

**Trade Globalization and Political Liberalization:
A Gravity Approach**

Miaojie Yu¹

Department of Economics

University of California-Davis

November 2005

¹ I would like to thank Robert Feenstra, Peter Lindert, Deborah Swenson, Bruce Blonigen and conference participants in the 6th Annual Asian Pacific Rim University Conference for their very helpful comments. All errors are mine. Corresponding address: Room 908, K. K. Leung building, School of Economics and Finance, University of Hong Kong, Pokfulam Road, Hong Kong. E-mail: mjyu@econ.hku.hk. Tel: (+852) 2857-8501.

Trade Globalization and Political Liberalization: A Gravity Approach

[Abstract]

This paper is an empirical investigation on the relationship between trade globalization and political liberalization. The sample is based on 157 countries from years 1957-1998, taking into consideration many social, economic, environmental, geographical, and historical factors. From this, an augmented gravity equation is estimated and evidence is found to support the prediction that political liberalization could discourage trade and trade could foster democracy.

JEL Classifications: F13, F14, P16

Keywords: Trade, Democracy, Gravity equation

1. Introduction

One of the important components of globalization is the rising trade flow. In the last several decades, international trade has grown tremendously and trade liberalization has become an irresistible trend. At the same time, the average democracy level throughout the whole world has improved significantly as shown in Figure 1. The average log real export level increased from 14.02 in 1962 to 16.52 in 1998 and simultaneously, the average democracy level in 157 countries increased from 2.37 in 1962 to 5.41 in 1998². Does this mean trade could foster democracy? Or does democracy increase trade? This paper addresses these questions and discusses the relationship between trade and democracy.

[Insert Figure 1 Here]

To investigate whether or not trade affect democracy and vice versa, a two-way causality between democracy and trade globalization is considered. Economic theory does not tell us anything about the signs of these effects but intuition dictates that democracy could help foster trade, in particular, for developing countries. Political liberalization restricts the ability of a government to use strategic trade policies, such as a variety of trade barriers to earn political support. As such, politicians in labor abundant countries could foster trade policy liberalization as democracy increases (Milner, 2005). Trade policy liberalization may be viewed as synonymous to trade volume globalization. In this sense, political liberalization could increase trade.

However, there is also a possibility for democracy to discourage trade. In

² Data on measuring trade and democracy are from Feenstra (2005) and Marshall-Jagers (2004)

particular, the lengthy debates in the U.S. Congress deter the progress of trade liberalization. One good example was whether the U.S. should grant China, one of its biggest trading partners in the world, permanent normal trade relations in the year 2000. Although the U.S. Congress eventually passed the bill, the issue involved a lot of time and money, gave rise to arguments, and actually created tension that could have led to a “trade war” between the two countries.

Similarly, trade could foster democracy. Trade does not only change the consumption possibility set in trading countries but also creates an important channel for people to communicate ideas. As Lipset (1960) argues, growing communication makes people more aware of different ways of living. As a consequence, the ideas that are dominant in industrialized countries with a higher democracy level could be transmitted to other countries.

However, it is also possible for trade to have a negative impact on democracy. For example, in a labor abundant country with a dictatorial government, workers may be required to work more without extra pay to increase production of trade-related labor-intensive products. As a consequence, the growing GDP will provide an opportunity for the government to maintain and strengthen its political power. In a nutshell, the question as to whether trade fosters democracy and *vice versa* still remains empirical.

Previous studies have mixed findings on how trade affects democracy. For example, Rigobon and Rodrik (2004) found that the trade-GDP ratio has a negative effect on democracy, using a new identification through heteroskedasticity. In contrast,

Lopez, Cordova, and Meissner (2005) found a positive impact of trade on democracy from year 1895 onwards, by adopting a powerful series of instrumental variables introduced by Frankel and Romer (1999) and also Rose (2004).

