it more difficult for domestic industries to be able to

compete with cheaper foreign firms. For example, we have been privy to this situation, seeing an overall decrease in the domestic auto and electronic manufacturing production from 1980 to 2000. As we began to trade to other auto producing nations during this time frame, we became exposed to higher quality and lower priced items, which caused an inevitable decline of the American auto and electronic manufactures due to the high labor costs caused by strong union wages. Trying to learn from their mistakes, heads of the auto industry have taken notice and have begun in recent years to make an attempt to be able to use new technology and produce items that will rival their Japanese counterparts.

Data and Descriptive Statistics

The data that will be used has been acquired from the databases of the United States Energy Information Administration (U.S. E.I.A.), the U.S. Department of Commerce's Bureau of Economic Analysis, the Federal Reserve Bank of St. Louis' economic research data (FRED), and the International Labour Organization's database (LABORSTA). This paper looks to consider what relationship natural resource exports and manufacturing jobs within the United States might have with one another. The data on the number of natural resources being exported was obtained from the U.S. E.I.A. over a thirty-three year period that stretches from 1980 to 2012. Even though there are several categories of different natural resources that are being exported, I chose to only deal with the three most popular resources, coal, crude oil and natural gas, for the main purpose of setting a limit to the number of variables and also due to the limited data that can be found on certain exported materials, such as, rare earth metals and precious gemstones just to name a few. As for the data on the number of domestic manufacturing jobs,

that was found using the LABORSTA database and was also during the same time frame of 1980 to 2012. During this research, I referenced the real GDP of the United States, with the data provided by the Federal Reserve Bank, which had been calculated by year a base year of 2005, with any subsequent years having a seasonally adjusted annual rate.

As we have been seeing for the past thirty-three years, there has been a shrinking manufacturing sector, with the current manufacturing sector accounting for only 4.64% of the total domestic labor force, which is approximately an 8,000,000 loss in number of domestic manufacturing jobs. Figure 1 shows this loss graphically:

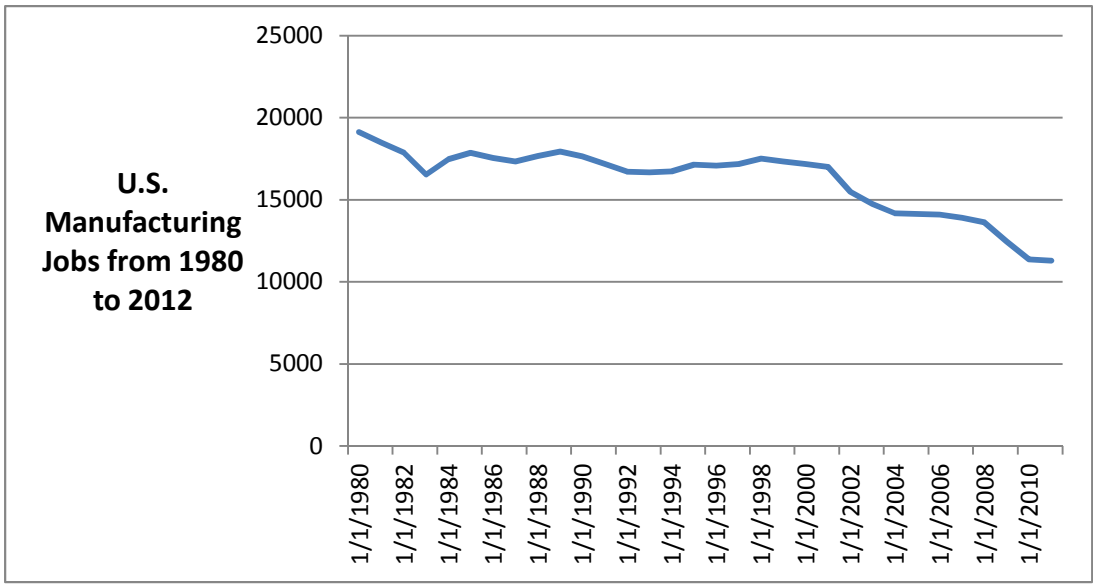

Figure 1: Number of domestic manufacturing jobs

As I mentioned earlier, the amount of coal that is being exported has seen the most market volatility, with it having its' ups and downs since 1980 (figure 2a), which can be seen as being naturally correlated with its' domestic market price (figure 2b), which was also calculated in 2005 dollars:

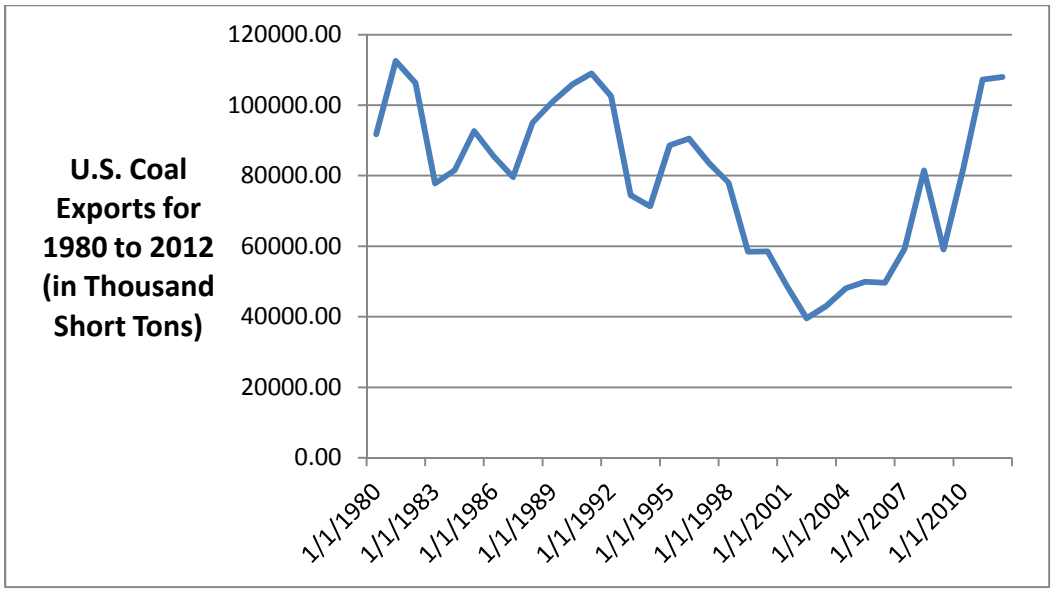

Figure 2a: Domestic Exports

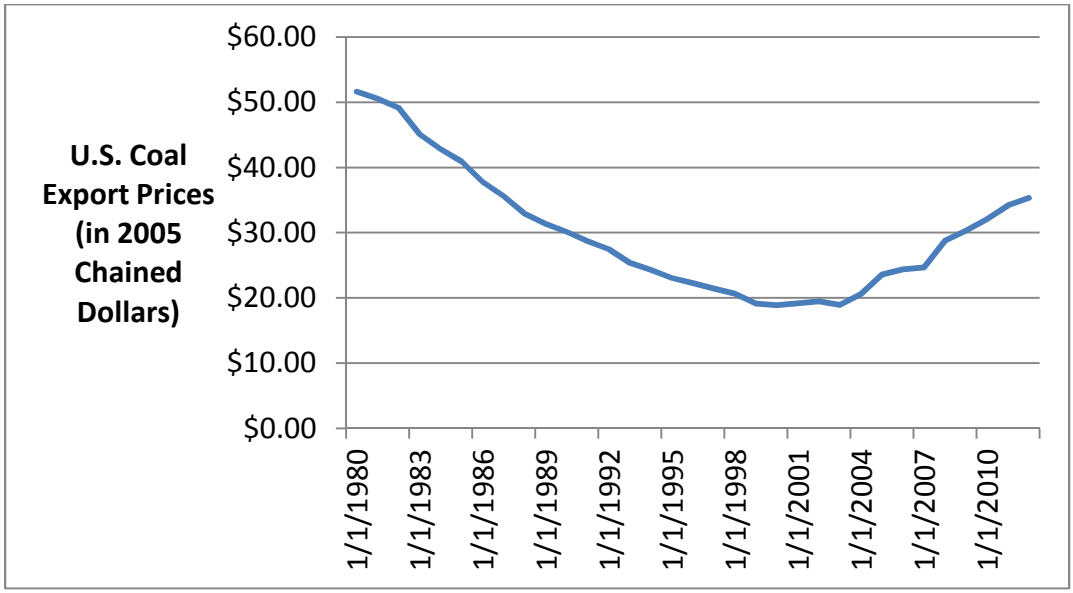

Figure 2b: Export Prices

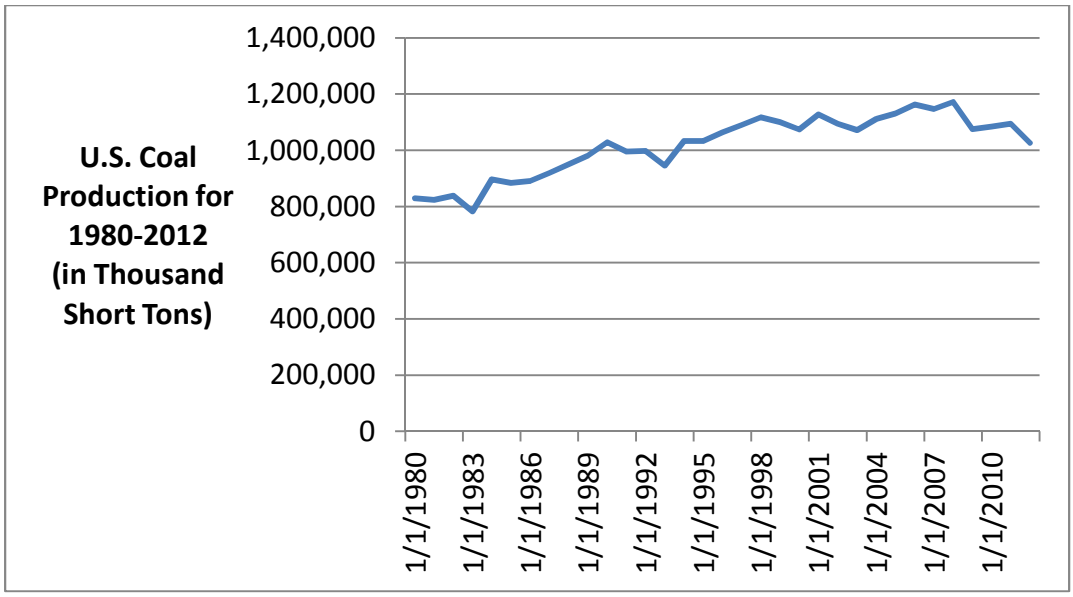

Figure 2c: Production

As we can see, the amount of coal that has been exported from the United States has varied over time, with a severe dip exports from 1996 to 2006, but it has rebounded over the past five years, with the total amount being exported increasing by 17.72% since 1980. At the same time of this export volatility, there has been a steady increase in the amount of coal that was being produced in the United States (figure 2c), with production being increased by 23.63%. With the export price of coal, however, we see a steadier decline in real prices, with the price trending downward since 1984, but starting in 2004 we can see that the price of coal is bouncing back by returning to similar prices seen in 1987.

As having stated previously, the amount of crude oil that the United States has been exporting since 1980 has plummeted by almost 80%, with the United States exporting approximately 104,935,000 barrels in 1980, to just over 17,150,000 barrels in 2012. This decrease in exporting crude oil is shown below in figure 3a:

