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On the Impacts of Economic Freedom on International Trade Flows: Asymmetries and Freedom Components

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Abstract

This paper employs a gravity equation to estimate the effects of economic freedom on U.S. consumer exports and imports for 131 countries over the years 2000 - 2005. Using the newly updated Fraser Institute's Economic Freedom of the World Index, we find that increased economic freedom in the rest of the world would increase the United States' overall trade volume. We also consider whether imports and exports are affected asymmetrically with respect to income, transaction costs, and economic freedom. We find considerable differences in how these variables affect imports and exports of consumer goods. Our results also give some insight into how economic freedom might affect the U.S. trade position.

Keywords

gravity model, trade flows, trade balance

JEL classification

D63, F14, R10

1. Introduction

The literature on the effects of economic freedom on the welfare of an economy's participants has been growing in recent years, though the concept is considerably older. Authors such as Peter Bauer and Friedrich von Hayek, among others [1] argue that the centralized coordination of individual and group action would find it impossible to reach an outcome superior to that which would obtain with private action and information. The upshot of these authors' works was that a necessary condition for sustained economic growth and activity was some minimum level of individual freedom, especially in the allocation of scarce resources, i.e., economic freedom.

With the arrival of larger and more comprehensive data sets, as well as indices of freedom, such as the Heritage Foundation's Freedom Index and the Simon Fraser Institute's Economic Freedom of the World Index have made it possible to enlarge studies of the impacts of various components of freedom on economic activity.

Most studies on the impacts of freedom on welfare have been conducted the role of economic freedom on economic growth literature with the consensus being that several elements of economic freedom enhance economic performance at the macro level (e.g. Barro, 1991 Easton and Walker, 1997, de Haan and Sturm, 2000, and Greenaway, Morgan, and Wright, 2001).[2] Furthermore, there is some evidence that freedom "Granger Causes" income (Farr, Lord,and Wolfenbarger, 1998).

However, there a numerous studies which use freedom as an explanatory variable in a variety of contexts. Klein and Luu (2003) show that freer countries tend to be more efficient therefore producing closer to their PPF because they are more likely to recognize their true comparative advantage in a global market.

Studying the impacts of freedom on intellectual property rights, Depken and Simmons (2004) demonstrate greater protection of intellectual property thus providing a greater incentive to innovate, with commensurate public good aspects of new ideas. Similarly, Ovaska and Sobel (2005) and Clark and Lee (2006) demonstrate that economic free countries are better suited for entrepreneurship and innovation. Though freedom correlates with more failures and successes, it is these dynamics which allow an economy to diversify the possible sources of (successful) innovation. On the other hand, with less freedom comes greater concentration of innovation within a "ruling elite" which may not be necessarily a better solution.

Depken, La Fountain and Butters (2007) demonstrate that higher corruption reduces returns in the formal sector and rewards economic activity in the informal sector and potentially reducing overall economic activity. The rent seeking behavior of corrupt officials lead to inefficient government projects and aid, difficulties in creating/maintaining infrastructure (public health issues).

[1] See, for example Peter Bauer's collected essays in *From Subsistence to Exchange and Other Essays,* and Hayek's comments about information (1937 and 1989).

[2] Freedom indicators include: corruption, market capitalization, independent monetary authority, civil war, property rights, etc. See the *Quarterly Journal of Economics*, 108(3), a special issue on growth, for a good overview.

Likewise, the impacts of financial institutions on economic welfare (see Leopold, 2006) show that liberalization of asset markets positively impacts economic welfare gains.

This paper extends a paper of the effects of economic freedom on trade flows between the United States and her trading partners by Depken and Sonora (2005), but it also expands it in two notable ways. First, in their paper, they only employed an overall index of economic freedom whereas the current paper uses disaggregated freedom indicators such as the independent use of fiscal and monetary policy, restrictions on international flows of goods and services and capital flows, to name a couple. Secondly, the paper takes advantage of the expanded data set available from the Fraser Institute. Depken and Sonora only had two years of up-to-date data which has been expanded to six years allowing us to examine trade dynamics.

Breaking the index into its component parts allows us to investigate which elements which make up freedom, from economic policy to regulation to institutions, have the greatest impact, if any, on the trade of final goods and services between the US and its trading partners. Obvious institutional restrictions on trade, tariffs, quotas, subsidies, etc., should have a deleterious effect on trade, but are there other factors which undermine, or augment, trade.

Following Summary (1989), and Depken and Sonora (2005) this paper also reconsiders the standard gravity model which implicitly assumes that impacts of independent variables are symmetric on exports, imports, and the total volume of trade.

Empirically, I find that the economic freedom of a trading partner is found to have a statistically significant and positive effect on the volume of trade between the U.S. and its trading partners. Moreover, there is considerable evidence that trade flows do respond asymmetrically. Generally, there is greater evidence that export elasticities are larger than import and total volume elasticities.

I also find the economic sub-indices to generally be good indicators of trade flows, though two components do not have much predictive power. Interestingly, the component which rates the freedom of judiciary and preservation of property rights has little predictive power, or is negatively related to trade flows.

Next, I analyze the effects of changes in the relevant variables change trading partners over various time frames. I find changes in Real GDP and population have a more pronounced effect on trade flows over the shorter term whereas freedom effect trade over the medium term. Similarly, I employ an ordered probit model to investigate probability of increased trade based on changes in freedom and output.

The paper is organized as follows: Section 1 briefly outlines the theoretic justification for using the gravity framework and presents the gravity framework employed here; Section 2 examines the data used and some descriptive statistics; Section 3 provides empirical analysis of the effects of economic freedom on US imports and exports; provides discussion of our results and presents estimates of the gains from economic freedom; concluding remarks and suggestions for future research are offered in the final section.

2. The Gravity Model

The gravity model's basic premise is that the volume of trade is determined by the income of any two countries and that higher income countries are `drawn' towards each other by the gravitational pull of their respective GDPs. It was introduced into the international trade literature by Tinbergen (1962) and Pöynöhen (1963) but has long been used in the social sciences to describe migration, shipping, tourism, etc. In its simplest form the volume of trade between any two countries is an increasing function of their incomes and a decreasing function of the distance between them, often interpreted as the transportation, or `iceberg', cost of moving goods between the countries.

The standard (logarithmic) gravity representation is given by

$$vol_{i,j} = \alpha_0 + \alpha_1 dist + \alpha_2 y_i + \alpha_3 y_j + \alpha_4 pop_i + \alpha_5 pop_j + \sum_k \gamma_k z_k + \varepsilon \qquad (1)$$

where the α's and γ are coefficients to be estimated, and ε is a normally distributed error term. The dependent variable, vol_{ij}, is the volume of trade between countries i and j. The independent variables include the GDP of each of the trading countries, y_i and y_j, the distance between the two countries, $dist_{ij}$, the population of each country, pop_i and pop_j, and a vector of other variables z.[3] Lower case variables represent natural logs. Usually, the parameters of interest are α_1, the elasticity of trade volume with respect to distance, and the countries' GDP, α_2 and α_3. Generally, the literature finds estimates of these parameters to be: $\hat{\alpha}_1 \in [-1.2,-0.6]$, $\hat{\alpha}_2 \in [0.5,1.1]$, and $\hat{\alpha}_3 \in [0.4,0.8]$, see Wall (1999 and 2000) Wolf (2000), and Anderson and Marcouiller (2002).

Another interesting development is the use of gravity models to estimate the effects of international borders on trade flows, that is, to find the `distance equivalents' of borders in terms of miles.[4]

Though the gravity model has been widely adopted because of its empirical success, e.g., high R^2 s and tight fits of parameter estimates, there lacked any serious rigorous theoretical justification. Anderson (1979) and Bergstrand (1985) derived gravity equations from trade models of product differentiation and increasing returns to scale. Additionally, Anderson (1985) shows how including variables such as tariffs in z is consistent with established theory.

Evenett and Keller (1998) successfully incorporate the gravity model within the Ricardian and Heckscher-Ohlin-Samuelson frameworks. Feenstra, Markusen, and Rose (2001) show that a version of the gravity model is consistent with new theories of international trade including: models of transportation costs; monopolistic competition and national product differentiation (expenditure function based); homogeneous products (intra-industry) trade; and an amalgam of imperfect competition, segmented

[3] For example: dummies for border countries, membership in trade agreements and diversion (Soloaga and Winters, 2001), intra-state or intra-national trade (Wolf, 2000), directional flows of trade (Wall 2000), and terrorism (Blomberg and Hess, 2006).

