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Asymmetric Effects of Economic Freedom on International Trade Flows

Craig A. Depken, II*
Department of Economics, University of Texas at Arlington, U.S.A.

Robert J. Sonora
Department of Economics, Fort Lewis College, U.S.A.

Abstract

We employ a gravity equation to estimate the effects of economic freedom on U.S. consumer exports and imports for the years 1999 and 2000. 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 overall U.S. 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.

Key words: gravity model; trade flows; trade balance

JEL classification: D63; F14; R10

1. Introduction

The impact of freedom on economic activity was a favorite topic of authors such as Peter Bauer (2000) and Friedrich von Hayek (1937, 1989) among others. The basic premise of these authors was that 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.

The role of economic freedom has been investigated in the 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; Greenaway et al., 2001). Furthermore, there

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*Correspondence to: Department of Economics, University of Texas at Arlington, Arlington, Texas 76019-0479, U.S.A. E-mail: depken@uta.edu.

is some evidence that freedom "Granger causes" income (Farr et al., 1998).

These findings are generally based on macroeconomic evidence, which seems primarily driven by the availability of data rather than a lack of acknowledgement on whom economic freedom has the greatest impact. Indeed, Adam Smith extolled the virtues of individual freedom, political and economic, long before economic freedom indices were created. While the impacts of economic freedom made possible by macro-level policies are ultimately manifested at the extreme micro level, the availability of easily comparable data at the micro level of various countries is extremely limited. Therefore, applied economists rely upon country or regional macroeconomic data with which to infer the impact of economic freedom at the micro level.

This paper investigates the impact of economic freedom on international trade flows between the U.S. and its trading partners. We employ the measure of freedom compiled by the Fraser Institute. Our investigation serves two major functions. First, we expand the gravity model to include the measure of economic freedom of the U.S. trading partner, thereby capturing some of the institutional characteristics of other countries not directly included in previous models and find that economic freedom has a significant impact on the total volume of consumer goods and services traded between the U.S. and its trading partners.

Secondly, we focus on an implicit assumption in the standard functional form of the gravity model: the impacts of independent variables are symmetric on imports and exports (the components of the total volume of trade between two countries). We question this assumption, especially in the case of economic freedom, and test whether there are asymmetric impacts of economic freedom on the level of exports and imports to and from the U.S.

Empirically, we find that the economic freedom of a trading partner is found to have a statistically significant and positive effect on the amount of exports from the U.S. to that country. However, economic freedom has a statistically insignificant impact on the level of imports from that country to the U.S. We offer some intuitive explanations for why this might be the case and suggest that the asymmetric impacts of economic freedom have implications for trade policy.

The results tend to confirm the intuition that improved economic freedom motivates an increase in economic activity, arguably for the betterment of society in general and between bilateral trading partners in particular. To illustrate, we estimate what the level of U.S. imports and exports would have been in 1999 and 2000 if all U.S. trading partners experienced a 10% improvement in economic freedom. For 2000 alone, the estimates show that the U.S. would have enjoyed a net trade surplus in consumer goods, making the gains from increased exports substantial for the U.S., and, by extension, for other developed countries, implying that the benefits of improved economic freedom are not one-sided.

This paper is organized as follows. Section 2 briefly outlines the theoretic justification for using the gravity framework. Section 3 examines the data used and some descriptive statistics. Section 4 provides empirical analysis of the effects of economic freedom on U.S. imports and exports. Section 5 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 gravity representation is given by

$$VOL_{ij} = \alpha_0 D_{i,j}^{\alpha_1} Y_i^{\alpha_2} Y_j^{\alpha_3} N_i^{\alpha_4} N_j^{\alpha_5} X^{\gamma} u_{ij}, \tag{1}$$

where the α and γ are coefficients to be estimated and u_{ij} is a log normally distributed error term. The response variable, VOL_{ij}, is the volume of trade between countries *i* and *j*. The predictor variables include the GDP of each of the trading countries, Y_i and Y_j, the distance between the two countries, D_{ij}, the population of each country, N_i and N_j, and a matrix of other variables X, including dummy variables for border countries, membership in trade agreements and diversion (Soloaga and Winters, 2001), intra-state or intra-national trade (Wolf, 2000), and directional flows of trade (Wall, 2000).