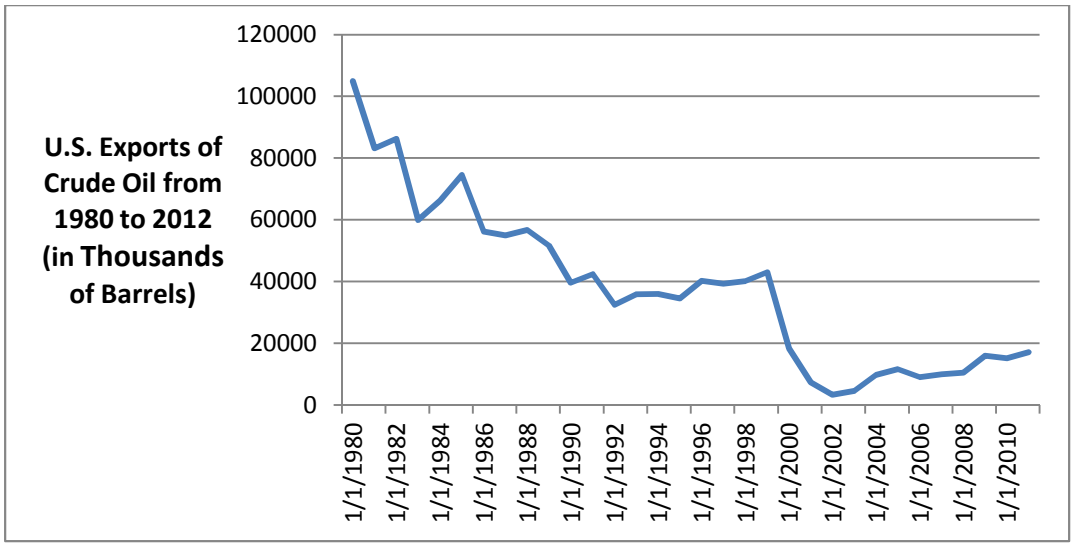

Figure 3a: Domestic Oil Exports

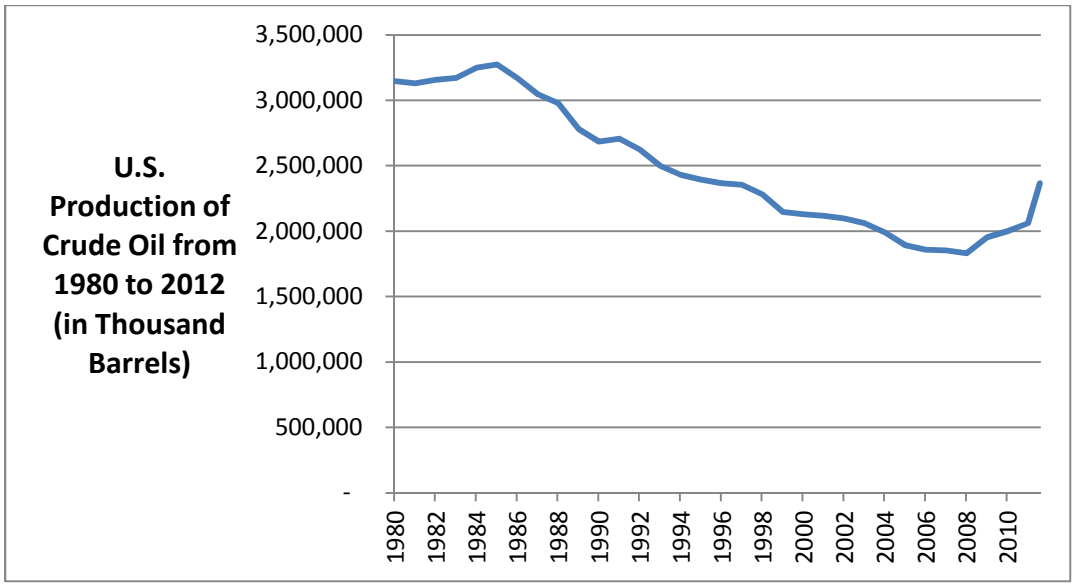

Figure 3b: Domestic Crude Oil Production

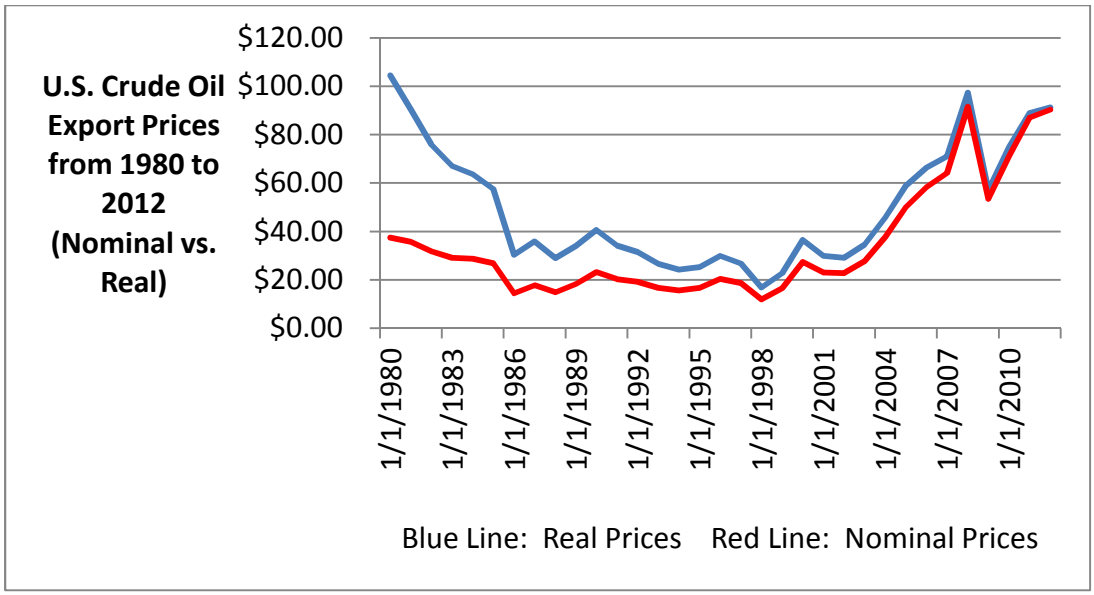

Figure 3c: Nominal vs. Real Oil Export Prices

From the first and second figures (3a and 3b), we can see that even though there has been a definite decrease in the amount of crude oil that has been exported from the United States, as well as a decrease in production, the amount being produced has seen a slight uptake over the past four years, especially from a production standpoint. There has been a similar decrease in the real export price during the same time period, up until about 2001 when we see a spike upward in price. This sudden upturn in price could have coincided with the Afghanistan and Iraq wars, but more research would have to be done to determine the exact cause for this price increase.

Also as stated previously, the exportation of natural gas from domestic wells has seen the greatest percentage increase over the same time period, with the amount being exported in million cubic feet (MMcf) in 1980 being a mere fraction of what is being exported thirty-three years later in 2012. As we have seen the amount of domestic natural gas being exported has increased by more than 3200% over this time (figure 4a):

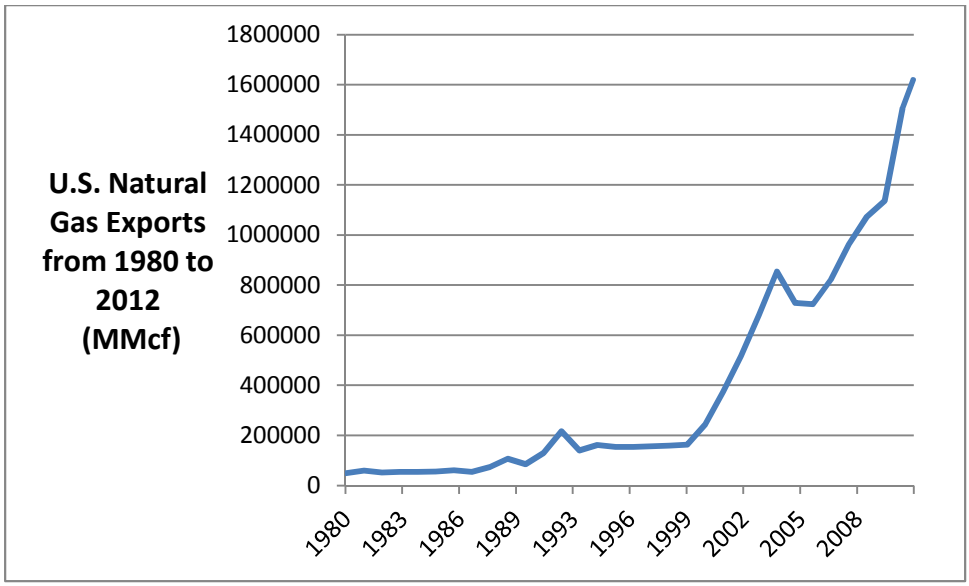

Figure 4a: Natural Gas Exports

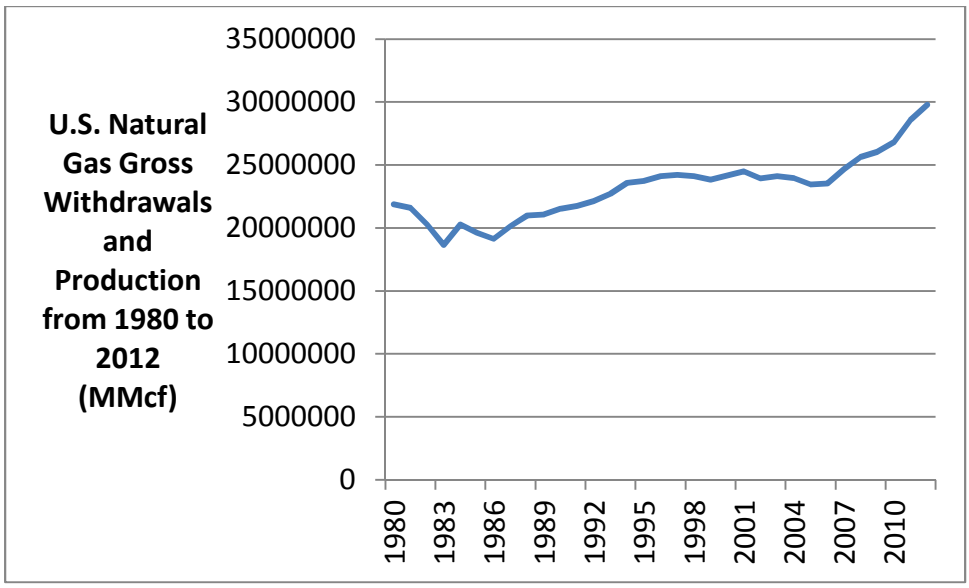

Figure 4b: Gross Withdrawals and Production

At the same time of this tremendous increase, the United States has seen only a 30.75% increase in the amount of natural gas being withdrawn and produced from domestic wells. Part of the increase in the amount being exported when compared to the amount that is being withdrawn and produced is could be related to the fact that over the past thirty-three years, parts of the world have become more developed economically and are now capable of

purchasing heating supplies and fuel for their citizens to be able to use on a daily basis, rather than on an intermittent scale.

Methodology

The Null hypothesis of this research will be that as exportation of natural resources are increased; there should be a negative correlation to the number of manufacturing jobs in the United States. The Alternative hypothesis for this would be that the number of American manufacturing jobs have either no correlation, or even possibly in a positive one, with the increased exportation of natural resources.

The dependent variable (Y) I intend on regressing is the number of manufacturing jobs in the United States during the time period of 1980-2012, which was found by using the ILO's database, LABORSTA. The independent variables and the levels of measurement that will be used are provided here in Table 1:

Table 1: Levels of Measurement

X	Variables	Attributes	Level of Measurement
X1	Exports	Coal	Ratio
X2	Exports	Crude Oil	Ratio
X3	Exports	Natural Gas	Ratio

The regression model will take the following form with all of their corresponding parameters (Beta's):

$$Y(hat) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

In order to study the correlations of these studies, there will be a need to run a multiple regression analysis. When doing so, I intend on using an overall F-test, in order to test for

whether all β_i are equal to 0. For this test, I will have a Null hypothesis of $B_1 = \beta_i = 0$, and an alternative hypothesis that not all of the Beta's are not equal to zero. I will be using an alpha level of 0.05 as my parameter for the rejection region. In addition to running this analysis, I intend on examining the partial correlations of these predictor variables, in order to measure if there happens to be any marginal contribution of a particular X variable to Y, when all other predictors are already included in the model. I will also be looking at the semi-partial correlations in order to find out if there is a unique contribution of an independent variable (X_i) to the dependent variable (Y) when the influence of the other predictor variables is only removed from the predictor variable that I am testing, but not from the dependent variable.

The methodology that I intend on using for all of these tests can be found in the texts that were part of a recent Multiple Regression course and are noted in the References section of this paper.