In sum, very few works have considered the application of reverse causality. This is not a big surprise since researchers face an immediate difficulty in finding good instruments for democracy. Many economic variables affect not only democracy but also trade. Hence, they do not qualify as instrumental variables. It is difficult to find a variable that affects democracy alone and not trade. One exception is the study by Acemoglu, Johnson, and Robinson (2001). They estimated the impact of institution on incomes, using as instruments the morality rates of bishops, soldiers, and sailors during the time of the early European colonists. However, the instruments used in that paper are good for identifying the effect of “protection against expropriation risk” on GDP, but they are not necessarily an ideal proxy to identify the effect of democracy on trade. Milner (2005) considered how democracy affects trade policy in developing countries. She used a percentage of competing secondary schools as one of the instruments of democracy by showing that the correlation between trade policy and the competing secondary schools is low. However, if we use trade volume as a proxy for globalization, a percentage of competing schools may be inappropriate as an instrument. Although education level is an important indicator of skilled labor, previous studies have already found evidence that trade also has a strong relationship with skilled labor (Feenstra and Hanson, 1996). Hence, another contribution of this paper is to introduce new valid instruments to estimate the effect of democracy on

trade.

In a nutshell, this paper will empirically explore the relationship between trade globalization and political liberalization. To investigate trade pattern, I used a revised version of the gravity equation, which means that bilateral trade volume is directly affected by the countries' GDP levels and also by other factors such as transportation costs, geographic characteristics, and social-economic factors. Recent studies (Rose 2004, Subramanian and Wei, 2003) found mixed evidence on the impact of membership to GATT/WTO on trade. Thus, this paper also intensively investigates the impact of membership to GATT/WTO.

Besides these, environmental regulations may also play an important role in determining trade pattern. Developing countries have loose environmental regulation policies. As a consequence, dirty industries in industrial countries prefer to migrate to developing countries to avoid stricter regulations in their own countries. In other words, different environmental policies among countries generate a "pollution haven" for industrial countries and affect international trade patterns as well. If this hypothesis holds true, one can expect that the worse the environmental quality is, the more trade exists between the country and its trading partners. Therefore, to fully explore the relationship between trade and democracy, environmental quality should also be considered.

The rest of this paper is organized as follows. The next section describes the empirical methodology. Section 3 describes the data gathered, followed by the estimation results in Section 4. Finally, Section 5 contains a brief summary of the

study.

2. Empirical Methodology

A two-step procedure is adopted in this study. First, in the benchmark estimation, an investigation is made to find out how political liberalization (i.e., democracy) affects trade. A linear system of simultaneous system estimations (SEMs) is then also used, in which trade and democracy are treated as endogenous. This implies that trade could affect democracy and vice versa.

A revised gravity equation is applied in the benchmark estimation. Gravity equation means that bilateral trade volume is directly proportional to trading countries' GDP. In other words, larger countries trade more. Previous works found that the gravity approach works well in explaining trade volume. Since the goal of the study is to estimate the effect of democracy on trade, each country's democracy level is added to the traditional gravity estimation, when controlling for environmental factors. Precisely, the first specification is of the following form:

$$\begin{aligned} \lg X_{ijt} = & \beta_0 + \beta_1 \cdot Polity_{it} + \beta_2 \cdot Polity_{jt} + \beta_3 \cdot CO2_{it} + \beta_4 \cdot CO2_{jt} + \beta_5 CO2pc_{it} \\ & + \beta_6 CO2pc_{jt} + \beta_7 \cdot both_t + \beta_8 \cdot one_t + \theta \cdot Z_{ijt} + \gamma \cdot R_{ijt} + \alpha_{ij} + \varphi_t + \varepsilon_{ijt} \quad (1), \end{aligned}$$

where the regressand, $\lg X_{ijt}$, is the log real export from country i to country j at year t . Regressors are defined as:

- Political liberalization level in country i and country j : $Polity_{it}$ and $Polity_{jt}$.
- Environmental quality variables: $CO2$ denotes emission level of carbon dioxide and $CO2pc$ is the emission level of carbon dioxide per capita.
- WTO membership in two countries: $both$ means both countries are members

of WTO, *one* means only one country is a member of WTO.

- Z_{ijt} denotes a variety of socio-economic variables, which are directly adapted from Rose (2004), such as logarithm of GDP and GDP per capita of exporting and importing countries, greater circle distance between two countries, logarithm land area of each country, dummies for colonial link and language, shared borders, currency, island, landlocked countries.
- R_{ijt} is a variety of regional trade agreements, such as FTA (Free Trade Agreement), GSP (Generalized System of Preferences), NAFTA (North American Free Trade Agreement), CARICOM (Caribbean Community and Common Market), PATCRA (Papua New Guinea Trade and Commercial Relations Agreement), CAPM (Central American Common Market), MERCOSUR (Common Market of the South), ASEAN (Association of South East Asian Nations), and SPARTECA (South Pacific Regional Trade and Economic Cooperation Agreement).