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; see Engel and Rogers (1996) and Wall (2000) among others. Usually, the parameters of interest represent the elasticities of trade volume with respect to distance (α_1) and the GDPs of the trading countries (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, 2000), Wolf (2000), and Anderson and Marcouiller (2002).

Though the gravity model has been widely adopted because of its empirical success, e.g., high R^2 and tight fits of parameter estimates, it originally lacked rigorous theoretical underpinnings. 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 the matrix X is consistent with established theory. More recently, Evenett and Keller (1998) successfully incorporated the gravity model within the Ricardian and Heckscher-Ohlin-Samuelson frameworks. Feenstra et al. (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, homogeneous products (intra-industry) trade, and an amalgam of imperfect competition, segmented markets models, and "reciprocal dumping." Furthermore, their models provide a theoretical explanation of asymmetric impacts of national income on the total volume of trade, i.e., $\alpha_2 \neq \alpha_3$.

3. The Data

Our data describe the volume of consumer good imports and exports between the U.S. and 119 countries in 1999 and 2000. We focus on these two years because of data availability. The data on imports and exports come from the U.S. Census Bureau and USA Trade Online, which provide the total volume of imports and exports by country. We focus purposefully on consumer imports for two reasons. First, it is the portion of international trade with the most direct influence on consumer welfare. While capital goods may constitute a large portion of trade between any particular country and the U.S., capital goods typically have only an indirect influence on the welfare or utility of the consumers of the trading partner. One of the important benefits of economic freedom is an increased choice set and individuals' freedom to act upon this increased choice set. In many countries, limited economic freedom does not reduce the ability to import capital goods from the U.S. or to export consumer goods to the U.S. Using a measure of total volume of trade that includes capital goods might mask any impact of economic freedom (or the lack thereof) on trade flows. Finally, many of the limitations on exports from the U.S. are in the capital good sector, e.g., computer technology, satellite systems, etc.

Individual country GDP data for each year comes from the IMF's International Financial Statistics macroeconomic data set. Distance is the greater surface distance between the population center of the U.S. (roughly St. Louis, Missouri) and the individual trading partner's capital (e.g., Moscow, Russia).

The economic freedom variable we use is the Economic Freedom of the World Index (EFWI) calculated under the sponsorship of the Fraser Institute. Other research on the effects of economic freedom, such as Wall (1999), uses the freedom index calculated by the Heritage Foundation (HFI). Both indices are calculated 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. The ERWI for a country is in the set $(0,10]$, with 10 being the "most free"; for details see Gwartney and Lawson (2002), the Fraser Institute's *Economic Freedom of World: 2001 Report*, and de Haan and Sturm (2000) and Heckelman (2002). Recently, the Fraser Institute updated its methodology for calculating the Freedom Index, and, to date, this improved version is only available for the years 1999 (recalibrated) and 2000—herein lies our data restriction as earlier years are not directly comparable to the two years used here.

Table 1 presents some basic summary statistics of the variables used. All values

are in natural logarithms. Looking first at the Freedom Index, the mean for 1999 was 6.17, between Tunisia and Slovakia (both indexed at 6.1) and Lithuania (6.2), and increased to 6.29 in 2000, between Belize, Cyprus, and Fiji (6.2) and Guatemala, Honduras, and Paraguay (6.3). The mean U.S. exports (*X*), imports (*M*), and total volume of trade (*TV*) all grew from 1999 to 2000, as did non-U.S. GDP.

Figure 1 plots the Fraser Institute's freedom index on the *x*-axis against the log of U.S. exports (circles) and imports (squares) on the *y*-axis, for the year 2000. 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. imports is more widely distributed compared to the plot for U.S. exports.