Results

As a first indication of the possible association between the number of domestic manufacturing jobs and the amount of domestic natural resources being exported, the multiple correlation coefficient gave us the value of 0.971. This lets us know that the correlation between the predictor variables and the dependent variable has a strong and linear relationship. However, because the multiple R can only take on positive values between 0 and 1, I decided to split up the data into different simple linear regression models in order to find the Pearson correlation for each variable. Once this was done, it revealed a possibly better explanation as to what was going on with the data, which can be seen in table 2:

Table 2: Correlations

		Y ManJobs	X1Coal	X2Oil	X3Gas
Pearson Correlation	Y ManJobs	1.000	.396	.731	-.968
	X1Coal	.396	1.000	.656	-.355
	X2Oil	.731	.656	1.000	-.704
	X3Gas	-.968	-.355	-.704	1.000
Sig. (1-tailed)	Y ManJobs	.	.012	.000	.000
	X1Coal	.012	.	.000	.023
	X2Oil	.000	.000	.	.000
	X3Gas	.000	.023	.000	.
N	Y ManJobs	32	32	32	32
	X1Coal	32	32	32	32
	X2Oil	32	32	32	32
	X3Gas	32	32	32	32

From this table, we can see that the correlation between manufacturing jobs and the amount of coal being exported has a positive and moderate relationship with the dependent variable and along with this finding, we can see that the correlation between domestic manufacturing jobs and the amount of oil being domestically exported has a positive and strong relationship. On the other hand, we see that the natural gas predictor variable has a negative and strong relationship with my dependent variable, the number of manufacturing jobs in the United States. Along with these correlations, we are able to see that the predictor variables coal and oil have a moderate, positive relationship with each other and that the natural gas exports variable has a moderate to slightly strong negative relationship with the other two predictor variables, domestic coal and crude oil exports respectively.

During my research, multiple regression analysis was used to examine how well the amount of domestic coal, crude oil, and natural gas exports would explain/predict the number

of domestic manufacturing jobs. The three predictors together accounted for approximately 93.5% of the variance in the number of manufacturing jobs ($R^2_{adj} = 0.9364$), F(3, 28) = 153.2294, p = 1.78E-17. When comparing the F-statistic (153.2294) to the F-critical value of 2.947, we see that the full model showed significance, but when examining the three predictor variables, we see that not all of them are significant. The following table will give a brief glimpse into the results that were observed over the time period of 1980 to 2012.

Table 3: Full Model 1980 to 2012

Predictor Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
X1Coal	.002	.006	.024	.399	.693	.396	.075	.018
X2Oil	.006	.006	.077	.953	.349	.731	.177	.043
X3Gas	-.005	.0001	-.906	-13.926	.000	-.968	-.935	-.630

The amount of natural gas being exported from the United States was a significant predictor for the number of manufacturing jobs, t(28) = -13.926, p = -1.94E-09, which accounted for 87.43% of the variance in manufacturing jobs not accounted for by the amount of coal and oil being exported, and it uniquely accounted for 39.69% of the variance in the number of manufacturing jobs. Holding the amount of coal and oil being exported as constant, as the amount of natural gas being exported increased by 1, the number of manufacturing jobs we estimated to decrease by about -0.005 points. The amount of coal being exported was not a significant predictor of the number of manufacturing jobs in this model, t(28) = 399, p = 0.693. It accounted for only 0.56% of the variance in the number of manufacturing jobs which was not accounted for by the amount of oil and natural gas exports and it uniquely accounted for

0.003% of the variance in the number of manufacturing jobs. When the other two predictor variables are held constant, we see that as the amount of coal being exported is increased by 1, the number of manufacturing jobs increased by 0.002 points. The last of the predictor variables, oil exports (X_2) was also not a significant predictor of the number of manufacturing jobs, $t(28) = 0.953$, $p = 0.349$. The amount of domestic oil being exported only accounted for 3.13% of the variance in the dependent variable which was not accounted for by the amount of coal and natural gas exports, and it uniquely accounted for only 0.0018% of the variance in the number of manufacturing jobs. When the other two predictor variables are held constant, we see that as the amount of oil being exported is increased by 1, the number of manufacturing jobs is increased by 0.06 points. From these partial correlations, we see that the third predictor variable (X_3 = natural gas) accounted for the greatest amount of variance in the number of manufacturing jobs, once the influences of X_1 and X_2 were removed from X_3 and Y.

With the knowledge that only one of my predictor variables showed significance in the full model, which differed from when the Pearson correlation coefficient was examined, I then chose to breakdown the full model into separate simple linear regression equations for the purpose of testing to see if each variable would show signs of significance when it had been regressed upon by the original dependent variable. For each independent variable, I broke them each into a set of data which was then divided up into two time periods (1980 to 1995 and 1996 to 2012), so as to see if there was any change in significance over time for each variable. With each separate equation, the dependent variable remained the domestic number of manufacturing jobs. Tables 4a and 4b illustrate each variables unstandardized beta coefficient, test statistic, and p-value:

Table 4a: Each predictor variable (1980-1995)

Predictor Variables	Unstandardized Beta	t-statistic	p-value
X_1-Coal	-0.005	-0.410	0.6876
X_2-Oil	0.027	5.144	0.0002
X_3-Natural Gas	-0.006	-2.802	0.0144

Table 4b: Each predictor variable (1996-2012)

Predictor Variables	Unstandardized Beta	t-statistic	p-value
X_1-Coal	-0.007	-0.245	0.8102
X_2-Oil	0.084	2.386	0.032
X_3-Natural Gas	-0.005	-12.802	4.06E-09

After having run each separate regression equation, we see that over time, the amount of domestic coal being exported is still not a significant predictor of the number of manufacturing jobs within the United States, however, the significance levels for the amount of oil being exported is different from when the full model was regressed. The amount of oil being exported proves to be a significant predictor variable over the first and second periods, which helps to support the Pearson correlations coefficient. During this same process, the amount of natural gas being exported remained a significant predictor for the number of domestic manufacturing jobs during both time periods.

During this survey, I was also able to see that the correlations between the dependent variable and the crude oil exports independent variable remained strong over time, while the correlations for the dependent variable and the natural gas exports variable actually increased significantly over time. The correlations for coal however, declined significantly as when

compared to the Pearson coefficient from the full model, which spanned over the observed length of time. These results can be viewed below in table 5:

Table 5: Correlation Statistics for separate sets of years

Predictor Variable (Years measured)	Multiple R	R-squared	Adjusted R-squared
Coal (1980-1995)	0.109	0.012	-0.058
Coal (1996-2012)	0.065	0.004	-0.067
Oil (1980-1995)	0.809	0.654	0.629
Oil (1996-2012)	0.538	0.289	0.238
Natural Gas (1980-1995)	0.599	0.359	0.313
Natural Gas (1996-2012)	0.956	0.921	0.916

With all of this information, I can conclude that there are strong, negative, and linear relationships that exist between the independent variables natural gas that are exported domestically, and the dependent variable, the number of domestic manufacturing jobs. There was evidence to support a possible link between the amount of crude oil and the amount of natural gas being exported, with the possible outcome of the number of manufacturing jobs due to the evidence shown when the dependent variable was solely regressed upon each predictor variable during the separation of time periods. Both the crude oil and the natural gas independent variables showed significance in predicting the number of manufacturing jobs during both of these time periods.

