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The Political Economics of International Trade:

The Impact of Institutions, Governance Quality, and Public Spending

DISSERTATION

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By

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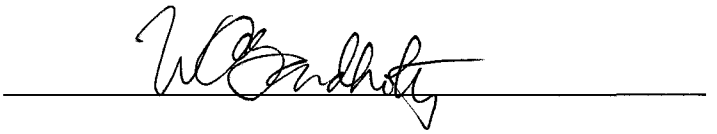

Professor Wayne Sandholtz, Chair

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University of California, Irvine

2009

DEDICATION

To

My loving, patient, and understanding wife

My mother for encouraging me to think creatively

With a deep intellectual gratitude to and inspiration to James Rosenau

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I am thankful and indebted to my committee who provided continual guidance and encouragement while also correcting and challenging me to improve my work.

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ABSTRACT OF THE DISSERTATION

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Christopher Balding

Doctor of Philosophy in Political Science

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Professor Wayne Sandholtz, Chair

An understudied area of international trade is the role politics plays in impacting trade levels between states. Politics as used here can comprise a broad array of non-economic factors including institutions, governments, public spending that relate to the governance of a state or agreements between states. Economists in recent years have begun exploring in much greater detail the link between politics and economics, leading to many insights into political science, institutions, economic growth, questions of equity, and corruption, among others. Recent research on the political economics of international trade has tended to focus more on interest group formation and influence on trade policy. However, significant gaps remain beyond the role of interest groups in formulating trade policy.

A major question of interest to political scientists and economists involves the impact of governance structures on the international economy. The role of domestic and international governance structures and behavior on international trade in many areas remain an open question. Specifically, the impact of democracy, international

institutions, and government spending on international trade remains unanswered, but of interest to political scientists interested in questions of globalization and economists interested in political variables. My research specifically targets three levels of political variables and their impact on international trade. First, I study the role of international institutions via the impact of the World Trade Organization (WTO) on trade. Second, I study the role of state level democracy and governance and their impact on international trade. Third, I study the behavior of government via spending patterns and their role in China on the international trading patterns of provinces. While the importance of understanding the theory and empirics of international trade, the impact of domestic and international institutions and governance plays a significant role in creating the incentives to promote international trade.

Chapter 1

The Political Economics of International Trade

An understudied area of international trade is the role politics plays in impacting trade levels between states. Politics as used here can comprise a broad array of non-economic factors including institutions, governments, public spending that relate to the governance of a state or agreements between states. Economists in recent years have begun exploring in much greater detail the link between politics and economics leading to many insights into political science, institutions, economic growth, questions of equity, and corruption among others (Persson and Tabellini 2000, Mueller 2003, and Acemoglu and Robinson 2006). Recent research on the political economics of international trade has tended to focus more on interest group formation and influence on trade policy (Kono 2006). However, significant gaps remain beyond the role of interest groups in formulating trade policy.

A major question of interest to political scientists and economists involves the impact of governance structures on the international economy. The role of domestic and international governance structures and behavior on international trade in many areas remain an open question. Specifically, the impact of democracy, international institutions, and government spending on international trade remains unanswered, but of interest to political scientists interested in questions of globalization and economists interested in political variables. My research specifically targets three levels of political variables and their impact on

international trade. First, I study the role of international institutions via the impact of the World Trade Organization (WTO) on trade. Second, I study the role of state level democracy and governance and their impact on international trade. Third, I study the behavior of government via spending patterns and their role in China on the international trading patterns of provinces. While the importance of understanding the theory and empirics of international trade, the impact of domestic and international institutions and governance plays a significant role in creating the incentives to promote international trade. I divide the remainder of the paper into three sections. First, I analyze my work on the impact of the WTO on international trade levels. Second, I study the impact of democracy and trade on international trade. Third, I summarize my work on the role of central government spending in promoting international trade in Chinese provinces.