Finally, assuming the error term is well-behaved, the disturbances are decomposed into trading countries fixed effect, time-specific fixed effect and also idiosyncratic effect given the data here are a panel. My main interests for this estimation are the signs of β_1 and β_2 .

To mitigate the possible problem of endogeneity due to the omitted variables in (1), the Two-Stage Least Square (2SLS) estimation is also applied. The instruments for the democracy variables are judicial independence and death penalty abolishment for both trading countries (exporter and importer).

Intuitively, judicial independence is a good instrument. It is an excellent index for the democracy level of a country because the more democracy there is, the more judicial independence exists. Also, the judicial independence of a country does not have a strong link to its trade volume. A similar argument applies to the dummy index of the death penalty abolishment. Whether a country has abolished the death penalty or not does not affect trade directly, yet it is an important indicator to measure the democracy level in a country. The detailed technique to construct the dummy variable of the death penalty will be discussed in the next section.

Even though democracy could increase trade, a reverse causality might exist and trade could affect democracy as well. To completely explore the relationship between trade and democracy, the reduced form used above might be insufficient. Thus, a linear system of SEM is used to construct a structural form of estimations:

$$\begin{aligned} \lg X_{ijt} = & \beta_0 + \beta_1 \cdot Polity_{it} + \beta_2 \cdot Polity_{jt} + \beta_3 \cdot CO2_{it} + \beta_4 \cdot CO2_{jt} + \beta_5 \cdot CO2pc_{it} \\ & + \beta_6 \cdot CO2pc_{jt} + \beta_7 \cdot both_t + \beta_8 \cdot one_t + \theta \cdot Z_{ijt} + \gamma \cdot R_{ijt} + \varepsilon_{ijt} \end{aligned} \quad (2A),$$

and

$$\begin{aligned} \lg Polity_{it} = & \gamma_0 + \gamma_1 \cdot \lg X_{ijt} + \gamma_2 \cdot penalty_{it} + \gamma_3 \cdot legal_{it} + \gamma_4 \cdot CO2_{it} + \gamma_5 \cdot CO2_{jt} \\ & + \gamma_6 \cdot CO2pc_{it} + \gamma_7 \cdot CO2pc_{jt} + \theta^* Z_{ijt}^* + \varepsilon_{ijt}^* \end{aligned} \quad (2B).$$

In this SEM, we have two endogenous variables: a country's export volume and its democracy level. (2A) is identical to the previous estimation. (2B) includes two new variables that are not apparent in (2A): $penalty_{it}$ and $legal_{it}$, which determine whether a country abolished death penalty (affirmative is 1 and negative is 0) and whether there is judicial independence in the export country i , respectively. The social variables

(Z_{ijt}^*) in (2B) include whether both countries use a common language, whether they were related to a common colony and whether they still are a colony of some other country. Error terms in each equation characterize its idiosyncratic effects, respectively.

Compared to (2A), some economic variables are not included in (2B). These include log product of GDP and GDP per capita level, WTO membership, regional trade agreement dummy, and many social and geographical variables. The reason for this strategy is because there is no clear relationship between the GDP level and the democracy level. Larger countries do not necessarily have a higher democracy level. Geographic variables are not included since they are not directly related to democracy though they are important regressors of trade volume. Meanwhile, environmental quality is included in (2B) since it is still not clear whether environmental quality has an effect on democracy.

My main interests for this SEM are the signs of the coefficients of β_1 , β_2 , and γ_1 . Since the error terms in the SEM, generally speaking, are correlated with the dependent variables, the estimated coefficients using conventional methods, such as the Ordinary Least Square (OLS) and the Generalized Least Square (GLS), will be inconsistent. Instead, Three-Stage Least Square (3SLS) is an appropriate method to estimate it when the ordering condition and the rank condition are satisfied (Wooldridge, 2002). After checking these two conditions, I am confident to use 3SLS to estimate this SEM.

3. Data Description

This paper uses a large panel data set which covers 157 Fund member countries during the years 1962 to 1998. The data used include aggregate trade volume, democracy level, environmental quality, as well as many social, cultural, geographical, and historical characteristics.

Data on trade volume can be accessed from Feenstra *et al.* (2005). To measure a country's democracy level, the *Polity* index from Marshall-Jaggers (2004)'s Polity IV project was used. Precisely, the *Polity* variable is defined as the difference between the democracy indicator and the authoritarian indicator. Since each indicator is an additive eleven-point scale (0-10), the variable *Polity* is scaled between -10 and 10 consequently. The higher the number is, the higher the political liberalization level is.