When testing the effects that oil and natural gas have on any dependent variable, we have to be aware of the fact that multicollinearity could exist because of the fact that natural gas and coal are commonly extracted from the same areas and might have an impact on one another. During these analysis' I did not feel that these variables had a negative impact on the precision of the estimated mean response due to the fact that when X_3 was added to the full

model, neither one of the Beta's for X_1 or X_2 grew substantially larger. To support this, I performed Variance Inflation Factor tests (VIF), in which $\mathrm{VIF} = \frac{1}{1-R^2}$ and using the standard measurement of any VIF > 10, this would indicate a serious multicollinearity problem bad enough to cause an extremely poor parameter estimate. None of the independent variables in my full model had a VIF score that was greater than 10, which can be seen table 6 below:

Table 6: Collinearity Statistics

Collinearity Statistics		
Variables	Tolerance	VIF
X_1-Coal Exports	.546	1.830
X_2-Crude Oil Exports	.315	3.175
X_3-Natural Gas Exports	.484	2.068

Additional Discussion

After having observed the data and considered the results, I began to question if other developed nations have been seeing a similar trend that concerns the number of manufacturing jobs and the amount of natural resources that are being exported from their particular nations due to the fact that other papers have questioned whether or not these nations are also suffering or have suffered from Dutch disease in the past. I decided to take a brief look at six other nations that export the two of the same predictor variables that I used in my regressions. The only change that I had to make in this analysis was to change the crude oil independent variable to a refined petroleum exports variable, which was due to the lack of reliable data on

crude oil exports from these nations. The countries include: Canada, Denmark, Japan, the Netherlands, Norway, and Russia. Below is a table for these nations that will show the number of manufacturing jobs in the beginning year of observations, the number of observed jobs in the end year, and the percentage change during the observed time frame, with the complete numbers being found in appendix B:

Table 7: Amount of Manufacturing Jobs in Thousands and Years Observed

Country	**Number of Jobs (Year observed)**	**Number of Jobs (Year observed)**	**Amount Changed (+/-)**	**Percentage Changed (+/-)**
Canada	2006.0 (1980)	1838.1 (2008)	-167.9	-8.37%
Denmark	486.2 (1999)	386.9 (2008)	-99.3	-20.42%
Japan	11210.0 (1980)	10590 (2008)	-620.0	-5.53%
Netherlands	1053.2 (2000)	876.5 (2008)	-176.7	-16.78%
Norway	369.0 (1980)	257.7 (2008)	-44.3	-30.16%
Russia	12212.0 (2005)	11862 (2008)	-350.0	-2.87%
United States	19312.0 (1980)	11125 (2012)	-8007.0	-41.85%

From this table, we are able to see that not only has the United States been lost the greatest number of jobs by a physical count, we have lost the most jobs from a percentage standpoint as well. Not all of these nations had the data readily available from the LABORSTA database when it concerned the number of domestic manufacturing jobs, which is why some of the beginning years differ from one another. However, we can still see one possible trend is that most of these nations are moving away from their manufacturing sectors, whether it be because of advancements in technology (robotics, cost efficient assembly lines, etc…) or because these nations are looking for greater revenue from a different source.

During this same time period, all of these nations saw growth in the amount of exported natural resources, with the only exception being Japan and its' level of coal exports,

which saw a decrease. Two additional countries that I also looked at were China and India, for the reason being to see if and by how much, the levels of natural resource exports changed for these developing nations. The reason China and India were not included in the manufacturing jobs table was due to a lack of reliable and/or available data. The following table shows the percentage change for each country's level of exported coal, refined petroleum, and natural gas, and the years that they were observed. The complete numbers can also be found in appendix B:

Table 8: Percentage Change in Natural Resource Exports

Country	**Coal (Years Observed)**	**Refined Petroleum (Years Observed)**	**Gas (Years Observed)**
Canada	121.88% (1980-2011)	654.41% (1984-2010)	116.27% (1990-2011)
Denmark	2296.74% (1980-2011)	137.39% (1984-2010)	198.27% (1990-2011)
Japan	-54.02% (1980-2011)	1261.32% (1984-2010)	0% (No observations)
Netherlands	151.89% (1980-2011)	96.86% (1984-2010)	54.87% (1990-2011)
Norway	1084.25% (1980-2011)	549.41% (1984-2010)	283.46% (1990-2011)
Russia	188.32% (1992-2011)	155.81% (1992-2011)	13.68% (1992-2011)
United States	15.37% (1980-2012)	329.61% (1980-2012)	3222.21% (1980-2012)
China	150.02% (1980-2011)	325.24% (1986-2010)	727.84% (1990-2011)
India	4130.56% (1980-2011)	2208.61% (1986-2010)	0% (No observations)

From this chart we are able to see the dramatic amount increased in certain natural resource exports for different countries. Part of these increases could be explained by new technology and better extraction techniques that were incorporated during these time periods, though I believe there is an equally plausible option. Since 1980, we have seen an exploding global demand that has to be filled and even though some of these nations are not the top natural resource exporters in each category, they are capitalizing on the situation at hand and are starting the slow process of diverting capital and labor resources from their manufacturing

sectors, to a potentially more profitable and less costly market. The constant speculation on how many natural resources that are still available in the world, is a booming industry and with the likelihood that it takes fewer people to extract these materials than it would to run an automotive assembly line, helps to reduce a nation's labor cost, but also it could increase a nation's unemployment rate due to the reduced need for particular laborers. Throughout this potential storyline though, there has to be the constant consideration that correlation does not imply causation.

Potential Problems and Non-included Variables

Throughout all of these procedures, the use of manufacturing jobs was the dependent variable in an attempt to find out why this particular sector was seeing substantial loss over the past thirty-three years, however, if anyone wanted to carry on additional research, there could be the opportunity to measure other sectors (industry, housing, currency exchange rates, etc…) by swapping out the dependent variable for a new one.

When constructing the first model, there were various elements that were not included for specific reasoning. One variable that was not included for the regression equation that had natural resource qualities was the timber industry. Some of the reasons for not including the timber industry include the fact that while coal, crude oil, and natural gas can all technically be labeled as renewable resources they are, for all intensive purposes, non-renewable due to the longevity it takes for them to re-spawn, while timber on the other hand, can be replanted and regrown in almost 40 years. The ability to regenerate the supply of timber much quicker than its' counterparts, gives it an increased market volatility due to the possibility of some replanting

not taking hold in the soil or the additional possibility that timber companies skirt the laws and do not follow through with the necessary number of replanted trees. During this time of regeneration, there is also comes the prospect of areas being decimated by fire and wind much easier than any of the other three predictor variables, which can also cause a greater variability in the year to year harvesting and calculation of the timber resource. Timber, like other natural resources, is also not isolated to only a few countries, however, the extraction of timber is much easier and less costly than my predictor variables. With the exception of some extreme regions, timber is not an exclusive resource with trees being able to be grown in almost every country, and along with this line of thinking, is the reason why I did not also include wind and/or solar power into the model as well. Another resource that was not included in the model was the excavation and exporting of precious minerals (silver, platinum, uranium, titanium, etc…), mainly due to the fact that data and location of precious minerals has been too great of a fluctuation to be consistently measured in this trading scenario.

A weakness of the full model is the possibility of there being an unintended bias within the terms, which was not accounted for during testing. It could be possible for one of the terms to be artificially pulled in either direction, up or down, if the production or exportation of a good has a dominant effect. This dominant effect can cause a sample to have Type 2 errors that cause a false acceptance of the Null hypothesis if we begin to see fewer and fewer significant results.

Concluding Remarks

Throughout this process, there has been an understanding that a correlation does not imply causation. With this understanding, however, there is still a possible story that could be told. As having stated in the additional discussion section, there could be the gradual shifting taking place of moving capital and labor resources to the more profitable market of natural resource exportation. The attempt to explain any of these effects by simply labeling it as a form of Dutch Disease is difficult, due to the fact that Dutch Disease is a wide ranging term that is almost always associated with only developing nations, and not with top-tier economies like the United States. Most of the time, when countries are being afflicted with this problem, it is due to an increase of foreign aid having negative externalities on a country, such as, corruption, decreased human and physical capital, and an increase in political oppression. As we look around and see an increase technology, from fracking in the oil sands of Alberta, Canada, to the Alaskan pipeline that is currently being constructed, we see human and financial capital being steered towards advancements in production and refinement of natural resources. A problem that some economists see with this is that with the shrinking manufacturing sector, what happens to the people that at one time held those jobs? If they cannot find work that pays a similar wage, they will most likely be forced to take a job that pays less than their previous positions, due to the likelihood that most of these people who are searching for new jobs do not hold higher education degrees or are insufficiently educated for new opportunities. This situation causes a polarization of the classes, leading to a shrinking middle class, which some could argue is what we are currently experiencing in the United States. By accepting these lower wage jobs, it is possible to still see a growing GDP, but also have a shrinking

GDP-per capita. All of this begins to beg the question: are we as a global market place growing too dependent on these exports as being a part of our GDP; which is the type of research done by Gylfason in 2004 and Larsen in 2006, when they examined this exact possibility with Norway. With crime being a good example, there are varying degrees of ways a law can be broken, so why not varying degrees of Dutch Disease as well.