Table 1. Summary Statistics

	Mean	Std Dev	Minimum	Maximum
ln(*DIST*)	8.53	0.51	6.78	9.22
1999 (*N* = 119)				
ln(*EFWI*)	1.82	0.21	0.99	2.19
ln(*TV*)	7.21	2.33	1.79	12.81
ln(*X*)	6.32	2.34	1.10	12.02
ln(*M*)	6.45	2.55	0.69	12.02
ln(*GDP*)	10.24	1.97	6.51	15.29
ln(*POP*)	2.36	1.71	−1.45	7.14
2000 (*N* = 119)				
ln(*EFWI*)	1.84	0.18	1.16	2.17
ln(*TV*)	7.42	2.34	1.55	12.86
ln(*X*)	6.37	2.41	0.53	11.96
ln(*M*)	6.77	2.53	1.06	12.34
ln(*GDP*)	10.25	1.98	6.48	15.36
ln(*POP*)	2.35	1.68	−1.39	7.14

4. Economic Freedom and (Asymmetric) Trade Flows

We estimate a traditional gravity model functional form. However, in addition to the standard method of using the total value of trade, we also decompose total volume of trade into separate equations for imports and exports and estimate the equations separately for the years 1999 and 2000. The cross-sectional empirical specification is:

$$\ln(V_{US,i}) = \beta_0 + \beta_1 \ln(DIST_{US,i}) + \beta_2 \ln(GDP_i) + \beta_3 \ln(POP_i) + \beta_4 \ln(EFWI_i) + \varepsilon_i , \qquad (2)$$

where the dependent variable, $V_{US,i}$, is alternatively the total volume of consumer-goods trade (*TV*), exports (*X*), and imports (*M*) between the U.S. and country *i*. The predictor variables are the distance between St. Louis and the capital of trading country *i* ($DIST_{US,i}$), country *i*'s GDP (GDP_i), population (POP_i), and freedom index ($EFWI_i$). Of the most interest are the signs 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., $\hat{\beta}_2 > 0$ and $\hat{\beta}_3 > 0$. Ex ante we also expect that economic freedom implies a greater degree of access to foreign markets, goods and services, and capital. Therefore, we anticipate $\hat{\beta}_4 > 0$: more freedom allows consumers to purchase more imported goods both because income is higher and because there are fewer barriers to entry and exit in traded goods markets.

The specification in Equation (2) is closest in spirit to Wall (1999) and Anderson and Marcouiller (2002). Wall (1999) investigates the welfare implications of trade openness and economic freedom using the Heritage Foundation's index of trade policy, and Anderson and Marcouiller (2002) investigate the effects of a vector of "obstacles to doing business," such as high taxes, 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 the total volume of trade implicitly assumes that the impacts of distance, national income, and economic freedom are symmetric on 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.

4.1 Results

The results of estimating Equation (2) using total volume of trade (Model I), total exports (Model II), and total imports (Model III) as response variables are reported in Table 2. Each model reports two specifications: the first model is unrestricted and the second restricts the parameter on economic freedom to zero (i.e., $\hat{\beta}_4 = 0$). Estimates for 1999 appear in the top half and for 2000 in the bottom. Heteroscedastic-consistent *t*-statistics are reported in parentheses and the adjusted R^2 for each regression specification is also reported.

We begin discussion of the estimates by focusing on the two commonly used predictor variables in the literature: distance and GDP. The first observation we make is that estimates for both the distance and GDP coefficients for all three regressions are similar to those found in the existing literature and are statistically significant at standard levels. Because gravity research concentrates on total volume of trade (due to data availability), we first summarize our results with this as the response variable. Our estimates of the distance elasticity ($\hat{\beta}_1$) is –1.03 and –1.07 for 1999 and 2000, respectively, which compare favorably with the baseline results found in the literature.