[4] See McCallum (1995), Engel and Rogers (1996), Wall (2000), and Anderson and among others.

markets models, and `reciprocal dumping'. More recently Anderson and Wincoop (2004) demonstrate that gravity can link cross country general equilibrium models to barriers of trade. Moreover, they show that trade costs do not necessarily depend on the structure of the general equilibrium that underlies consumption and production allocation.

Note that this model considers bilateral exchanges between all countries in the sample and cannot extract differences in export and import patterns as one countries exports are, of course, an others imports. Thus, in equation (1) we cannot examine trade asymmetries that may exist between exports and imports. To analyze differences in trade patters, we must rely on a single country gravity model, first used by Summary (1989) using US data for the years 1978 and 1982. Her estimates show that trade asymmetries do exist between the two key variables, real GDP and distance, and the endogenous variables, exports and imports. Similarly, Depken and Sonora (2005) also find evidence for asymmetries in the treatment of exports and imports *and* total volume trade.

This paper employs a gravity model of the form analyzed in Summary (1989) and Depken and Sonora (2005). The model used here is given by

$$v_i = \beta_0 + \beta_1 dist_i + \beta_2 y_i + \beta_3 pop_i + \beta_4 efwi_i + \varepsilon, \qquad (2)$$

where the dependent variable, v_i, is alternatively the total volume of consumer-goods trade (TV), exports (EXP), and imports (IMP) between the U.S. and country i, $efwi$ is economic freedom and all other variables are discussed above. Two diversion/creation dummies, one each for OECD and NAFTA countries are also included.Of most interest are the sign and significance of β_1, β_2 and β_4. As in the standard gravity model we anticipate that greater distance between trading partners reduces the volume of trade, i.e., $\hat{\beta}_1 < 0$. It is expected that countries with greater levels of income and population trade more with the U.S., *ceteris paribus*, i.e., $\beta_2 > 0, \beta_3 > 0$, though there is no consistent, or theoretical, reason why β_3 should be positive. Indeed, one might expect that relative, say to GDP, more populous countries are lower income and thus, would tend to trade less with the US, more on this below. *Ex ante* we might expect economic freedom implies a greater degree of access to foreign markets, therefore, $\hat{\beta}_4 > 0$.

The specification in equation ((2)) is closest in spirit to Wall (1999) and Anderson and Marcouiller (2002). Wall investigates the welfare implications of trade openness and economic freedom by using the Heritage Foundation's index of trade policy and Anderson and Marcouiller investigate the effects of a vector of “obstacles to doing business” such as high taxes, institutions (regulations, corruption, crime, labor regulations, inflation, etc.) In each case, as anticipated, impediments to a well-functioning economy reduce trade flows whether they be *a la carte* or compiled in a single index. Here, the EFWI incorporates trade policy, “obstacles to doing business,” and other policies that make it relatively more or less difficult to engage in trade in consumer goods. The extension of the gravity model employed here follows in the spirit of the aforementioned authors.

Using of total volume of trade implicitly assumes that the the impacts of distance, national income, and economic freedom are symmetric on both imports and exports. Yet, this restriction is rarely discussed much less explicitly tested. However, it is likely that distance would have a greater impact on U.S. exports to than on U.S. imports from the same country. Because imports and exports face asymmetric policies and attitudes about traded goods, the estimated coefficient for the Freedom Index will likely differ for imports and exports.

Because presumably the impacts of changes on trade are not immediate, it should take time for changes to real GDP and freedom to have an impact on trade flows, we investigate changes in freedom over a five year time horizon. Therefore, I also consider equation (2) in growth terms:

$$\Delta v_{i,t-k} = \beta_0 + \beta_1 dist_i + \beta_2 \Delta gdp_{i,t-k} + \beta_3 \Delta pop_{i,t-k} + \beta_4 \Delta efwi_{i,t-k} + \varepsilon_i, \qquad (3)$$

with $k = 1,\ldots 5$.

3. The Data

The data used is the value of *consumer* imports and exports between the U.S. between 120 and 137 countries for the years 2000 -- 2005. The number of countries differs across years as data for some countries became available (e.g. Vietnam and several Commonwealth of Independent States [CIS]).[5] Note, this is not a complete set of all countries listed in the United Nations, but represents the majority of US trading partners. I concentrate on consumer goods as it is the consumption of household, final, goods and services which contribute to overall economic welfare, an outward shift in the "consumption possibilities frontier" (CPF), this is similar in spirit to the shift in the PPF discussed by Klein and Luu (2003). Similarly, exports represent increases in the overall output in a country which concurrently expands the PPF.

It is true that capital goods constitute a large portion of trade, but they typically have only an indirect influence on the welfare or utility of the consumers of the trading partner. A benefit of economic freedom is the increased set of consumer goods and services. Moreover, many countries, any form of reduced economic freedom does not attenuate the ability to import capital goods from the U.S. or to export consumer goods to the U.S. Secondly, many of the limitations on exports from the United States are in the capital good sector, e.g., computer technology, satellite systems, etc.

These years are used because of data constraints, discussed below. The country specific import and export data is from the USA Trade Online data sponsored by the U.S. Census Bureau. Individual country GDP and population data for each year comes from the IMF's IFS macroeconomic data set. Distance is the greater surface distance between the (log) center of the United States, roughly Chicago, IL, and the individual trading partner's capital (e.g. Paris, France). All data for trade and real GDP is in billions of dollars, population is in millions.

[5] For details on the countries in the sample please contact the author.

For economic freedom I use the Economic Freedom of the World Index (EFWI) calculated by the Fraser Institute. Other research in the effects of economic freedom, such as Wall (1999), have used the freedom index calculated by the Heritage Foundation (HFI). Both indices are calculated by using a weighted average of several different components of economic freedom. However there are some differences between the two indices (a more detailed explanation is provided in de Haan and Sturm, 2000). First, the EFWI relies primarily on *quantitative* variables while the HFI uses *qualitative* evaluations to sort countries into one of five categories, assigned one-to-five component ratings. While the $HFI \in [0,5]$ with 0 the most free, the $EFWI \in (0,10]$, with 10 being the `most free', see Gwartney and Lawson (2007) for details.[6] Recently, the Fraser Institute updated its methodology for calculating the freedom index for consecutive years and, to date, this version of the data is only available for the period 2000 -- 2005 --- herein lies the data restriction mentioned above. Figure 2 shows the percentage difference from the mean for each country for 2005.

In addition to the overall index, the paper also examines the the sub-freedom indices. They are: *AREA 1*, the Size of Government; *AREA 2*, Legal System and Property Rights; *AREA 3*, "Sound Money"; *AREA 4*, is divided into an *international trade* component (*AREA 4a* and a freedom of *international capital* movement component (*AREA 4b*); *AREA 5a*, Business Regulation; and *AREA 5b*, is overall Regulation.

Descriptive statistics are presented in Table 1, for each year and overall for Distance, Imports, Exports, Total Volume, Real GDP, and Population -- all of these are natural logs. The percent change calculated for the entire period is the average of the growth over the sample period. Table 2 contains simple sample correlations over the entire period for the trade variables, freedom, distance and real GDP. Figure 1 shows the overall freedom index and each of the individual freedom Area Index means and the standard deviations -- this data is *not* in logs. For comparison, the US indices are also included, the sample mean and standard deviations do not include the US data.

Turning our attention first to the freedom indices in Figure 1 we note that the general trend for the means is upwards (more freedom) with the exception of the international trade flows of goods and services and capital. Both are falling, about 0.5 points for each, however it is also worth noting that there is less freedom in capital movements than in trade, which is intuitively attractive given the ongoing trade negotiations reducing trade barriers. However, it also worth noting the overall decline in the freedom of movements of both goods and assets.

We can also see no real trend in the convergence of freedom, the standard deviation of some of the component indices is falling monetary and fiscal policy, whereas regulation seems to be diverging. The overall index displays no discernable trend.