The emission level of carbon dioxide is used as an indicator of environmental quality. This data can be accessed from World Development Indicators (henceforth, WDI) CD-Rom (2002). Besides this, all socio-economic data are directly from Rose (2004).

For the instruments of democracy, the data on the death penalty are from Amnesty International (2005). Precisely, four different groups for the regulation of the death penalty are employed: absolutely outlawed, allowed in extreme case, De Facto Ban on Death Penalty (i.e., death penalty is sanctioned by law but has not been the practice for ten or more years), and death penalty permitted. For example, during 2004, more than 3,797 people were executed in 25 countries, and more than 7,395 people were sentenced to death in 64 countries. Thus, a dummy variable is constructed in this way:

the score is *zero* if the death penalty is allowed at a particular year in a country; the score is *one* for the first three cases of death penalty.

Data on judicial independence for trading countries can be referred to from Gwartney and Lawson's (2005) "Economic Freedom of the World". It is also an additive scale between 0 and 10 and spans every five years from year 1970 to 2000. Under this restriction, the number of observations for 3SLS estimates goes down from 157,571 to 14,995.

For the validity of the instruments, the dummy of death penalty abolishment and judicial independence are relatively highly correlated to democracy, but weakly related to trade. Two variables appear valid when checking the t-statistics and F-statistics in the first-stage estimates.

Table 1 describes the basis for statistics. For the use of sensitivity analysis, the 157 countries are classified into five different income groups according to the World Bank's criteria: low income, lower middle income, upper middle, high income non-OECD, and high income OECD countries. On the other hand, the countries can also be grouped into seven geographical regions: East Asia, South Asia, Mid-east and North Africa, Sub-Saharan, European, North America, Latin American and the Caribbean countries.

[Insert Table 1 Here]

4. Estimation Results

A. Benchmark Estimates

Table 2 covers benchmark estimates of the impact of democracy on trade, using the fixed effects (“within-effect”) and the 2SLS methods. The baseline estimations are as expected. First, all estimates show that trade volume has significantly positive correlation with the trading countries’ GDP and the number of the countries’ islands; but it has significantly negative correlation with the greater circle distance and number of landlocked countries. These make much economic sense since larger countries trade more and countries which are closer to one another trade more since they have relatively low transportation costs. Countries which are far from the seaports suffer from inconvenient transportation. Trade is also directly proportional to GDP per capita of trading partners, though it is statistically insignificant at conventional levels. This means that richer countries trade more. To sum up, the augmented gravity equation used here works well and the findings of this study are consistent with those of Frankel-Romer (1999) and Rose (2004).

[Insert Table 2 Here]

Another question that needs clarification is, “Does democracy increase trade significantly?” Based on estimates, the answer is negative. For the fixed effect estimation, as column (1) of Table 2 shows, the impact of the exporter’s democracy on trade volume (log real export) is close to zero and is thus insignificant. Similarly, the impact of the importer’s democracy on trade volume is very small and insignificant. These estimates are robust even when year effect is included, as shown in column (2). The impact of the exporter’s democracy on trade is still very close to zero. Likewise, the coefficient of the importer’s democracy is also very small though it is significantly

at the 5% level for a two-tailed test.

In the meantime, the impact of environmental quality on trade is ambiguous. At first glance on the carbon dioxide emission for trading countries, the impact of environmental quality on trade is negative and statistically significant; worse environmental quality is related to larger trade volume. This is consistent with the “pollution haven hypothesis”. Yet, reverse evidence is observed when the emission per-capita is taken into account.

The last interest of this study is to discuss the effect of memberships to GATT/WTO. As columns (1) and (2) in Table 2 show, the coefficients of memberships to GATT/WTO (*both* and *one* in the table) are positive and statistically significant. GATT/WTO promotes trade strongly, using the augmented gravity equation. This finding is consistent with Subramanian and Wei (2003).

The rest of Table 2 contains the TSLS estimations, serving as robustness check. Column (3) excludes year-specific effect while column (4) includes this effect. In a nutshell, both estimates show that the democracy in trading partners does not have impact on trade. Also, it is not necessary to have a strong link between environmental quality and trade volume. Furthermore, membership to GATT/WTO strongly encourages trade.