Table 2. Gravity Regression Results

	Model I		**Model II**		**Model III**	
Response	Volume		Exports		Imports	
1999						
CONSTANT	3.931*	5.768***	2.992	7.035***	2.904	3.929*
	(1.923)	(3.214)	(1.548)	(3.879)	(1.213)	(1.883)
ln(*DIST*)	−1.028***	−1.067***	−1.244***	−1.329***	−0.972***	−0.994***
	(−5.388)	(−5.428)	(−7.027)	(−6.842)	(−4.301)	(−4.311)
ln(*GDP*)	0.965***	1.060***	0.874***	1.084***	1.041***	1.094***
	(12.604)	(19.651)	(11.377)	(20.993)	(11.084)	(16.075)
ln(*POP*)	−0.034	−0.130*	0.007	−0.206***	−0.034	−0.088
	(−0.346)	(−1.771)	(0.090)	(−3.078)	(−0.275)	(−0.914)
ln(*EFWI*)	1.237	—	2.723***	—	0.690	—
	(1.632)		(3.681)		(0.743)	
R^2_{ADJ}	0.767	0.761	0.818	0.781	0.685	0.686
$F_{1,115}$	3.872*		23.798***		0.742	
2000						
CONSTANT	3.086*	6.048***	1.919	7.795***	1.464	3.426*
	(1.652)	(3.796)	(1.018)	(4.588)	(0.657)	(1.737)
ln(*DIST*)	−1.071***	−1.098***	−1.399***	−1.454***	−0.906***	−0.924***
	(−6.706)	(−6.486)	(−9.074)	(−8.285)	(−4.501)	(−4.441)
ln(*GDP*)	0.906***	1.064***	0.799***	1.113***	0.994***	1.099***
	(11.043)	(18.675)	(10.152)	(18.879)	(9.773)	(15.332)
ln(*POP*)	0.100	−0.074	0.158*	−0.188**	0.096	−0.019
	(0.914)	(−0.940)	(1.657)	(−2.283)	(0.714)	(−0.203)
ln(*EFWI*)	2.137***	—	4.241***	—	1.416	—
	(2.695)		(5.644)		(1.537)	
R^2_{ADJ}	0.817	0.804	0.855	0.802	0.757	0.753
$F_{1,115}$	9.193***		43.121***		2.602	

Notes: Heteroscedastic-consistent *t*-statistics are reported in parenthesis; *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

The estimated coefficients for national income, in the neighborhood of 0.90, are also consistent with previous literature and are significant at the 1% level. A country's population has a statistically insignificant impact in 1999 but is significant and positive in 2000. This is consistent with Krugman's intra-industry trade argument and is sensible given the fact that trade in consumer goods is much more intra-industry in nature (Krugman and Obstfeld, 2003, p. 140).

The unrestricted parameter estimates from Model II and Model III in Table 2 facilitate statistical tests of whether there are asymmetric effects of the variables on U.S. exports and imports. Asymmetries are partly addressed in Wolf (2002) with respect to "home bias" using intra-Canadian and U.S. trade data. Beginning first with distance, in both years the absolute value of the distance coefficient for exports (X) is

greater than for imports (M), i.e., $\left|\hat{\beta}_{1,X}\right| > \left|\hat{\beta}_{1,M}\right|$: in 1999 $\hat{\beta}_{1,X} = -1.24$ and $\hat{\beta}_{1,M} = -0.97$. This gap widens in 2000 with $\hat{\beta}_{1,X} = -1.40$ and $\hat{\beta}_{1,M} = -0.91$. The results for national income are consistent with the estimates from the total volume of trade, but with a twist. Higher foreign income might be expected to coincide with a greater degree of responsiveness to U.S. exports. However, we find the opposite is true—U.S. imports respond more to increasing GDP in other countries than do U.S. exports ($\hat{\beta}_{2,M} > \hat{\beta}_{2,X}$). The difference between the coefficients is approximately 0.3 and significant at the 1% level. One explanation is intra-industry consumer trade; the U.S. imports more from countries with higher income because of similar preferences or similarities in product cycles.