Looking at Table 1, we see that there are some overall trends, US trade with the rest of the world (ROW), has, on average, been rising, despite the short down turn after 9-11-2001. On the other hand, average real GDP has fallen, though this may have to do with the inclusion of new countries, which tend to

[6] Also see de Haan and Sturm (2000), and Heckelman (2002).

be lower income, e.g. Vietnam and Bosnia-Herzegovina. Also, continued liberalization of trade restrictions and the realization of has led to increasing levels of trade Distance changes are due to the inclusion of new countries, a changing composition of countries, and tectonic plate activity.

From Table 2 we can see that, we do see positive relationships between output, freedom, and the three trade variables. Also, as expected, distance is negatively correlated to all the variables. Figures 2a-c plot the log of the three trade variables to the log of freedom for the whole period, the line is the estimated bivariate relationship. As can be easily seen, the scatter plots show a clear upward relationship between each of these indices and exports and imports. Moreover, exports and imports respond differently to economic freedom. Specifically, the scatter plot for U.S. exports is more widely distributed compared to the plot for U.S. imports. Table 3 shows the sample correlations for the seven freedom indices. As can be seen, correlations are rarely above 0.7, and a couple are negative.

4. Empirical Results

I begin with a gravity model which includes all the freedom indices, but *not* the overall index, i.e.

$$v_i = \beta_0 + \beta_1 dist_i + \beta_2 y_i + \beta_3 pop_i + efwi'\beta_4 + efwi_{k\ell}'\beta_5 + \varepsilon, \tag{4}$$

where all the variables are defined as before and

$$efwi = (Area1, Area2, Area3, Area4a, Area4a, Area5a, Area5b)'$$

is the freedom vector. This allows us to analyze the conditional impacts of each of the areas. The vector $efwi_{k\ell}$ captures each of the 21 interaction terms of Areas $k \neq l$, $k = 1,K,5a$; $l = 2,K,5b$.

Results of the pooled OLS model above are presented in Table 4, time dummies have not been tabulated. Estimated coefficients and their White adjusted $p-$values are presented. First we note the standard gravity variables, real GDP and distance, are close to the literature standard, and are statistically significant. The *OECD* dummy is significant and negative, evidence, perhaps, of trade diversion over the period, while the *NAFTA* dummy is positive but insignificant.

Turning our attention to the freedom variables we see Areas 2, 4a, and to a lesser extent, 5a are the relevant variables. However, Area 2, legal system and property rights is strongly negative. Area 4a, the freedom to trade, is significantly positive. With respect to the interaction terms, we see most are not significant, with the exception of those Area 4a, 4b, freedom of asset movements, and 5b, regulation. Moreover, we see

$$\partial^2 v \partial A3\, \partial A5b < 0, \partial^2 v \partial A4a\, \partial A4b < 0.$$

and each are statistically significant at the 1% level, or close to it.

4.1. Results of the Pooled OLS regressions

Next we consider the different Areas in isolation. Results of the pooled regressions with time dummies can be found in Tables 5 -- 7, though the time dummy results are not tabulated for to keep clutter to reduce clutter.[7] Each Model reports two specifications: the first is an unrestricted model, `Model A', the second restricts the parameter on economic freedom to zero, `Model B'. $p-$values for the $F-$tests of $\beta_4 = 0$ and whether or not each freedom component can be treated as the overall index, $\beta_{4i} = \beta_{4O}$, are also presented. Heteroskedastic consistent $p-$values are reported in parentheses. Adjusted R^2 for each regression specification is also reported.

First, we note that, like in most gravity models, the model displays a good fit. Also, most of the estimates are significant at the 5% level or better. This is contrast with the results in Depken and Sonora (2005) who find that while the gravity model does a good job of estimating total volume and export trade flows, it is less successful with imports.

A cursory glance at the results reveals that the estimated coefficients for the "standard" regressors, real GDP and distance, all fall comfortably within the range found in the literature. Before specifically discussing the freedom estimates, it is interesting to note that the *OECD* dummy yields a statistically significant negative estimate $\in (-1.5,-0.8)$ across the board with the largest effect on imports from *OECD* countries. This is consistent with the US shifting its final consumer goods trade away away from similar countries, though the time frame might be too short to capture the trade dynamics over the product cycles.

On the other hand, the *NAFTA* dummy is positive. In this case, the coefficient for NAFTA imports is generally greater than for exports. Most likely this is due to the presence of Mexican tariffs on US imports, which are scheduled to be phased out on virtually all agricultural imports by the end of 2008.

Next, we turn our attention to the estimates of the various economic freedom indicators. At first glance, it is easy to see that there is considerable variation in the size of the elasticities of the trade values to economic freedom. With one exception, all the estimates are positively correlated as predicted, and highly significant. We see the overall index elasticities of freedom, β_4, to be between 1.6 and 2.5, the largest of any of the coefficient estimates.

Interestingly, the only indicator of freedom which is negative, though not necessarily statistically significant, is the indicator for `Legal Systems and Property Rights', *Area 2*, which has the implication that countries with strong interest groups may be able to manipulate the system to their benefit, e.g. French farmers. Perhaps, unsurprisingly, `Sound Money', *Area 3*, does not have much of an large impact on total volume or imports, but does with exports, presumably because countries with relatively high degrees of monetary autonomy closely correspond to countries which have more liberal trade, see Table 3.

[7] Results are available from the author on request.

Not surprisingly `Freedom to Trade', *Area 4a*, has a larger impact on trade flows than `Freedom of Capital Movements', *Area 4b*, by roughly a factor of four, and both are statistically significant.

Next, consider the test statistics for $\hat{\beta}_4 = 0$ and $\hat{\beta}_{4i} = \hat{\beta}_{4O}$. The results show that the indicator which is most closely correlated to the overall index is `Freedom to Trade'. The data always rejects $\hat{\beta}_4 = 0$ but never rejects the $\hat{\beta}_{4i} = \hat{\beta}_{4O}$ restriction. And closer inspection of the results shows that estimates are similar, again intuitively appealing as the biggest impact on trade flows *should be* overall trade policy.

Table 8 presents the the $p-$values for restricting the estimated coefficients for Real GDP, Distance, and the Overall Economic Freedom Index equal to each other from each of the three dependent variables: In the top third considers symmetric responses for Distance, $\beta_{1i} = \beta_{1j}, i \neq j$, Real GDP, $\beta_{2i} = \beta_{2j}, i \neq j$, and the Freedom Index, $\beta_{4i} = \beta_{4j}, i \neq j$, $i, j =$ total volume, exports, imports. As can be see, with the exception of restricting the distance estimate on imports and total volume, the data does demonstrate considerable differences in the treatment of the exogenous variables vis-á-vis distance, real GDP, and the Freedom Index, we can infer asymmetries do exist, particularly if we think of the total volume as a restricted version of the overall model.

4.2. Results of the "Dynamic" Regression

Estimates from the dynamic version, using a SUR model, of the gravity model are given in Table 9. A simple two variable scatter plot of the five year growth of trade to the five year change in the EWFI, Figure 4, shows a slight, negative relationship. For these tests I only consider the overall index. For each of the five changes in the variables, in the first column the notation $\Delta x_i = x_t - x_{t-i}$ is used, thus $\Delta x_1 = x_t - x_{t-1}$. Note that the regressors are not differenced form, with the exception of distance. Estimated coefficients, their $p-$values, and an F test of $\Delta ewfi = 0$ is given.

What is most notable, is which independent variables become significant over each time frame. Thus, we notice that over shorter growth periods, one to two years, distance and population seem to play a relatively large role, with three years of growth, economic freedom becomes statistically significant suggesting that population growth or business cycle fluctuations, influence short term trading patterns, but institutional/real changes to the economic structure, freedom, have longer impacts.

Additionally, freedom falls out of favor over the longer periods with respect to imports. Indeed, longer term changes in freedom have a *negative* impact on imports in for Δx_3 and on, though not significant. Also, freedom negatively impacts exports and the total volume over two year growth periods.

What is also striking is the impact countries get from improving their freedom over the longer periods. Generally speaking, the elasticities of freedom are substantially greater than those for real GDP growth and, with the exception of two year growth, population.