B. Core Estimates

Table 3 reports the core results of the paper, using the estimations of system of simultaneous equations (SEM). The first equation of the system considers the effect of

democracy on trade; conversely, the second one measures the effect of trade on democracy.

From the estimations given, we find that democracy does not foster trade. The democracy variables for both trading countries have very small negative coefficients. Precisely, the effect of the exporter's democracy on trade is also statistically significant. These empirical findings are strong when considering time-specific effect. They suggest that the impact of democracy on trade is negative, if any. Furthermore, political liberalization actually hinders trade. The lengthy debates in U.S. Congress increased the opportunity cost of international trade. Even in the developing countries, although democracy could restrict the ability of the government to use strategic trade policies to earn political support, it is also possible that a myopic protectionist legislature could make a pro-trade government's policy impotent.

On the other hand, we find that trade fosters democracy. The estimates of the second equation of the SEM, with and without the time-specific effect, suggest that trade has a significant positive effect on democracy. Specifically, the semi-elasticity of trade on exporter's democracy is $\partial \lg Polity_{it} / \partial Export_{it} = 0.55$. If the year-specific effect is considered, then the semi-elasticity reduces to 0.45. Both are significant at 1% level.

These estimations suggest that trade fosters democracy while the reserve effect is insignificant. Trade globalization not only extends people's consumption bundles, but also creates an important channel to let people understand different cultures. The ideology and culture in the developed countries, which generally have higher

democracy level, could be transmitted to their trading partners, particularly for the developing countries. Thus, as a consequence, democracy level in the developing countries might increase due to the growing trade flow.

Two other interests remain. In this SEM estimates, membership to WTO has a strong positive effect on trade.. This is exactly consistent with the previous findings in the benchmark estimation. On the other hand, the effect of environmental quality on trade is ambiguous. In other words, if carbon dioxide emission is an appropriate proxy for environmental quality, then one cannot find strong evidence for the “Pollution Haven Hypothesis” in these estimations.

C. Robustness Check

Results reported in Table 3 are based on the data set for 157 countries. Are they still valid when the scopes are restricted in different income groups? To find the answer to this, the countries are classified into five income groups using the World Bank’s classification: low income countries, lower middle countries, upper middle countries, high income non-OECD countries, and high income OECD countries.

[Insert Table 3 Here]

Table 4 contains the estimated results which vary by different income class. Previous results are strongly supported for the estimations without year-effect. Precisely, results from the high-income OECD countries are the same with the previous findings: democracy has negative effect on trade, while trade has positive effect on democracy. When year-effect is included in the estimations, the signs of high-income non-OECD and upper-middle income countries change and become

insignificant at the conventional level. Interestingly, the impact of trade on democracy also changes its sign for low and lower-middle income countries.

[Insert Table 4 Here]

Table 5 shows the estimation results varied by geographical regions. One striking finding is for the East Asian countries: democracy fosters trade and simultaneously, trade encourages democracy. The SEM is also statistically significant for both modules. This is because most East Asian countries are developing countries. As argued by Milner (2005), political liberalization pushes government toward free trade for more political support, particularly for labor-abundant countries. Simultaneously, people in these countries are also aware of different ideologies transmitted in developed countries via international trade.

[Insert Table 5 Here]

5. Conclusions

Based on a revised gravity approach, trade globalization could foster democracy whereas democracy does not have a significant effect on trade, controlling for many other factors such as GATT/WTO membership, environmental quality, and many other related socio-economic factors.

Besides this, two other interesting findings are presented in this paper. First, the membership to GATT/WTO could increase trade when democracy and environmental issues are considered. Second, the effect of environmental quality on trade is mixed. In other words, there is no strong evidence to support the “pollution haven hypothesis”.

Reference:

- Amnesty International (2005), Working to Project Human Rights Worldwide, online documentary archive: <http://web.amnesty.org/pages/deathpenalty-index-eng>.
- Anderson, J. and E. van Wincoop (2003), Gravity with Gravititas: A Solution to the Border Puzzle, *American Economic Review*, 93 (1), pp.170-192.
- Acemoglu D., S. Johnson, and J.A. Robinson (2001), The Colonial Origins of Comparative Development: An Empirical Investigation, *American Economic Review*, 91 (5), pp.1369-1401.
- Feenstra, R., (2004), *Advanced International Trade: Theory and Evidence* (Princeton Press).
- Feenstra, R. and G. Hanson (1996), Foreign Investment, Outsourcing, and Relative Wages, in: R. C. Feenstra, G. M. Grossman and D. A. Irwin (Eds) *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*, Cambridge: MIT Press
- Feenstra, R. R. Lipsey, H. Deng, A. Ma and H. Mo, (2005), World Trade Flow: 1962-2000, NBER Working Paper, No. 11040.
- Frankel, A. and D. Romer (1999), Does Trade Cause Growth? *American Economic Review*, 89 (3), pp.379-399.
- Gwartney J. and R. Lawson (2005), *Economic Freedom of the World: 2004 Annual Report*, Cato Institute, Washington D.C.
- Helpman, E. (1987), Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries, *Journal of the Japanese and International*