In both 1999 and 2000 there is a positive relationship between economic freedom and the volume of trade: the freedom elasticity of total trade is estimated to be 1.24 in 1999 and 2.14 in 2000. However, whereas freedom is statistically significant in 2000 at the 1% level, it is not in 1999. Additionally, there is considerable difference between the estimated coefficients for exports and imports, as can be seen in Table 3. Economic freedom is insignificant in explaining the variation in U.S. imports from other countries, reflecting the fact that the U.S. has no severe restrictions on the majority of consumer imports, especially based upon where the products are made (except for the notable exceptions of the Cuban embargo and certain international trade sanctions). For 1999 the export-freedom elasticity is estimated to be $\hat{\beta}_{4,X} = 2.72$ while the import-freedom elasticity is $\hat{\beta}_{4,M} = 0.69$. In 2000 both coefficients increase though the export elasticity is still larger than the import elasticity: 4.24 versus 1.42.

Beyond the differences in the estimated coefficients, the regressions also show that there is no statistically significant relationship between U.S. imports and economic freedom, while there is a strong relationship between U.S. exports and freedom. These results confirm that utility-maximizing U.S. consumers are not severely restricted in their consumption choices based on the origin of their imports. On the other hand, less economic freedom in other countries restricts the choices non-U.S. households have in their consumption bundles. Table 2 highlights the asymmetric effects of economic freedom on trade flows and supports our disaggregation of the total volume of trade.

For Models I and II in Table 2, the restriction that the parameter estimate of economic freedom is zero is soundly rejected, whereas for Model III the restriction cannot be rejected. These tests, reported in the last row of the upper and lower panels of Table 2 are consistent with the single-parameter *t*-tests reported for the unrestricted models: economic freedom is a statistically important variable in the gravity equation specification of trade flows. This might be a heretofore underappreciated aspect of the foreign policy agendas of many developed countries which are often intended (rhetorically at least) to improve the choice set of consumers living in less economically free countries. The best policies with which to improve economic freedom are still open to debate, both within and outside of target countries. Yet, our results indicate that increases in economic freedom are expected to yield benefits to both the "exporters" and "importers" of economic freedom.

Table 3. Pooled Gravity Regression Results

	Model I		**Model II**		**Model III**	
Response	Volume		Exports		Imports	
CONSTANT	3.541**	5.784***	2.696*	7.391***	2.124	3.497**
	(2.540)	(4.849)	(1.954)	(5.970)	(1.291)	(2.460)
ln(*DIST*)	−1.046***	−1.081***	−1.318***	−1.391***	−0.935***	−0.957***
	(−8.470)	(−8.402)	(−11.282)	(−10.706)	(−6.239)	(−6.219)
ln(*GDP*)	0.945***	1.063***	0.851***	1.099***	1.025***	1.098***
	(16.457)	(27.323)	(15.093)	(28.455)	(14.482)	(22.296)
ln(*POP*)	0.022	−0.104*	0.066	−0.197***	0.022	−0.055
	(0.289)	(−1.932)	(1.040)	(−3.788)	(0.233)	(−0.812)
ln(*EFWI*)	1.572***	—	3.290***	—	0.962***	—
	(2.776)		(5.878)		(1.416)	
YEAR DUM	0.161***	0.194	−0.031	0.036	0.283*	0.302*
	(8.649)	(1.375)	(−0.250)	(0.258)	(1.645)	(1.736)
R^2_{ADJ}	0.794	0.785	0.836	0.793	0.724	0.722
$F_{1,115}$	11.525***		61.463***		2.716	

Notes: Heteroscedastic-consistent *t*-statistics reported in parenthesis; *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

The results of the individual least squares regressions are confirmed for each specification by pooling data across years and including a year dummy variable taking the value 1 for 2000. These pooled results are reported in Table 3. For the total volume of trade, the GDP and distance coefficients are consistent with the literature, and the freedom elasticity is statistically significant with estimate 1.57. Decomposing trade into exports and imports also yields similar results to those in the single year regressions. The distance elasticity is greater in absolute value for exports than for imports. Similarly, imports are more income elastic than exports. Finally, the freedom elasticity is greater for exports than imports; however, unlike the individual year regressions, the estimated import-freedom elasticity is statistically significant. Estimation results obtained when restricting the parameter on economic freedom to zero are also presented in Table 3. Again for total volume of trade and U.S. exports, the restriction is strongly rejected.