4.3. Ordered Probit Regression

To investigate the effects of changes in output, population and economic freedom on the probability that trade flows will increase. Under the assumption that errors are standard normal consider the following model:

$$\theta_{t,t-k} = \alpha + \beta \Delta efi_{t-k} + \Delta z_{t,t-k}' \gamma + \varepsilon; k = 1,\ldots,5 \qquad (5)$$

where $\theta_{t,t-k}$ is an indicator variable with the properties

$$\theta_{t,t-k} = \begin{cases} 0 & if \Delta v_{t,t-k} \leq 0, \\ 1 & if \Delta v_{t,t-k} \in (0, \Delta \bar{v}_{t,t-k}] \\ 2 & if \Delta v_{t,t-k} > \Delta \bar{v}_{t,t-k}, \end{cases}$$

$\hat{\beta}$, the estimated coefficient of most interest, and, *ex ante*, should be positive, a higher index increases the probability of further trade; $\Delta \bar{v}_{t,t-k}$ is the average growth of the trade variables, and is expected to be larger as we extend the time of the lag; $z = (rgdp, pop, dist, OECD, NAFTA)'$ is a vector of country characteristics as define in equation ((2)), γ is a vector of characteristic coefficients and $\varepsilon \sim (0,1)$. As before, changes in any of the explanatory variables may take time to "bleed" into invigorated trade, so we define the growth in any variable x to be defined over $k = 1,\ldots,5$ lags: $\Delta x_t = x_t - x_{t-k}$.

Results of the ordered probit model can be found in Table 11. Unfortunately, the estimated coefficients from probit are difficult to interpret, though they have a similar explanation or a binary OLS model's estimated coefficients, which are understood as a probabilities. Essentially, the probit model defines the dependent variable θ as given by

$$\theta = \ln(P(Trade)1 - P(Trade))$$

where $P(Trade)$ is the probability of increased trade. Thus we can only concentrate on estimated signs and the size of the coefficients.

What is striking is how the significance of the independent variables change as we extend the length of time. Over the short term, two years or less, real GDP is the only variable which is statistically significant. However, once we lengthen years the lag of growth, the freedom coefficients become more important, particularly for exports. We also note that the magnitudue of the freedom coefficients relative to the other variables as we increase the lag, implying a greater probability for increase trade flows as the result of more freedom. This result has the intuitively attractive result that in the shorter term, trade increase

simply due to increases in incomes, but over the longer term improvements in welfare are due to changes in the economic structure of an economy.

The results suggest that economies which experience rapid short term growth will have a larger probability of increased trade volume. But, if this growth is not accompanied by longer term changes in freedom, any increases achieved by economic growth cannot sustain increased trade flows. Put another way, to ensure the probability of robust medium term trade growth a country must implement institutional changes which impact freedom.

For countries which have experienced rapid GDP growth and commensurate trade growth without implementing other reforms, such as China which EFI is below the mean, the analysis indicates that to enjoy longer term expansion, changes in policy to ensure greater freedom be put in place.

Given the length of the data, we cannot make inference the time frame required to fully enjoy the fruits of the policy changes, but the current analysis suggests that even the relatively short time span of six years, there is evidence of the effects of institutional changes on trade.

5. Summary

This paper examines the impacts of economic freedom within the context of a standard gravity model. Using a single country model, the gravity model can also investigate the asymmetries of trade between the United States and her trading partners. It is clear from the estimates that if the gains to the United States are any indication, and given that the US accounts for about about 12% of merchandise and 13% of services trade, we can imagine what the scope of welfare improvement would be should we conduct similar studies on world trade.

The results also suggest that even if countries concentrate on one of the areas of freedom they can enjoy an increase in their overall welfare through the expansion of trade. However, it does depend on which of the freedom indicators a country chooses to concentrate one.

While economic improvement of the masses may come at the detriment of those who hold political power and those who benefit from the rents generated by less economic freedom, the methods by which economic improvement improves are left to those with a comparative advantage in that area.

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Tables

Table 1. Descriptive Statistics

Year	Variable	N	Mean	%Δ*Mean*	St. Dev.
2000-2005	Distance	749	8.524	0.37%	0.479
	Imports	749	--0.449	7.66%	2.855
	Exports	749	--0.555	4.91%	2.469
	Total Volume	749	0.375	11.65%	2.447
	Real GDP	749	3.293	--1.71%	2.025
	Population	748	16.152	0.16%	1.663
2000	Distance	120	8.510	--	0.484
	Imports	120	--0.396	--	2.793
	Exports	120	--0.593	--	2.531
	Total Volume	120	0.337	--	2.542
	Real GDP	120	3.280	--	2.039
	Population	120	16.117	--	1.682
2001	Distance	120	8.515	0.06%	0.487
	Imports	120	--0.389	--1.89%	2.790
	Exports	120	--0.556	--6.44%	2.426
	Total Volume	120	0.387	13.75%	2.433
	Real GDP	120	3.306	0.80%	2.033
	Population	120	16.151	0.21%	1.682
2002	Distance	121	8.518	0.03%	0.486
	Imports	121	--0.487	22.62%	2.924
	Exports	121	--0.652	15.96%	2.408
	Total Volume	121	0.303	--24.66%	2.471
	Real GDP	121	3.322	0.48%	2.027
	Population	121	16.175	0.14%	1.675
2003	Distance	124	8.525	0.09%	0.484
	Imports	124	--0.645	27.96%	2.401
	Exports	124	--0.369	--56.96%	2.770
	Total Volume	124	0.353	15.48%	2.449
	Real GDP	124	3.320	--0.07%	2.023
	Population	124	16.175	0.00%	1.667
2004	Distance	127	8.530	0.05%	0.479
	Imports	127	--0.351	--60.86%	3.215
	Exports	127	--0.532	36.66%	2.323
	Total Volume	127	0.484	31.48%	2.360
	Real GDP	127	3.315	--0.16%	2.032
	Population	127	16.150	--0.16%	1.675
2005	Distance	137	8.541	0.14%	0.467
	Imports	137	--0.428	19.82%	2.969
	Exports	137	--0.623	15.68%	2.384
	Total Volume	137	0.379	--24.41%	2.472
	Real GDP	137	3.224	--2.77%	2.036
	Population	137	16.143	--0.05%	1.636

Table 2. Sample Correlations

	RGDP	Exports	Imports	Total Volume	Distance	*EWFI*
RGDP	1.000					
Exports	0.857***	1.000				
Imports	0.826***	0.867***	1.000			
Total	0.876***	0.962***	0.953***	1.000		
Distance	-0.033	-0.291***	-0.211***	-0.245***	1.000	
EWFI	0.415***	0.512***	0.465***	0.475***	-0.176***	1.000

Notes: *** , ** , and * represent the 1%, 5%, and 10% significance levels

Table 3. Economic Freedom Correlations

	Area 1	Area 2	Area 3	Area 4a	Area 4b	Area 5a	Area 5b
Area 1	1.000						
Area 2	-0.153***	1.000					
Area 3	0.109***	0.452***	1.000				
Area 4a	0.106***	0.333***	0.457***	1.000			
Area 4b	0.059	0.532***	0.548***	0.646***	1.000		
Area 5a	-0.071*	0.762***	0.467***	0.409***	0.535***	1.000	
Area 5b	0.119***	0.548***	0.441***	0.307***	0.429***	0.726***	1.000