Another difficulty with the full model is that there are undiscovered reserves of natural resources being found every day, all over the world, by different nations. At any one time, the United States could see itself drop off of the competitive cliff if a large enough reserve is found outside of the scope of our reach. Along this train of thought, is the fact that we host some of the most state-of-the-art research facilities that are examining new ways to utilized existing resources for consumption, while at the same time, looking into new technologies that can revolutionize the way we use a new and unfounded resource, much like the way natural gas was a negative byproduct of drilling for oil before we found a way to use it to heat homes and power engines. Our dependence on natural resource production and exports has been with our economy for quite some time, but it could be viewed as a temporary inconvenience, if we as nation can find a new innovation to push us through the 21st century.

REFERENCES

Bresser-Pereira, Luiz Carlos (2008) "The Dutch Disease and Its Neutralization: A Ricardian Approach," *Revista de Economia Politica* No. 28, issue 1, pgs. 47-71

Brunnschweiler, Christa (2006) "Cursing the Blessings? Natural Resource Abundence, Institutions and Economic Growth," *World Development*, No. 36, issue 3, pgs. 399-419

Gylfason, Thorvaldur (2004) "Natural Resources and Economic Growth: From Dependence to Diversification," *CEPR Discussion Papers* No. 4804, C.E.P.R. Discussion Papers

Javaid, Shahid Hussain (2011) "Dutch Disease Investigated: Empirical Evidence from Selected South-East Asian Economies," *Journal of Economic Cooperation and Development* No. 32, issue 4, pgs. 51 – 74

Larsen, Erling Roed (2006) "Escaping the Natural Resource Curse and the Dutch Disease? Norway's Catching Up With and Forging Ahead of Its' Neighbors," *The American Journal of Economics and Sociology* No. 65, issue 3, pgs. 605 - 640

Rajan, Raghuram and Arvind Subramanian (2011) "Aid, Dutch Disease and Manufacturing Growth," *Journal of Development Economics* No. 94, pgs. 106 – 118.

Ruta, Michele and Venables, Anthony J. (2012) "International Trade in Natural Resources: Practice and Policy," *Annual Review of Resource Economics*, No. 4, issue 1, pgs. 331-352

For the Data:
www.ilo.org and www.bea.gov for their databases with data on manufacturing jobs
www.us.doe.gov/ and www.eia.gov for the databases and statistics on natural resources
research.stlouisfed.org/fred2/ for the real GDP

For the Analysis Testing:

Mendenhall, W., & Sincich, T. (2011). *A second course in statistics: Regression analysis* (7th ed.). New Jersey: Pearson. (ISBN: 0321691695)

Howell, D. C. (2012). *Statistical methods for psychology* (8th ed.). London: Duxberry Press. (ISBN: 1111835489)

Leech, N. L., Barrett, K. C., & Morgan, G. A. (2011). *IBM SPSS for intermediate statistics.* (4rd ed.). New Jersey: Lawrence Erlbaum. (ISBN: 0415880475)

APPENDICIES

Appendix A: Domestic Natural Resource and Manufacturing Jobs Data

Year	Total Coal Exports for U.S. (X 1) (Thousand Short Tons)	Total Crude Oil Exports for U.S. (X 2) (Thousands Barrels per Day)	Total Natural Gas Exports for U.S. (X 3) (Million Cubic Feet)	Number of Manufacturing Jobs in U.S. (Y) (in Thousands)
1980	91742.000	104935.000	48731.00	19132
1981	112541.000	83166.000	59372.00	18482
1982	106277.000	86279.000	51728.00	17874
1983	77772.000	59948.000	54639.00	16530
1984	81483.000	66233.000	54753.00	17461
1985	92680.000	74513.000	55268.00	17860
1986	85518.000	56205.000	61271.00	17551
1987	79607.000	54964.000	54020.00	17339
1988	95023.000	56713.000	73638.00	17669
1989	100815.000	51683.000	106871.00	17939
1990	105804.000	39653.000	85565.00	17648
1991	108969.000	42385.000	129244.00	17184
1992	102516.000	32473.000	216282.00	16703
1993	74519.000	35834.000	140183.00	16661
1994	71359.000	36020.000	161738.00	16722
1995	88547.000	34509.000	154119.00	17133
1996	90473.000	40211.000	153393.00	17083
1997	83545.000	39308.000	157006.00	17183
1998	78048.000	40102.000	159007.00	17511
1999	58476.000	43031.000	163415.00	17324
2000	58489.000	18352.000	243716.00	17179
2001	48666.000	7386.000	373278.00	16993
2002	39601.000	3296.000	516233.00	15475
2003	43014.000	4538.000	679922.00	14744
2004	47998.000	9783.000	854138.00	14171
2005	49942.000	11619.000	728601.00	14142
2006	49647.000	8999.000	723958.00	14093
2007	59163.000	10006.000	822454.00	13898
2008	81519.000	10464.000	963263.00	13619
2009	59097.000	15985.000	1072357.00	12450
2010	81716.000	15198.000	1136789.00	11357
2011	107259.000	17158.000	1507058.00	11284
2012	108000.000	21874.000	1618946.00	11125

Appendix B-1: World Data, U.S.

Year	Total Coal Exports for U.S. (X 1) (Thousand Short Tons)	Total Refined Petroleum Exports for U.S. (Thousand Barrels per Day)	Total Natural Gas Exports for U.S. (X 3) (Million Cubic Feet)	Number of Manufacturing Jobs in U.S. (in Thousands)
1980	91742.000	N/A	48731.00	19132
1981	112541.000	N/A	59372.00	18482
1982	106277.000	N/A	51728.00	17874
1983	77772.000	N/A	54639.00	16530
1984	81483.000	537.915	54753.00	17461
1985	92680.000	575.173	55268.00	17860
1986	85518.000	628.181	61271.00	17551
1987	79607.000	611.090	54020.00	17339
1988	95023.000	658.385	73638.00	17669
1989	100815.000	711.060	106871.00	17939
1990	105804.000	746.389	85565.00	17648
1991	108969.000	884.312	129244.00	17184
1992	102516.000	860.079	216282.00	16703
1993	74519.000	895.836	140183.00	16661
1994	71359.000	826.701	161738.00	16722
1995	88547.000	839.984	154119.00	17133
1996	90473.000	846.814	153393.00	17083
1997	83545.000	863.104	157006.00	17183
1998	78048.000	776.038	159007.00	17511
1999	58476.000	779.120	163415.00	17324
2000	58489.000	937.582	243716.00	17179
2001	48666.000	912.184	373278.00	16993
2002	39601.000	908.704	516233.00	15475
2003	43014.000	952.641	679922.00	14744
2004	47998.000	956.353	854138.00	14171
2005	49942.000	1062.608	728601.00	14142
2006	49647.000	1200.800	723958.00	14093
2007	59163.000	1304.238	822454.00	13898
2008	81519.000	1188.997	963263.00	13619
2009	59097.000	1980.326	1072357.00	12450
2010	81716.000	2310.918	1136789.00	11357
2011	107259.000	N/A	1507058.00	11284
2012	108000.000	N/A	1618946.00	11125