Next, we confirm a statistically significant difference between the coefficients on distance and freedom by testing if asymmetries between exports and imports exist with respect to: (1) distance: $\hat{\beta}_{1,X} = \hat{\beta}_{1,M}$, (2) GDP: $\hat{\beta}_{2,X} = \hat{\beta}_{2,M}$, (3) the freedom index: $\hat{\beta}_{4,X} = \hat{\beta}_{4,M}$, and (4) the combined effects of distance and economic freedom: $\hat{\beta}_{1,X} = \hat{\beta}_{1,M}$ and $\hat{\beta}_{4,X} = \hat{\beta}_{4,M}$.

Results of the Wald tests are tabulated in columns 2 and 3 of Table 4 for both years; *p*-values for each test statistic reported in parentheses. Each of the null hypotheses enumerated above is strongly rejected, except for distance in 1999. Clearly, it seems inappropriate to treat exports and imports symmetrically with respect to distance and economic freedom in the gravity regressions.

Next, because of observed asymmetries within both exports and imports across

years, we conduct another set of tests to see if the estimated coefficients differ across years: $\hat{\beta}_{k,l}^{1999} = \hat{\beta}_{k,l}^{2000}$ for $k = 1,2,4$ and $l = X, M$. The Wald statistics suggest considerable asymmetries across time for U.S. exports but not for U.S. imports. The most striking implication is that U.S. exports are sensitive to changes in freedom, whereas U.S. imports are not.

Table 4. Wald Asymmetric Restriction Tests for Exports and Imports

	Exports vs Imports		Across Time	
Restriction	1999	2000	Exports	Imports
1. Distance	2.038	41.890	1.191	0.434
	(0.153)	(0.000)	(0.275)	(0.510)
2. GDP	5.101	5.841	0.680	0.002
	(0.024)	(0.016)	(0.410)	(0.967)
3. Freedom	12.689	15.915	6.512	0.375
	(0.000)	(0.000)	(0.011)	(0.541)
4. Distance	15.821	23.759	8.054	0.763
and Freedom	(0.000)	(0.000)	(0.018)	(0.683)

Notes: Asymmetric tests done using a system of SUR regressions. Restriction 1: $\hat{\beta}_{1,X} = \hat{\beta}_{1,M}$; Restriction 2: $\hat{\beta}_{2,X} = \hat{\beta}_{2,M}$; Restriction 3: $\hat{\beta}_{4,X} = \hat{\beta}_{4,M}$; and Restriction 4: $\hat{\beta}_{1,X} = \hat{\beta}_{1,M}$ and $\hat{\beta}_{4,X} = \hat{\beta}_{4,M}$. The $\chi^2(q)$ p-values are in parenthesis, where q is the number of restrictions.

5. Discussion

The empirical results indicate that if the rest of the world (ROW) was to improve its economic freedom, the level of trade between the U.S. and the countries in the sample would increase, most notably through an increase in U.S. exports to ROW. Given our results, we next turn to estimating the effect on U.S. exports and imports if ROW enjoyed a proportional increase or decrease in their economic freedom.

5.1 Estimates of welfare gains and losses

From the regression analysis it is possible to estimate the dollar gain of greater economic freedom as reflected in the changes in U.S. exports and imports: higher economic freedom enhances trade flows between the U.S. and the ROW. Consider first a world where all countries experience a 10% increase or a 10% decrease in their level of economic freedom. Estimates of trade volume gain/loss are presented in Table 5 for both possibilities using the three specifications in Table 3.