Notes: *** , ** , and * represent the 1%, 5%, and 10% significance levels

Table 4. Unrestricted Pooled OLS Results

	TV	*P* – value	Exports	*P* – value	Imports	*P* – value
Cons	-9.152	0.241	-3.229	0.680	-9.772	0.361
rgdp	1.042***	0.000	1.022***	0.000	1.149***	0.000
dist	-0.968***	0.000	-1.159***	0.000	-0.896***	0.000
pop	-0.013	0.816	0.032	0.575	-0.069	0.329
*Area*1	-3.269	0.358	-4.011	0.297	-2.063	0.651
*Area*2	-12.735***	0.000	-10.606***	0.000	-10.648***	0.006
*Area*3	3.745	0.196	3.913	0.164	-0.643	0.863
*Area*4*a*	7.108***	0.001	5.750**	0.014	10.241***	0.002
*Area*4*b*	-0.928	0.828	-5.925	0.173	-0.944	0.871
*Area*5*a*	8.026*	0.058	6.734	0.161	11.586**	0.047
*Area*5*b*	10.187	0.112	9.380	0.178	5.538	0.536
OECD	-0.734***	0.000	-0.726***	0.000	-0.857***	0.000
NAFTA	0.301	0.138	0.161	0.522	0.384	0.136
*A*12	0.342	0.647	0.134	0.881	0.274	0.751
*A*13	0.856	0.290	-0.254	0.763	1.128	0.263
*A*14*a*	-1.829***	0.001	-1.109*	0.077	-1.947***	0.004
*A*14*b*	1.832	0.319	3.192	0.124	1.929	0.411
*A*15*a*	-1.362	0.200	0.210	0.853	-1.655	0.233
*A*15*b*	2.173	0.252	0.437	0.841	1.431	0.515
*A*23	1.453	0.180	-0.215	0.856	1.795	0.206
*A*24*a*	0.032	0.923	-0.265	0.553	0.110	0.799
*A*24*b*	1.174	0.254	2.496*	0.055	1.430	0.299
*A*25*a*	0.964	0.109	1.187	0.058	1.281	0.127
*A*25*b*	2.688**	0.029	2.392*	0.079	0.479	0.796
*A*34*a*	-0.895	0.273	-0.086	0.915	-1.866*	0.080
*A*34*b*	3.777***	0.002	3.568***	0.005	5.108***	0.002
*A*35*a*	0.155	0.909	-0.232	0.868	-0.264	0.884
*A*35*b*	-7.988***	0.000	-5.392***	0.007	-6.398**	0.012
*A*4*a*4*b*	-3.354***	0.000	-2.546**	0.016	-4.701***	0.001
*A*4*a*5*a*	0.494	0.441	0.365	0.628	0.563	0.526
*A*4*a*5*b*	1.756	0.119	0.484	0.693	2.519*	0.097
*A*4*b*5*a*	-1.740	0.399	-2.562	0.277	-4.263	0.136
*A*4*b*5*b*	0.017	0.995	0.198	0.955	1.992	0.647
*A*5*a*5*b*	-2.709	0.151	-2.184	0.288	-1.619	0.512
R^2	0.879		0.861		0.827	

Notes: Time dummies suppressed; ***, **, and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. $Am\ell, m = 1,\ldots 5a, \ell = 2,\ldots,5b, m \neq \ell,$ where *m* and ℓ index the different freedom indices are the interaction variables.

Table 5. Freedom Index Area Results: Total Volume

	Overall-A	Overall-B	Area 1-A	Area 1-B	Area 2-A	Area 2-B	Area 3-A	Area 3-B
Cons	3.780 ***	8.150 ***	6.280 ***	8.150 ***	9.010 ***	8.150 ***	8.130 ***	8.150 ***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
rgdp	1.140 ***	1.240 ***	1.230 ***	1.240 ***	1.300 ***	1.240 ***	1.240 ***	1.240 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	-0.997 ***	-0.976 ***	-0.940 ***	-0.976 ***	0.922 ***	-0.976 ***	-0.974 ***	-0.976 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	-0.089 **	-0.202 ***	-0.204 ***	-0.202 ***	-0.261 ***	-0.202 ***	-0.200 ***	-0.202 ***
	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ewfi	1.630 ***	--	0.900 ***	--	--0.325 **	--	0.000	--
	(0.000)		(0.000)		(0.036)		(0.998)	
OECD	--0.950 ***	-0.905 ***	-0.763 ***	-0.905 ***	-0.865 ***	-0.905 ***	-0.905 ***	-0.905 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.795 ***	0.854 ***	0.654 ***	0.854 ***	0.892 ***	0.854 ***	0.857 ***	0.854 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R_A^2	0.835	0.830	0.839	0.830	0.831	0.830	0.829	0.830
$\beta_4 = 0$	--	0.000	--	0.000	--	0.036	--	0.998
$\beta_{4i} = \beta_{4O}$	--	--	--	0.057	--	0.006	--	0.006
N	748	748	745	748	748	748	746	748

Notes: *** , ** , and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Overall - Overall Index; Area 1 - Size of Government; Area 2 - Legal System/Property Rights; Area 3 - Monetary Policy.

Table 6. Freedom Index Area Results: Total Volume (cont.)

	Area 4a-A	Area 4a-B	Area 4b-A	Area 4b-B	Area 5a-A	Area 5a-B	Area 5b-A	Area 5b-B
Cons	6.380 ***	8.150 ***	4.080 ***	8.150 ***	5.490 ***	8.150 ***	3.430 ***	8.150 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
rgdp	1.170 ***	1.240 ***	1.120 ***	1.240 ***	1.150 ***	1.240 ***	1.170 ***	1.240 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	- 0.958 ***	- 0.976 ***	-0.997 ***	- 0.976 ***	- 0.850 ***	- 0.976 ***	- 1.020 ***	- 0.976 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	- 0.112 ***	- 0.202 ***	-0.099 ***	- 0.202 ***	- 0.106 **	- 0.202 ***	- 0.077 **	- 0.202 ***
	(0.001)	(0.000)	(0.003)	(0.000)	(0.020)	(0.000)	(0.038)	(0.000)
ewfi	0.298 ***	--	1.610 ***	--	0.202	--	1.780 ***	--
	(0.000)		(0.000)		(0.451)		(0.000)	
OECD	- 0.939 ***	- 0.905 ***	-0.937 ***	- 0.905 ***	- 0.861 ***	- 0.905 ***	- 0.992 ***	- 0.905 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.866 ***	0.854 ***	0.841 ***	0.854 ***	1.030 ***	0.854 ***	0.697 ***	0.854 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)
R_A^2	0.846	0.830	0.842	0.830	0.820	0.830	0.837	0.830
$\beta_4 = 0$	--	0.000	--	0.000	--	0.451	--	0.000
$\beta_{4i} = \beta_{4O}$	--	0.010	--	0.696	--	0.015	--	0.127
N	669	748	747	748	587	748	748	748

Notes: *** , ** , and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Area 4a - International Trade; Area 4b - International Capital Movements; Area 5a - Regulation; Area 5b - Business Regulation

Table 7. Freedom Index Area Results: Exports

	Overall-A	Overall-B	Area 1-A	Area 1-B	Area 2-A	Area 2-B	Area 3-A	Area 3-B
Cons	2.810 **	9.620 ***	7.290 ***	9.620 ***	9.830 ***	9.620 ***	8.190 ***	9.620 ***
	(0.018)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
rgdp	1.070 ***	1.240 ***	1.220 ***	1.240 ***	1.250 ***	1.240 ***	1.210 ***	1.240 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	-1.250 ***	- 1.220 ***	- 1.170 ***	- 1.220 ***	- 1.200 ***	- 1.220 ***	- 1.210 ***	- 1.220 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	-0.050	- 0.227 ***	- 0.231 ***	- 0.227 ***	- 0.241 ***	- 0.227 ***	- 0.197 ***	- 0.227 ***
	(0.205)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ewfi	2.550 ***	--	1.110 ***	--	-0.080	--	0.461 **	--
	(0.000)		(0.000)		(0.602)		(0.013)	
OECD	-0.908 ***	- 0.838 ***	- 0.669 ***	- 0.838 ***	- 0.828 ***	- 0.838 ***	- 0.868 ***	- 0.838 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.533 **	0.624 ***	0.387 *	0.624 ***	0.634 ***	0.624 ***	0.659 ***	0.624 ***
	(0.047)	(0.007)	(0.057)	(0.007)	(0.005)	(0.007)	(0.006)	(0.007)
R_A^2	0.831	0.817	0.829	0.817	0.817	0.817	0.818	0.817
$\beta_4 = 0$	--	0.000	--	0.000	--	0.602	--	0.013
$\beta_{4i} = \beta_{4O}$	--	--	--	0.160	--	0.035	--	0.030
N	748	748	745	748	748	748	746	748

Notes: *** , ** , and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Overall -- Overall Index; Area 1 -- Size of Government; Area 2 -- Legal System/Property Rights; Area 3 -- Monetary Policy.

Table 7. Freedom Index Area Results: Exports (cont.)