- Economics* 1, pp.62-81.
- Lipset, S. M. (1960), *Political Man-the Social Bases of Politics*, Garden City: Doubleday & Company.
- Lopez-Cordova, E. and C. Meissner (2005), The Globalization of Trade with Democracy, 1870-2000, NBER working paper, No.11117.
- Marshall, M. and K. Jaggers (2004), POLITY IV Project: Political Regime Characteristics and Transitions, 1800-2002, University of Maryland, College Park.
- McCallum, J. (1995), National Borders Matter, *American Economic Review*, 85, pp.615-23.
- Milner, H. (2005), Why the Move to Free Trade? Democracy and Trade Policy in the Developing Countries, *International Organization*, 59, pp. 157-193.
- Rigobon, F. and D. Rodrik (2004), Rule of Law, Democracy, Openness, and Income: Estimating the Interrelationships, NBER Working Paper, No.10750.
- Rose, A. K.(2004), Do We Really Know that the WTO increases Trade, *American Economic Review*, March 2004, 94(1), pp. 98-114.
- Rose, A. K. (2002b), Do WTO Members have More Liberal Trade Policy? NBER working paper, No. 9347.
- Subramanian A. and S. Wei (2003), The WTO Promotes Trade, Strongly but Unevenly, NBER working paper, No. 10024.
- Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press.
- World Bank (2002), *World Development Indicator*, CD-Rom, version: 2002.

Table 1: Descriptive Statistics of Variables

Variable List	Mean	Std. Dev.	Min	Max
Log Exports	15.24	3.15	6.90	25.91
Exporter's Democracy	2.20	7.85	-10	10
Importer's Democracy	1.74	7.91	-10	10
Exporter's CO2 Emissions	.98	1.20	-.89	13.01
Importer's CO2 Emissions	.95	1.13	-.89	12.01
Dummy of Death Penalty Abolishment for Exporter	.60	.49	0	1
Exporter's Judicial Independence	5.50	1.89	1.15	9.6
Log product GDP	48.95	2.36	38.84	59.05
Log product GDP p/c	16.39	1.39	10.22	21.37
Log distance	8.17	.79	4.02	9.42
Common Language	.20	.40	0	1
Common Colony	.06	.24	0	1
Current Colony	.00	.03	0	1
Ever Colony	.02	.15	0	1
Free Trade Area	.01	.11	0	1
Granting GSP	.33	.47	0	1
Currency Union	.01	.09	0	1
Land Border	.03	.17	0	1
Number Landlocked	.22	.45	0	2
Number Islands	.27	.49	0	2
Log product land area	24.87	2.87	10.50	32.20
Income Class				
Low Income Countries	.08	.27	0	1
Lower Middle Income Countries	.14	.34	0	1
Upper Middle Income Countries	.16	.36	0	1
High Income Non-OECD Countries	.76	.27	0	1
High Income OECD Countries	.55	.50	0	1
Different Regions				
East Asian Countries	.16	.36	0	1
South Asian Countries	.03	.17	0	1
Mid-east and North Africa Countries	.07	.26	0	1
Sub-Saharan Countries	.05	.22	0	1
European Countries	.50	.50	0	1
North American Countries	.04	.20	0	1
Latin American and Caribbean Countries	.15	.36	0	1

Note: 157,571 observations from year 1962 to year 1998. For data on dummy of death penalty abolishment and judicial independence, variables across regions and income level, we have 14,995 observations, spanning every 5 years between 1970 and 2000. Sources: Amnesty International (2005), Feenstra *et al.* (2005), Rose (2004) and WDI (2002).