Appendix B-2: World Data, Canada

Year	Total Coal Exports for Canada (Thousand Short Tons)	Total Refined Petroleum Exports for Canada (Thousand Barrels per Day)	Total Natural Gas Exports for Canada (Million Cubic Feet)	Number of Manufacturing Jobs in Canada (in Thousands)
1980	16931.500	N/A	N/A	2006.0
1981	17538.880	N/A	N/A	2003.0
1982	17656.820	N/A	N/A	1904.0
1983	18753.620	N/A	N/A	1734.0
1984	27722.030	142.259	N/A	1828.0
1985	30203.330	165.551	N/A	1866.0
1986	28564.190	150.935	N/A	1930.0
1987	29554.070	175.359	N/A	1851.6
1988	35000.590	238.958	N/A	1910.4
1989	36256.120	218.838	N/A	1974.3
1990	34404.240	243.429	1436900.00	1931.1
1991	37675.900	274.467	1684000.00	1777.2
1992	31165.650	240.397	2044630.00	1678.5
1993	31537.130	257.627	2225445.00	1612.4
1994	35364.350	241.218	2521600.00	1596.9
1995	37839.040	255.237	2795180.00	1723.6
1996	38414.450	297.521	2829332.00	1719.2
1997	40619.070	317.430	2888590.00	1803.6
1998	38008.800	298.974	3148685.00	1892.1
1999	37258.120	306.706	3359163.00	1971.1
2000	35695.050	311.349	3575502.00	2079.0
2001	32820.220	405.901	3822496.00	2111.6
2002	29834.060	434.796	3804485.00	2057.8
2003	31367.370	441.978	3583413.00	2152.5
2004	28652.380	456.474	3717292.00	2125.2
2005	31259.350	455.083	3752960.00	2111.0
2006	31242.810	433.123	3605732.00	1952.2
2007	34131.970	450.788	3782731.00	1943.7
2008	36485.400	381.692	3589099.00	1838.1
2009	31777.430	962.922	3271123.00	N/A
2010	36919.710	1073.215	3263106.00	N/A
2011	37567.870	N/A	3107720.00	N/A

Appendix B-3: World Data, Denmark

Year	Total Coal Exports for Denmark (Thousand Short Tons)	Total Refined Petroleum Exports for Denmark (Thousand Barrels per Day)	Total Natural Gas Exports for Denmark (Million Cubic Feet)	Number of Manufacturing Jobs in Denmark (in Thousands)
1980	3.307	N/A	N/A	N/A
1981	3.307	N/A	N/A	N/A
1982	45.195	N/A	N/A	N/A
1983	44.092	N/A	N/A	N/A
1984	85.980	43.975	N/A	N/A
1985	79.366	39.863	N/A	N/A
1986	72.753	49.258	N/A	N/A
1987	58.423	48.163	N/A	N/A
1988	99.208	52.487	N/A	N/A
1989	48.502	61.784	N/A	N/A
1990	45.195	52.955	37000.00	N/A
1991	89.287	60.477	50000.00	N/A
1992	38.581	73.925	54880.00	N/A
1993	26.455	80.012	57280.00	N/A
1994	65.036	81.152	59540.00	N/A
1995	27.558	81.737	59400.00	N/A
1996	171.961	94.626	67698.85	N/A
1997	115.743	87.072	104885.60	N/A
1998	188.495	64.801	95350.50	N/A
1999	220.462	80.591	95703.65	486.2
2000	135.584	93.305	107357.60	498.7
2001	181.881	79.271	119117.50	464.0
2002	185.188	77.277	116186.40	462.6
2003	166.449	81.250	101283.40	424.0
2004	175.268	83.348	144791.50	425.0
2005	105.822	80.974	197022.40	421.5
2006	121.254	93.162	184944.70	409.8
2007	209.439	95.006	159553.20	429.4
2008	171.961	93.743	194797.50	386.9
2009	70.548	100.131	141471.90	N/A
2010	78.264	104.392	124838.50	N/A
2011	79.259	N/A	110359.40	N/A

Appendix B-4: World Data, Japan

Year	Total Coal Exports for Japan (Thousand Short Tons)	Total Refined Petroleum Exports for Japan (Thousand Barrels per Day)	Total Natural Gas Exports for Japan (Million Cubic Feet)	Number of Manufacturing Jobs in Japan (in Thousands)
1980	2346.821	N/A	0.00	11210.0
1981	2220.055	N/A	0.00	11570.0
1982	2969.627	N/A	0.00	11590.0
1983	3580.307	N/A	0.00	11550.0
1984	4168.942	25.702	0.00	11900.0
1985	4470.975	26.385	0.00	12470.0
1986	4429.087	32.823	0.00	12440.0
1987	4716.790	50.454	0.00	12210.0
1988	3260.637	34.111	0.00	12470.0
1989	2819.712	55.154	0.00	12470.0
1990	2073.448	81.435	0.00	12520.0
1991	3037.970	84.192	0.00	12910.0
1992	3365.357	113.071	0.00	13520.0
1993	3807.383	126.750	0.00	13540.0
1994	3570.386	145.161	0.00	13250.0
1995	3780.928	176.148	0.00	13000.0
1996	3119.541	161.434	0.00	12910.0
1997	2957.501	174.710	0.00	13010.0
1998	3492.122	133.694	0.00	12710.0
1999	3029.152	109.288	0.00	12460.0
2000	2861.600	89.901	0.00	12060.0
2001	2653.263	96.053	0.00	12050.0
2002	3562.670	84.326	0.00	11370.0
2003	2866.010	69.699	0.00	10980.0
2004	2245.408	94.834	0.00	10670.0
2005	1848.576	168.843	0.00	10460.0
2006	2169.349	179.354	0.00	10720.0
2007	1527.804	268.276	0.00	10930.0
2008	1043.889	361.788	0.00	10590.0
2009	1032.866	366.764	0.00	N/A
2010	723.116	349.890	0.00	N/A
2011	1079.163	N/A	0.00	N/A

Appendix B-5: World Data,
Netherlands

Year	Total Coal Exports for Netherlands (Thousand Short Tons)	Total Refined Petroleum Exports for Netherlands (Thousand Barrels per Day)	Total Natural Gas Exports for Netherlands (Million Cubic Feet)	Number of Manufacturing Jobs in Netherlands (in Thousands)
1980	2479.098	N/A	N/A	N/A
1981	2004.002	N/A	N/A	N/A
1982	1484.813	N/A	N/A	N/A
1983	1656.774	N/A	N/A	N/A
1984	2387.606	1086.155	N/A	N/A
1985	2558.465	1080.441	N/A	N/A
1986	3505.350	1192.255	N/A	N/A
1987	2928.841	1189.979	N/A	N/A
1988	3012.617	1162.422	N/A	N/A
1989	2138.484	1247.272	N/A	N/A
1990	3687.232	1220.391	1273600.00	N/A
1991	3887.852	1183.034	1432000.00	N/A
1992	3716.994	1129.768	1515755.00	N/A
1993	3528.499	1154.584	1551882.00	N/A
1994	4519.477	1131.984	1436760.00	N/A
1995	4390.506	1217.869	1436330.00	N/A
1996	3619.991	1233.585	1724184.00	N/A
1997	4932.843	1305.204	1499863.00	N/A
1998	10068.510	1304.496	1373294.00	N/A
1999	8951.871	1298.673	1345713.00	N/A
2000	10972.410	1367.497	1462677.00	1053.2
2001	19316.900	1416.798	1750070.00	1052.7
2002	10209.610	1408.072	1855062.00	990.8
2003	8666.372	1417.465	1699040.00	983.9
2004	10624.080	1521.637	1891471.00	977.3
2005	8523.071	1615.383	1843090.00	989.2
2006	11759.460	1804.830	1930318.00	978.7
2007	13721.570	1564.595	1965915.00	940.6
2008	8548.425	1285.750	2179571.00	876.5
2009	5364.949	1920.872	1963938.00	N/A
2010	6633.710	2138.174	2102373.00	N/A
2011	6244.594	N/A	1972413.00	N/A