	Area 4a-A	Area 4a-B	Area 4b-A	Area 4b-B	Area 5a-A	Area 5a-B	Area 5b-A	Area 5b-B
Cons	7.450***	9.620***	5.190***	9.620***	5.240***	9.620***	3.370***	9.620***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)
rgdp	1.170***	1.240***	1.100***	1.240***	1.110***	1.240***	1.140***	1.240***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	-1.140***	-1.220***	-1.240***	-1.220***	-1.080***	-1.220***	-1.270***	-1.220***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	-0.150***	-0.227***	-0.115***	-0.227***	-0.079*	-0.227***	-0.061	-0.227***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.091)	(0.000)	(0.113)	(0.000)
ewfi	0.348***	--	1.760***	--	0.747***	--	2.350***	--
	(0.000)		(0.000)		(0.003)		(0.000)	
OECD	-0.921***	-0.838***	-0.875***	-0.838***	-0.863***	-0.838***	-0.953***	-0.838***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.750***	0.624***	0.607***	0.624***	0.819***	0.624***	0.417	0.624***
	(0.001)	(0.007)	(0.008)	(0.007)	(0.001)	(0.007)	(0.156)	(0.007)
R_A^2	0.836	0.817	0.832	0.817	0.809	0.817	0.830	0.817
$\beta_4 = 0$	--	0.000	--	0.000	--	0.003	--	0.000
$\beta_{4i} = \beta_{4O}$	--	0.047	--	0.976	--	0.050	--	0.222
N	669	748	747	748	587	748	748	748

Notes: ***, **, and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Area 4a - International Trade; Area 4b - International Capital Movements; Area 5a - Regulation; Area 5b - Business Regulation.

Table 8. Freedom Index Area Results: Imports

	Overall-A	Overall-B	Area 1-A	Area 1-B	Area 2-A	Area 2-B	Area 3-A	Area 3-B
Cons	1.660	7.540 ***	5.910 ***	7.540 ***	8.180 ***	7.540 ***	7.170 ***	7.540 ***
	(0.421)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
rgdp	1.250 ***	1.400 ***	1.380 ***	1.400 ***	1.440 ***	1.400 ***	1.390 ***	1.400 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	-0.958 ***	-0.931 ***	-0.906 ***	-0.931 ***	-0.890 ***	-0.931 ***	-0.930 ***	-0.931 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	-0.114 *	-0.267 ***	-0.265 ***	-0.267 ***	-0.311 ***	-0.267 ***	-0.260 ***	-0.267 ***
	(0.062)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ewfi	2.200 **	--	0.810 ***	--	-0.242	--	0.125	--
	(0.017)		(0.000)		(0.365)		(0.751)	
OECD	-1.110 ***	-1.050 ***	-0.912 ***	-1.050 ***	-1.020 ***	-1.050 ***	-1.060 ***	-1.050 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.778 ***	0.857 ***	0.669 ***	0.857 ***	0.886 ***	0.857 ***	0.863 ***	0.857 ***
	(0.005)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R_A^2	0.738	0.731	0.737	0.731	0.731	0.731	0.730	0.731
$\beta_4 = 0$	--	0.017	--	0.000	--	0.365	--	0.751
$\beta_{4i} = \beta_{4O}$	--	--	--	0.876	--	0.312	--	0.320
N	748	748	745	748	748	748	746	748

Notes: *** , ** , and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Overall - Overall Index; Area 1 - Size of Government; Area 2 - Legal System/Property Rights; Area 3 - Monetary Policy.

Table 8. Freedom Index Area Results: Imports (cont.)

	Area 4a-A	Area 4a-B	Area 4b-A	Area 4b-B	Area 5a-A	Area 5a-B	Area 5b-A	Area 5b-B
Cons	5.110***	7.540***	0.538	7.540***	5.060***	7.540***	2.590*	7.540***
	(0.000)	(0.000)	(0.778)	(0.000)	(0.000)	(0.000)	(0.074)	(0.000)
rgdp	1.280***	1.400***	1.190***	1.400***	1.270***	1.400***	1.330***	1.400***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dist	-	-	-	-	-	-	-	-
	0.886***	0.931***	0.968***	0.931***	0.772***	0.931***	0.975***	0.931***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
pop	-	-	-0.090*	-	-	-	-0.136**	-
	0.144***	0.267***		0.267***	0.170***	0.267***		0.267***
	(0.000)	(0.000)	(0.100)	(0.000)	(0.004)	(0.000)	(0.013)	(0.000)
ewfi	0.326***	--	2.770***	--	0.004	--	1.860***	--
	(0.002)		(0.003)		(0.989)		(0.000)	
OECD	-	-	-	-	-	-	-	-
	1.050***	1.050***	1.110***	1.050***	0.950***	1.050***	1.140***	1.050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NAFTA	0.921***	0.857***	0.835***	0.857***	1.100***	0.857***	0.693**	0.857***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.016)	(0.000)
R_A^2	0.794	0.731	0.758	0.731	0.767	0.731	0.737	0.731
$\beta_4 = 0$	--	0.002	--	0.003	--	0.989	--	0.000
$\beta_{4i} = \beta_{4O}$	--	0.391	--	0.166	--	0.376	--	0.977
N	669	748	747	748	587	748	748	748

Notes: ***, **, and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively using White heteroskedastic corrected errors. Wald statistics are *p* – values. Area 4a - International Trade; Area 4b - International Capital Movements; Area 5a - Regulation; Area 5b - Business Regulation.

Table 9. Asymmetric Restriction Tests

	Total Volume	Exports
	Distance, $\hat{\beta}_1$	
Total Volume	--	
Exports	0.000	--
Imports	0.629	0.020
	Real GDP, $\hat{\beta}_2$	
Total Volume	--	
Exports	0.004	--
Imports	0.000	0.000
	Economic Freedom, $\hat{\beta}_4$	
Total Volume	--	
Exports	0.000	--
Imports	0.044	0.435

Table 10. SUR Estimates of Trade Growth, Eq. (3)

		Exports	*p*-value	Imports	*p*-value	Total	*p*-value
Δx_1	*Cons*	0.597	0.147	-1.755	0.392	0.531	0.380
	dist	-0.061	0.200	0.214	0.371	-0.057	0.417
	rgdp	0.043	0.953	6.735**	0.024	0.852	0.376
	pop	0.474	0.825	-11.286	0.273	0.186	0.953
	ewfi	0.641	0.243	-1.826	0.413	-0.158	0.811
	OECD	-0.015	0.786	-0.156	0.578	-0.025	0.763
	NAFTA	-0.123	0.496	0.434	0.631	-0.061	0.819
	F	1.370	0.243	0.670	0.413	0.060	0.811
Δx_2	*Cons*	5.268**	0.011	-4.309	0.066	0.780	0.437
	dist	-0.640***	0.009	0.593**	0.031	-0.071	0.549
	rgdp	0.074	0.970	-0.616	0.736	0.896	0.112
	pop	15.468***	0.005	-14.142**	0.019	1.361	0.600
	ewfi	-5.494**	0.011	4.088**	0.041	-0.841*	0.087
	OECD	-0.138	0.626	-0.019	0.951	-0.071	0.601
	NAFTA	-0.843	0.357	0.801	0.440	-0.096	0.830
	F	6.470	0.011	4.190	0.041	2.940	0.087
Δx_3	*Cons*	0.463	0.470	1.979	0.307	1.449	0.151
	dist	-0.023	0.757	-0.220	0.334	-0.147	0.215
	rgdp	0.294	0.462	1.617**	0.015	0.925**	0.021
	pop	-1.083	0.339	3.220	0.300	0.660	0.703
	ewfi	1.043*	0.074	-2.125**	0.022	0.096	0.847
	OECD	-0.076	0.383	0.000	0.999	-0.048	0.726
	NAFTA	-0.110	0.699	-0.383	0.657	-0.306	0.496
	F	3.200	0.074	5.300	0.022	0.040	0.847
Δx_4	*Cons*	0.269	0.738	1.786	0.395	1.549	0.153
	dist	-0.009	0.924	-0.195	0.428	-0.163	0.202
	rgdp	-0.025	0.951	0.825**	0.027	0.374	0.277
	pop	-0.177	0.869	0.732	0.764	0.514	0.709
	ewfi	1.703***	0.001	-0.127	0.695	0.957**	0.012
	OECD	-0.102	0.349	0.034	0.903	-0.029	0.843
	NAFTA	-0.075	0.833	-0.402	0.667	-0.356	0.459
	F	10.290	0.001	0.150	0.695	6.430	0.012
Δx_5	*Cons*	-0.059	0.946	1.758	0.394	1.162	0.348
	dist	0.004	0.966	-0.192	0.426	-0.134	0.358
	rgdp	0.732	0.059	0.724**	0.023	1.080***	0.002
	pop	1.546*	0.092	0.571	0.765	1.379	0.273
	ewfi	1.354***	0.004	-0.032	0.903	0.354	0.339
	OECD	-0.052	0.656	0.034	0.900	-0.006	0.973
	NAFTA	-0.168	0.661	-0.392	0.669	-0.350	0.525
	F	8.540	0.004	0.010	0.903	0.920	0.339

Notes: $\Delta x_k, k = 1,\ldots,5$ is the length of the growth period, e.g. $\Delta x_3 = x_t - x_{t-3}$; ***, **, and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively; F is the $F_{(1,555)}$ – test of $ewfi = 0$.