Table 2: Effect of Democracy on Trade: Fixed Effects and 2SLS Estimates

Log Real Export	Fixed Effects		2SLS	
	(1) no year effect	(2) year effect	(3) no year effect	(4) year effect
Exporter's Democracy	.00 (.39)	.00 (1.01)	-.02 (.70)	.02 (.09)
Importer's Democracy	.00 (1.06)	.01* (1.80)	.06 (.46)	.01 (.67)
Exporter's CO2 Emissions	.12** (4.13)	.15** (4.82)	.12** (4.17)	.15** (4.82)
Importer's CO2 Emissions	.12** (4.16)	.14** (4.75)	.12** (4.13)	.14** (4.75)
Exporter's CO2 Emissions per capita	-.13 (1.35)	-.02** (2.36)	-.02 (1.46)	-.03* (1.88)
Importer's CO2 Emissions per capita	-.02** (2.44)	-.03** (3.33)	-.03** (2.53)	-.03** (3.24)
Both in WTO	.55** (4.29)	.56** (4.37)	.64** (3.64)	.56** (3.46)
One in WTO	.50** (4.16)	.49** (4.04)	.56** (3.92)	.49** (3.49)
Log GDP of Exporter	1.68** (8.92)	2.06** (9.10)	.79** (3.25)	2.17** (9.48)
Log GDP of Importer	1.35** (7.18)	1.75** (7.73)	1.82** (6.98)	1.84** (8.05)
Log GDP per capita of Exporter	.25 (1.03)	.28 (1.11)	.26 (1.07)	.28 (1.08)
Log GDP per capita of Importer	.29 (1.19)	.31 (1.24)	.16 (.55)	.31 (1.14)
Free Trade Area		.18 (1.37)	.14 (1.02)	.18 (1.32)
Granting GSP		.33** (3.54)	.30** (3.23)	.33** (3.53)
Number of Observations	14,995	14,995	14,995	14,995
Number of Groups	3816	3816	3816	3816
R-square	.45	.46	.44	.47
Prob.>F or Prob.> χ^2	.000	.000	.000	.000

Note: Regressand: Log real export. Double stars and single star mean significance at 1% and 5% level for a two-tailed test. Z-statistics are in parenthesis and clustered by trading countries' pair-id. Year's coefficients are not reported here. For the 2SLS estimations, the instruments for the endogenous variable (exporter's democracy) are the dummy of death penalty abolishment and judicial independence index. We find that these two instruments are not weak by checking the first-stage estimates.

Table 3: 3SLS Estimations of System of Simultaneous Equations (Core Results)

Regressand Regressors	Log Real Trade		Democracy of Exporter	
	No Year Effect	Year Effect	No Year Effect	Year Effect
Log Real Trade			.55** (19.44)	.45** (18.29)
Democracy_ Exporter	-.10** (3.19)	-.06** (2.09)		
Democracy_ Importer	-.00 (.51)	-.01 (1.60)		
Dummy of Death Penalty Abolishment			2.65** (25.78)	2.35** (23.45)
_ Exporter Judicial			.45** (17.04)	.30** (11.55)
Independence_ Exporter				
CO2 Emissions _ Exporter	-.09** (5.22)	.00 (.24)	-1.30 (29.45)	-1.47** (33.53)
CO2 Emissions _ Importer	-.13** (9.79)	-.08** (6.01)	.41** (11.21)	.30** (8.54)
CO2 Emissions per capita_ Exporter	-.00 (.20)	.04** (7.76)	.30** (27.97)	.29** (28.50)
CO2 Emissions per capita_ Importer	.01** (.92)	-.02 (1.24)	-.15** (14.36)	-.41** (2.21)
Both in WTO	.86** (4.57)	.93** (4.51)		
One in WTO	.51** (4.10)	.60** (3.91)		
Log GDP_ Exporter	1.82** (23.67)	2.10** (49.01)		
Log GDP_ Importer	1.64** (26.93)	1.91** (60.36)		
Log GDP per capita _ Exporter	1.91** (4.73)	1.87** (4.78)		
Log GDP per capita _ Importer	.10 (1.60)	.62** (9.54)		
# of Observations	14,995	14,995	14,995	14,995
R-Square	.62	.22	.64	.27
Root Mean Square Error	1.75	5.91	1.70	5.75
Prob.>chi-square	.000	.000	.000	.000

Note: T-statistics in parenthesis (two-tail test). Double stars and single star mean significance at 1% and 5% level for a two-tailed test, respectively. In the regression of log trade, coefficients of geographic and social variables, such as common language, common colony, ever colony, free trade area, granting GSP, current union, land border, number landlocked, number islands and log products land area are not reported inside the table.