The overall gain/loss of U.S. exports and imports under each scenario is reported along with descriptive statistics: the mean, maximum (*Max*), minimum (*Min*), and standard deviation (*Std Dev*). All figures are in billions of U.S. dollars. Table 5 also reports the percentage change in exports and imports, and the same descriptive statistics under each scenario (country-specific estimates for each scenario and year are available from the authors upon request).

Table 5. Estimated Trade Effects of Changes in Economic Freedom

Year: Mean EFWI	1999: 6.31		2000: 6.41	
Change in EFWI	+10%	−10%	+10%	−10%
Total Trade Volume ±	150.854	−147.323	386.887	−345.265
Mean	1.278	−1.249	3.279	−2.926
Max	27.735	−27.085	81.413	−72.654
Min	0.003	−0.003	0.006	−0.005
Std Dev	3.727	3.639	10.242	9.141
Percentage Change	11.785	−13.028	20.371	−22.520
Total Exports from U.S. ±	166.106	−139.816	388.715	−281.199
Mean	1.408	−1.185	3.294	−2.383
Max	45.140	−37.996	138.403	−100.122
Min	0.002	−0.001	0.003	−0.002
Std Dev	4.874	4.102	13.874	10.036
Percentage Change	25.949	−28.686	40.423	−44.686
Total Imports to U.S. ±	44.136	−45.527	145.545	−139.606
Mean	0.374	−0.386	1.233	−1.183
Max	7.038	−7.259	25.315	−24.281
Min	0.001	−0.001	0.002	−0.002
Std Dev	1.094	1.128	3.175	3.564
Percentage Change	6.580	−7.274	13.497	−14.920

Notes: All figures are in billions of U.S. dollars.

If all countries experienced a 10% increase in their economic freedom index, U.S. consumer exports (imports) would have been approximately $166 billion ($44.1 billion) greater in 1999 and $388 billion ($145 billion) greater in 2000. The extent of the lost opportunities to trade is magnified when recognizing that U.S. consumer exports accounted for about 8.45% and 8.40% of total U.S. exports in 1999 and 2000, respectively, while consumer imports represented approximately 19.84% and 19.53%, respectively (Office of Trade and Economic Analysis, 2002). In percentage changes, on average U.S. exports would rise 26% and 40.4% and imports would increase 6.6% and 13.5% over the two years, respectively.

Next consider the case in which all countries experienced a 10% decline in economic freedom. Overall global loss would be about $184 billion in 1999 and $420 billion in 2000. There would be an average decline in U.S. exports to the countries of our sample of 28.68% and 44.68% in 1999 and 2000, respectively, and an average decline in U.S. imports from the countries in the sample of 7.27% and 14.92% for 1999 and 2000, respectively. These numbers are considerable: total global GDP for these 119 countries plus the U.S. was approximately $30 trillion in 2000.

5.2 The U.S. trade position

Having estimated both sides of the trade balance for the U.S. with the 119 countries in the sample, we estimate the impact on trade levels if all the trading

partners with the U.S. enjoyed the same 10% changes in economic freedom used in Table 5. We estimate the trade balance by adding the increases/decreases to exports and imports caused by changes in economic freedom to the actual exports and imports from 2000. The estimated totals are presented in Table 6. Actual U.S. consumer net exports were about –$315 billion and –$475 billion in 1999 and 2000, respectively. Using the disaggregated gravity model estimates, increases in economic freedom in ROW would have led to a U.S. consumer good trade surplus of $33.7 billion and $16.27 billion in 1999 and 2000, respectively. Most of the increase in the U.S. trade balance is caused by an increase in U.S. consumer exports, although U.S. imports also increase.