Table 11. Ordered Probit Estimates

		Volume	$p > z$	Exports	$p > z$	Imports	$p > z$
θ_1	*dist*	-0.178	0.111	0.045	0.694	-0.039	0.736
	rgdp	6.702***	0.000	2.520*	0.085	5.259***	0.001
	pop	0.399	0.936	2.658	0.597	-2.070	0.685
	efwi	1.194	0.340	1.481	0.244	1.814	0.159
	OECD	0.026	0.842	-0.059	0.659	0.041	0.757
	NAFTA	-0.443	0.308	-0.020	0.965	0.037	0.933
	$\tilde{R}^2$		0.022		0.007		0.017
	$p(\chi^2)$		0.000		0.276		0.006
θ_2	*dist*	-0.235**	0.056	-0.020	0.874	-0.080	0.525
	rgdp	5.822***	0.000	2.538**	0.012	3.443***	0.001
	pop	0.863	0.758	1.900	0.507	-1.469	0.605
	efwi	0.885	0.414	-0.094	0.932	0.741	0.494
	OECD	0.063	0.662	0.012	0.937	0.077	0.596
	NAFTA	-0.594	0.214	-0.139	0.773	-0.165	0.723
	$\tilde{R}^2$		0.041		0.009		0.017
	$p(\chi^2)$		0.000		0.232		0.013
θ_3	*dist*	-0.384***	0.007	0.051	0.718	-0.253	-0.543
	rgdp	5.411***	0.000	1.122	0.180	3.186	1.323
	pop	0.118	0.959	-2.898	0.187	4.831	0.317
	efwi	3.199***	0.009	3.117***	0.005	1.251	-1.080
	OECD	-0.002	0.991	-0.108	0.510	0.238	-0.102
	NAFTA	-0.901	0.086	-0.126	0.796	-0.696	-1.754
	$\tilde{R}^2$		0.079		0.024		0.031
	$p(\chi^2)$		0.000		0.006		0.002
θ_4	*dist*	-0.206	0.228	-0.115	0.512	-0.276	0.110
	rgdp	2.913***	0.001	1.509*	0.088	2.028**	0.028
	pop	1.291	0.535	5.232**	0.016	-0.363	0.862
	efwi	3.812***	0.001	6.407***	0.000	1.252	0.276
	OECD	-0.074	0.713	-0.160	0.439	0.172	0.403
	NAFTA	-0.499	0.414	-0.893	0.180	-0.872	0.146
	$\tilde{R}^2$		0.067		0.090		0.023
	$p(\chi^2)$		0.000		0.000		0.075
θ_5	*dist*	-0.152	0.540	-0.276	0.272	-0.194	0.432
	rgdp	2.745***	0.025	2.696**	0.029	1.607	0.162
	pop	1.640	0.507	6.422***	0.010	0.504	0.829
	efwi	4.769***	0.002	6.059***	0.000	1.766	0.221
	OECD	-0.071	0.808	-0.010	0.972	0.328	0.259
	NAFTA	-0.523	0.547	-1.161	0.212	-0.881	0.301
	$\tilde{R}^2$		0.097		0.130		0.026
	$p(\chi^2)$		0.001		0.000		0.375

Notes: $p > |z|$ is is the $p-$value; ***, **, and * represent rejection of the null hypothesis at the 1%, 5%, and 10% level respectively; $\tilde{R}^2$ is the pseudo-R^2; and $p(\chi^2)$ is the $p-$value associated with the normality test.