Table 4: Estimates Varied by Income Class

Regressand	Effect of Exporter's Democracy level on Log Real Trade		Effect of Log Real Trade on Democracy of Exporter	
	No Year Effect	Year Effect	No Year Effect	Year Effect
Income Groups				
High Income OECD Countries	-.32 (4.73)	-.27** (4.54)	.56** (20.97)	.45** (16.79)
High Income Non-OECD Countries	-.00 (.08)	.03 (.48)	-.00 (.07)	.07 (.61)
Upper Middle Income Countries	-.04 (.74)	.07* (1.66)	.77** (9.24)	.16** (2.51)
Low Income Countries	-.03 (.54)	-.04 (.56)	.18 (1.60)	-.20** (2.00)
Lower Middle Countries	-.07 (.74)	-.08 (.50)	.43** (4.39)	-.41** (4.54)

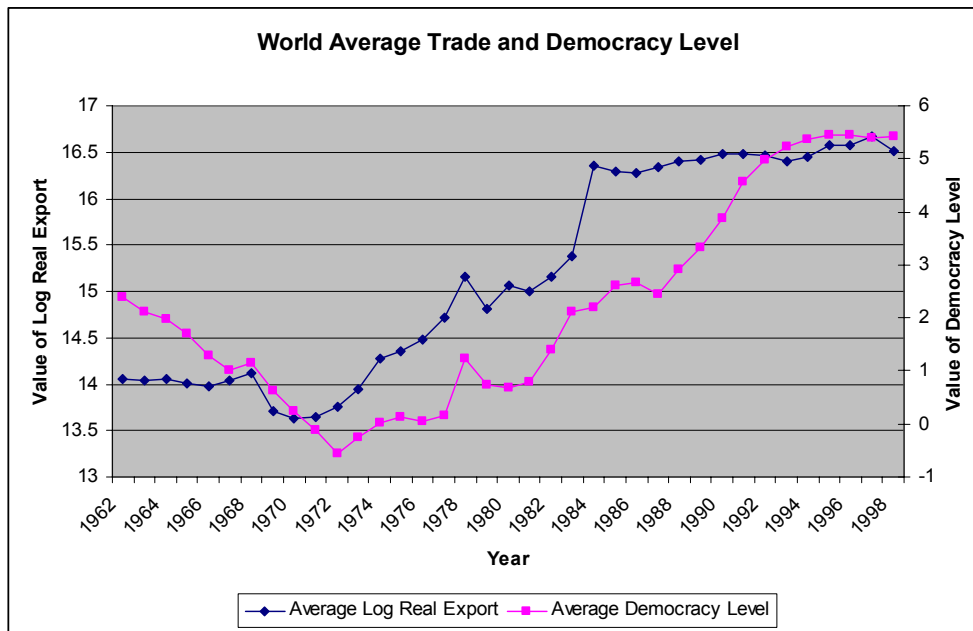
Notes: Numbers in parenthesis are z-values. Double stars and single star mean significance at 1% and 5% level for a two-tailed test, respectively.

Table 5: Estimates Varied by Regions

Regressand	Effect of Exporter's Democracy level on Log Real Trade		Effect of Log Real Trade on Democracy of Exporter	
	No Year Effect	Year Effect	No Year Effect	Year Effect
Income Groups				
East Asian Countries	.82** (11.24)	1.21** (9.92)	.51** (8.62)	.58** (10.08)
Southern Asian Countries	.07 (.73)	.19 (1.30)	.44** (2.43)	-.32** (2.19)
European Countries	.08** (2.28)	-.02 (.48)	.47** (13.82)	.38** (12.34)
Sub-Saharan Countries	.04 (1.14)	.10* (1.83)	-.59** (3.71)	-.46** (3.67)
Middle East or North Africa Countries	-.12** (2.25)	-.16** (2.36)	.48** (1.97)	.10 (.61)
Latin American or Caribbean Countries	-.06 (1.10)	.29 (.60)	.74** (9.41)	-.05 (.73)
North American Countries	.22 (1.34)	-.12 (.51)	1.23** (11.46)	1.08** (10.14)

Notes: Numbers in parenthesis are z-values. Double stars and single star mean significance at 1% and 5% level for a two-tailed test, respectively.

Figure1: Trends of World Trade Flow and Democracy Level



Notes: Data comes from various sources described in the paper.