Table 6. Actual and Estimated Change in U.S. Net Exports with ±10% Change in Economic Freedom in ROW (119 Countries)

	1999		2000	
Actual Exports	664.308		700.100	
Actual Imports	979.810		1174.708	
Actual Net Exports	–315.501		–474.607	
Change in EFWI	+10%	−10%	+10%	−10%
Estimated Exports	726.760	420.838	1,169.033	499.119
Estimated Imports	693.053	603.390	1,152.763	867.612
Estimated Net Exports	33.707	−182.56	16.270	–368.493

Notes: All figures are in billions of U.S. dollars.

These changes reflect only consumer goods and are thereby focused on those goods with the greatest probability of improving consumer welfare in a static or very short term. While the rest of the world gains by exporting more to the U.S. (and other countries) when they are freer, the U.S. (and other countries) also stands to gain by encouraging other countries to improve their economic freedom. We have not controlled for the impact of economic freedom on the GDP or GDP growth of the trading partners included in our sample. To do this would require a panel describing these countries over a sufficiently long period of time such that the relationship between economic freedom and income can be feasibly estimated.

The results contribute to the current debate over the proper "levers" for trade policy of Western countries. While it is clearly important to address tariff and non-tariff barriers to trade, it may be equally important that the U.S. and other countries address other issues not usually considered traditional trade policy levers. Issues such as stable monetary policy, reduced corruption, stable prices, well-established and protected property rights, and a stable banking system would have direct and indirect economic impacts on the U.S. While it is not necessary for other countries to directly imitate the U.S. in all aspects, indeed such imitation may not be feasible or advisable, an improvement in economic freedom in other countries, however obtained, has value to the U.S. much more tangible than the exporting of a particular culture or political prescription.

6. Conclusions

International trade in consumer goods seems naturally predicated upon some level of economic freedom. A lack of economic freedom tends to correlate with limited access to foreign goods, most likely to the benefit of those who hold political power. However, does a lack of economic freedom limit a country's ability to export to the U.S. and other developed countries? Anecdotal evidence suggests that in the absence of political sanctions, exports from less free to more free countries are commonplace. This may be caused by the foreign currency and capital-good demands of foreign governments in countries with highly concentrated political and economic control. Moreover, countries with less economic freedom may place greater focus on maximizing producer surplus (through exports) rather than consumer surplus (which theory suggests is weakly augmented by imports). Therefore, countries with relatively more economic freedom are expected to be able to import more. The more political and economic freedom a country's citizenry enjoys, the more one would expect the U.S. (and other countries) to export to that country, perhaps without a corresponding increase in the level of imports from that country.

We investigate the impact of economic freedom on trade flows by estimating a gravity model including the economic freedom index developed by the Fraser Institute as an explanatory variable. While distance, national income, and the population of other countries have the expected impacts on the total volume of trade with the U.S., we find that economic freedom is strongly correlated with increased trade flows. Tests for asymmetric effects of economic freedom on the level of U.S. exports and imports to and from other countries indicate that freedom has a greater impact on U.S. exports than imports. Finally, we estimate the impact on U.S. trade flows if all countries in the world experienced a 10% improvement/decline in their economic freedom, without specifying how this improvement occurs.

It is clear from the estimates that if the gains to the U.S. are any indication, an improvement in world economic freedom would enhance the exchange of goods and services among the nations of the world, and according to traditional trade theory, such trade is at least weakly welfare enhancing. 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.

Perhaps most important in our analysis is that we look only at consumer imports. The argument that so-called globalization is only a means for developed countries to gain access to natural resource goods in exchange for consumer goods, a rather mercantilistic view of trade, is challenged by our analysis. If developed countries gain at the expense of less developed (typically less economically free) nations, one would expect to see limited increases or perhaps even decreases in the flow of consumer products from other countries to the U.S. However, we find that greater economic freedom tends to increase both the level of exports and imports to and from the U.S. While trade in capital goods may also increase with economic freedom, trade in consumer goods arguably has a more direct impact on the well being of the consumer,

and therefore economic freedom may be construed as a vital ingredient in the improvement of social welfare for many countries.

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