Appendix B-6: World Data, Norway

Year	Total Coal Exports for Norway (Thousand Short Tons)	Total Refined Petroleum Exports for Norway (Thousand Barrels per Day)	Total Natural Gas Exports for Norway (Million Cubic Feet)	Number of Manufacturing Jobs in Norway (in Thousands)
1980	139.994	N/A	N/A	369.0
1981	211.644	N/A	N/A	374.0
1982	202.825	N/A	N/A	363.0
1983	316.363	N/A	N/A	342.0
1984	349.424	53.838	N/A	327.0
1985	393.525	55.554	N/A	329.0
1986	273.373	50.223	N/A	350.0
1987	399.037	80.520	N/A	355.0
1988	381.400	78.951	N/A	357.0
1989	287.703	93.365	N/A	363.0
1990	285.499	165.074	896000.00	360.0
1991	304.238	142.318	891000.00	345.0
1992	185.188	181.636	908337.10	339.0
1993	251.327	184.045	876871.00	336.0
1994	197.314	206.382	947500.00	318.0
1995	198.416	177.975	974690.00	314.0
1996	182.984	189.527	1342676.00	302.0
1997	207.235	198.142	1494178.00	320.0
1998	331.796	192.952	1504419.00	327.0
1999	324.080	190.329	1606479.00	307.0
2000	634.931	199.206	1727257.00	290.6
2001	1651.262	196.014	1783054.00	286.2
2002	2259.738	193.558	2222373.00	288.3
2003	2972.934	350.827	2481232.00	280.8
2004	3021.435	335.953	2666283.00	263.5
2005	1838.655	375.688	2885236.00	262.9
2006	2497.838	403.289	2974229.00	266.1
2007	3715.892	402.047	3011663.00	275.6
2008	3691.641	331.014	3380352.00	257.7
2009	2642.240	412.604	3433324.00	N/A
2010	1822.121	349.627	3561518.00	N/A
2011	1657.876	N/A	3435796.00	N/A

Appendix B-7: World Data, Russia

Year	Total Coal Exports for Russia (Thousand Short Tons)	Total Refined Petroleum Exports for Russia (Thousand Barrels per Day)	Total Natural Gas Exports for Russia (Million Cubic Feet)	Number of Manufacturing Jobs in Russia (in Thousands)
1980	N/A	N/A	N/A	N/A
1981	N/A	N/A	N/A	N/A
1982	N/A	N/A	N/A	N/A
1983	N/A	N/A	N/A	N/A
1984	N/A	N/A	N/A	N/A
1985	N/A	N/A	N/A	N/A
1986	N/A	N/A	N/A	N/A
1987	N/A	N/A	N/A	N/A
1988	N/A	N/A	N/A	N/A
1989	N/A	N/A	N/A	N/A
1990	N/A	N/A	N/A	N/A
1991	N/A	N/A	N/A	N/A
1992	48056.370	871.746	6868770.00	N/A
1993	30825.030	959.533	6342570.00	N/A
1994	27340.630	941.780	6494430.00	N/A
1995	32754.080	1005.561	6787540.00	N/A
1996	30748.980	1122.442	6941516.00	N/A
1997	28477.110	1203.781	6708084.00	N/A
1998	29761.300	1016.293	7020975.00	N/A
1999	34827.530	1139.159	7160469.00	N/A
2000	43981.120	1067.004	6590485.00	N/A
2001	49462.920	1134.810	6316441.00	N/A
2002	52377.430	1287.530	6198136.00	N/A
2003	65343.920	1342.804	6789662.00	N/A
2004	80250.470	1413.076	7218739.00	N/A
2005	98589.630	1575.450	7861472.00	12212.0
2006	103350.500	1738.329	8401792.00	12640.0
2007	112230.700	1871.138	8187076.00	12250.0
2008	111495.500	1923.925	8380250.00	11862.0
2009	119383.600	2007.998	7122682.00	N/A
2010	148912.300	2229.998	7933515.00	N/A
2011	13855.000	N/A	7808147.00	N/A

Appendix B-8: World Data, China

Year	Total Coal Exports for China (Thousand Short Tons)	Total Refined Petroleum Exports for China (Thousand Barrels per Day)	Total Natural Gas Exports for China (Million Cubic Feet)	Number of Manufacturing Jobs in China (in Thousands)
1980	7265.334	N/A	N/A	N/A
1981	7465.955	N/A	N/A	N/A
1982	7619.176	N/A	N/A	N/A
1983	7616.971	N/A	N/A	N/A
1984	8079.942	N/A	N/A	N/A
1985	8971.712	N/A	N/A	N/A
1986	11328.450	146.600	N/A	N/A
1987	15589.990	109.822	N/A	N/A
1988	18382.140	104.920	N/A	N/A
1989	18739.290	110.627	N/A	N/A
1990	20480.950	117.614	13629.50	N/A
1991	23241.130	103.677	14699.50	N/A
1992	27756.200	136.874	16481.90	N/A
1993	24713.820	79.960	17379.00	N/A
1994	31121.010	98.741	18763.20	N/A
1995	41312.650	112.673	19890.20	N/A
1996	48689.090	111.417	65827.16	N/A
1997	50609.320	159.664	103963.80	N/A
1998	48238.250	144.641	96886.70	N/A
1999	52263.890	147.866	106955.00	N/A
2000	77450.600	218.711	95279.87	N/A
2001	114612.800	258.025	96159.21	N/A
2002	107437.900	292.902	91395.22	N/A
2003	119876.400	337.093	67875.43	N/A
2004	112081.900	365.736	89135.06	N/A
2005	93086.890	454.572	108417.10	N/A
2006	85629.750	332.446	105895.60	N/A
2007	75414.630	388.617	94997.35	N/A
2008	63388.410	421.326	118658.40	N/A
2009	25239.620	611.111	113255.20	N/A
2010	24751.300	623.406	141966.30	N/A
2011	18164.990	N/A	112831.40	N/A

Appendix B-9: World Data, India

Year	Total Coal Exports for India (Thousand Short Tons)	Total Refined Petroleum Exports for India (Thousand Barrels per Day)	Total Natural Gas Exports for India (Million Cubic Feet)	Number of Manufacturing Jobs in India (in Thousands)
1980	119.050	N/A	0.00	N/A
1981	130.073	N/A	0.00	N/A
1982	198.416	N/A	0.00	N/A
1983	88.185	N/A	0.00	N/A
1984	99.208	N/A	0.00	N/A
1985	236.997	N/A	0.00	N/A
1986	147.710	54.000	0.00	N/A
1987	264.555	74.405	0.00	N/A
1988	212.746	51.465	0.00	N/A
1989	219.360	49.460	0.00	N/A
1990	110.231	58.420	0.00	N/A
1991	99.208	103.423	0.00	N/A
1992	139.994	67.519	0.00	N/A
1993	109.129	72.882	0.00	N/A
1994	194.007	79.816	0.00	N/A
1995	757.288	80.553	0.00	N/A
1996	537.928	83.526	0.00	N/A
1997	600.760	36.002	0.00	N/A
1998	868.621	36.338	0.00	N/A
1999	1276.477	22.432	0.00	N/A
2000	1430.800	147.516	0.00	N/A
2001	2104.312	213.479	0.00	N/A
2002	1675.513	269.670	0.00	N/A
2003	2010.616	325.238	0.00	N/A
2004	1597.249	386.872	0.00	N/A
2005	2365.560	450.713	0.00	N/A
2006	1796.768	671.224	0.00	N/A
2007	1900.385	825.634	0.00	N/A
2008	3299.218	812.053	0.00	N/A
2009	2901.284	1089.307	0.00	N/A
2010	5029.847	1246.648	0.00	N/A
2011	5036.461	N/A	0.00	N/A

Appendix C: Real GDP 1947-2012 for U.S.

DATE	VALUE		DATE	VALUE
1947	1774.6		1980	5834.0
1948	1852.7		1981	5982.1
1949	1843.1		1982	5865.9
1950	2004.3		1983	6130.9
1951	2159.3		1984	6571.5
1952	2242.0		1985	6843.4
1953	2345.3		1986	7080.5
1954	2330.4		1987	7307.1
1955	2498.2		1988	7607.4
1956	2547.6		1989	7879.2
1957	2598.8		1990	8027.0
1958	2575.4		1991	8008.3
1959	2760.1		1992	8280.0
1960	2828.5		1993	8516.2
1961	2894.4		1994	8863.1
1962	3069.8		1995	9086.0
1963	3204.0		1996	9425.9
1964	3389.4		1997	9845.9
1965	3607.1		1998	10274.8
1966	3842.1		1999	10770.6
1967	3939.2		2000	11216.4
1968	4129.9		2001	11337.5
1969	4258.2		2002	11543.1
1970	4266.3		2003	11836.4
1971	4409.5		2004	12246.9
1972	4643.8		2005	12623.0
1973	4912.8		2006	12958.5
1974	4885.8		2007	13206.4
1975	4875.4		2008	13161.9
1976	5136.9		2009	12758.0
1977	5373.1		2010	13063.0
1978	5672.8		2011	13299.1
1979	5850.1		2012	13591.1

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