Figures

Figure 1. Mean, St. Dev. and US Freedom Indices

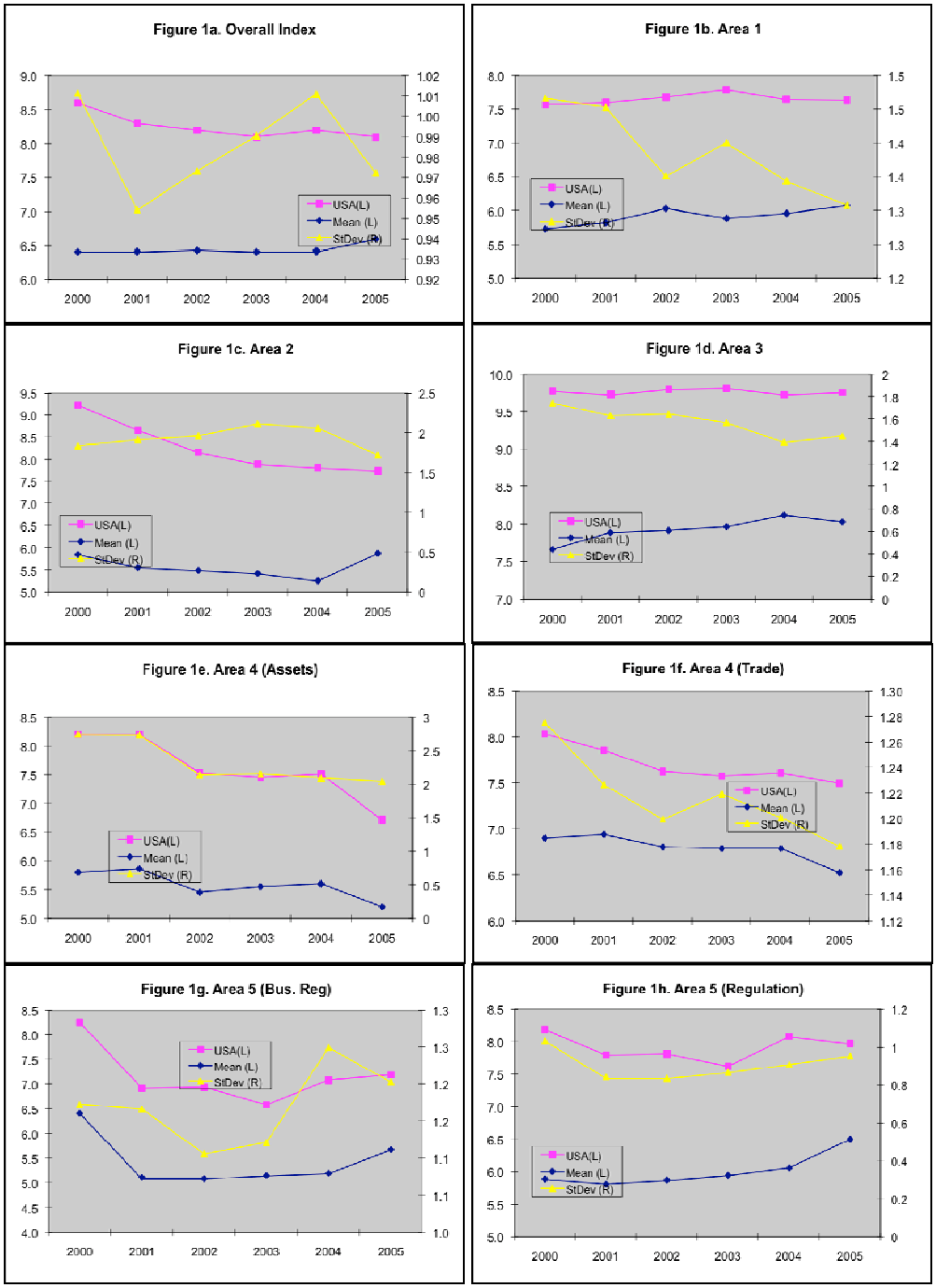


Figure 2. Percentage Difference from Mean EFWI in 2005

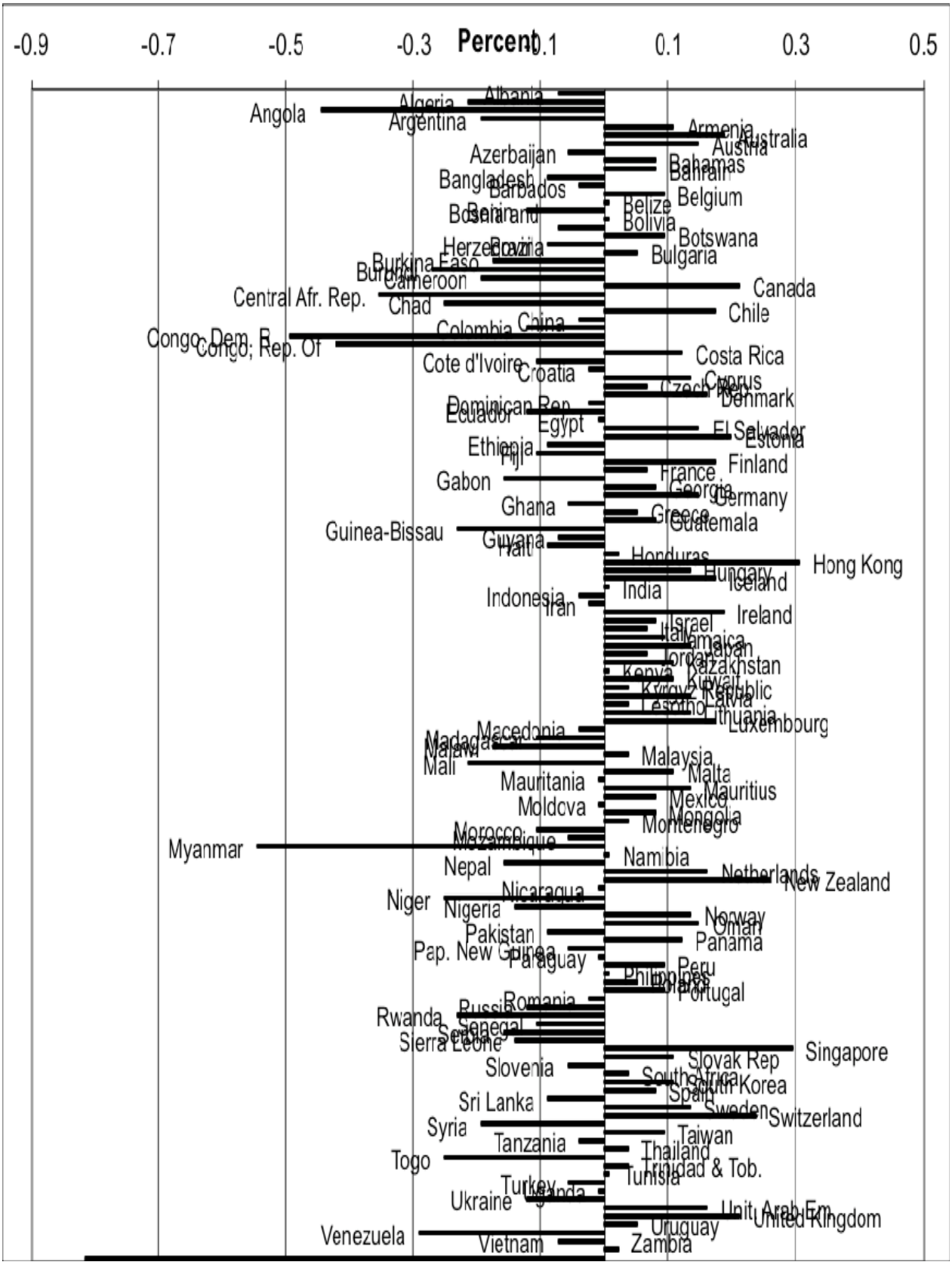
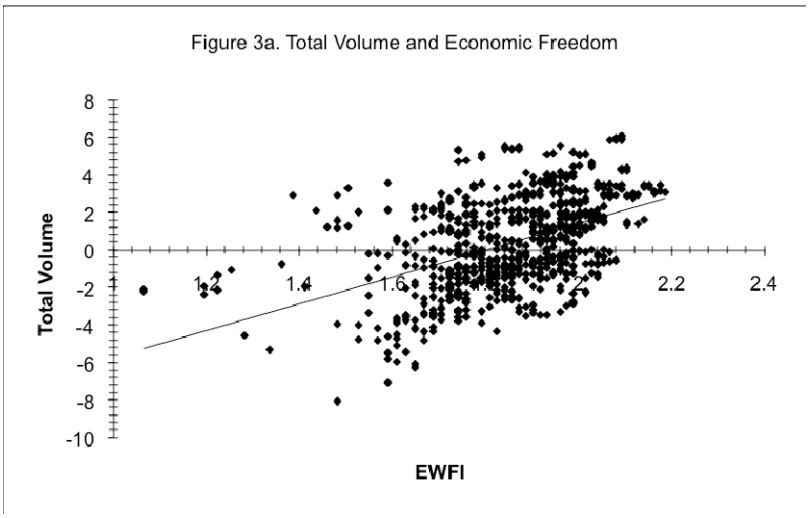
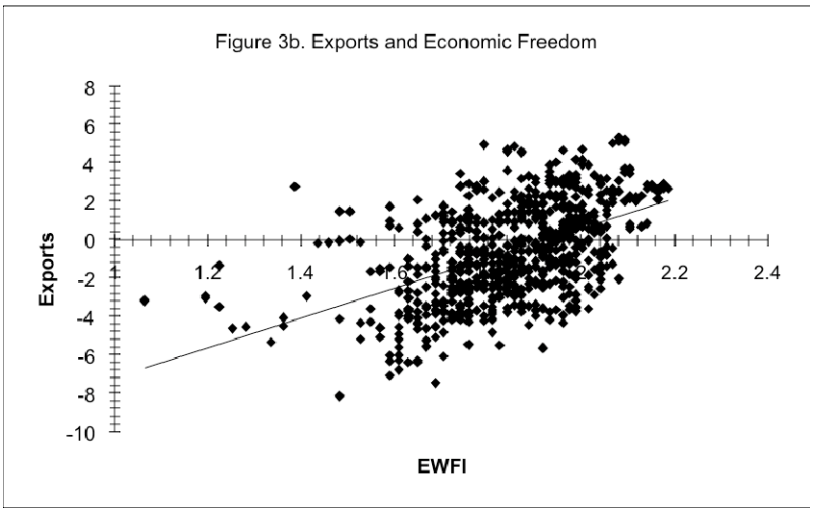


Figure 3. Relationship Between Trade Flows and Economic Freedom





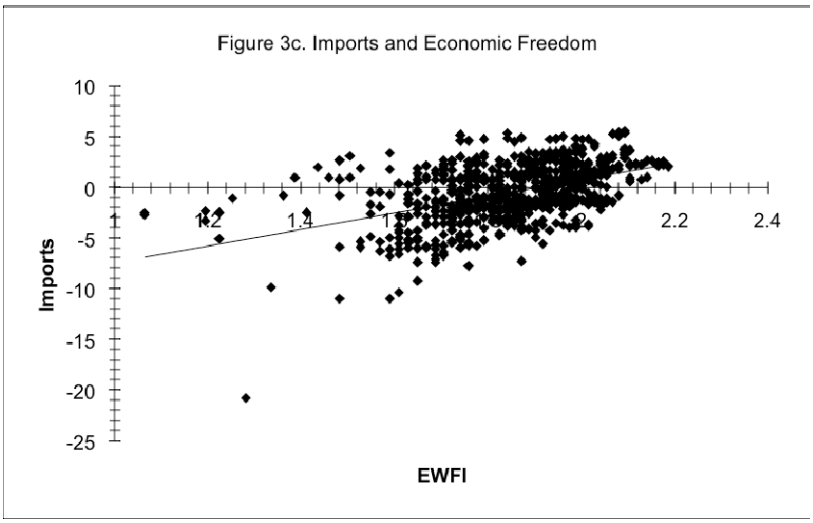


Figure 4. Change in Trade Volume and EWFI