Joining the WTO: What is the Impact

The World Trade Organization (WTO) is a controversial organization. Supporters of the WTO argue that it will promote growth and prosperity through increased international trade. Critics of the WTO argue that is has systematically favored rich countries while failing to increase trade. No systematic evidence of its impact existed until Andrew Rose produced research demonstrating that the WTO had no economically or statistically significant

impact on international trade (Rose 2004a 2004b). Using an extensive bilateral gravity trading model covering most countries and years from 1950 to 1999, the Rose results fail to find any WTO impact on trade. These findings prompted additional research by others. Subramanian and Wei, using a variation of the Rose data, but making some key methodological changes and definitional changes, find that the WTO increases trade, but unevenly across countries (Subramanian and Wei 2007). Others used different definitions of who joined the WTO and when they joined to produce different results (Tomz, Goldstein, and Rivers 2007). Research had previously focused on legal and political aspects of the WTO or the theoretical economic implications of the WTO, but Rose produced the first systematic study of the impact of the WTO. Though subsequent research calls into question the Rose results, his research prompted serious research on the impact of the WTO on its most fundamental mission of promoting international trade.

The Balding research demonstrates that the WTO does have an economically and statistically significant impact. However, the Balding research while refuting the Rose results, provides a number of advances to better estimate the impact of the WTO. First, the Balding research most closely adheres to the Rose use of data. Subramanian and Wei and Tomz et al. use derivations of the Rose data such as cross sections, Balding uses the Rose data in its entirety. Second, Balding decomposes the single Rose dependent variable of total bilateral

trade into two observations of trade in each direction, or imports and exports. This decomposition of the dependent variable into two observations of the dependent variable provides a much larger data set and allows improved detail the impact of the WTO on trade flows between countries. Third, Balding, like Subramanian and Wei, uses a comprehensive set of fixed year, importer, and exporter effects. Research indicates the use of the gravity model without fixed year, importer, and exporter effects may overestimate the coefficient values. The first example of this estimation problem was McCallum estimating an 1100% difference in trade between Canadian provinces and United States states due to the border (McCallum 1995). Subsequent research into improved estimation techniques of the gravity model, confirm the use of fixed year, importer, and exporter effects to counteract the tendency to overestimate key coefficients.

The Balding research, however, reconciles the key discrepancies between Rose and the Subramanian and Wei results. This reconciliation comes through a number of key findings. First, while the WTO does increase trade, its impact is not uniform across countries. This finding supports the Subramanian and Wei finding, but also provides some support to the Rose argument in that many countries experience no significant impact on trade. Second, by decomposing the Rose dependent variable of total real trade into two observations of trade for directional flow, Balding provides additional detail into the impact of the WTO on how trade flows. Balding finds the WTO has an uneven impact on imports

and exports potentially causing the lack of significance in total real trade results found by Rose. Balding found that while exports increase when joining the WTO, imports either remained steady or declined. Though counterintuitive, due to long phase out periods for import restrictions but near instantaneous export access, the WTO can have a divergent impact on total trade in the short and near term. Third, Balding results find that countries that benefit from WTO membership also undertake additional economic reforms designed to support openness and economic growth. Balding provides numerous examples of countries that joined the WTO and saw no impact on their trading levels. Conversely, countries such as Ireland, studied most closely, joined the WTO and undertook a series of economic reforms benefited substantially from WTO membership. While the exact economic causes remain difficult to disentangle, the impact of additional economic reforms cannot be under estimated. Balding builds upon the Rose results and reconciles them with Subramanian and Wei in a way that adds to the knowledge of the WTO to impact trade.

The Impact of Democracy and Governance on Trade

The second Balding paper focuses on the impact of democracy and governance on international trade flows. Though the impact of democracy on international trade has been studied extensively before, Balding made a number of key improvements to previous results (Gowa and Mansfield 1993, Long 2003,

Dai 2006, Dixon and Moon 1993, Bliss and Russett 1998, and Li and Reuveny 2003). First, Balding uses the largest and most extensive dataset used in the study of democracy and international trade. Previous studies on the impact of democracy on trade had used datasets as small as trading within Western Europe, failing to include a larger range of democratic and autocratic states (Morrow, Siverson, and Tabares 1998). By using a larger dataset with more countries over a large time period, Balding can better study the impact of democracy across states and time. Second, Balding uses a broader set of democratic variables to study the impact on trade. Political scientists and economists have created a wide range of variables that attempt to reflect the democratic qualities of a government, but also newer instrumental and proxy variables that measure a broader array of useful governance indicators. The use of broader measurements of governance, management, and institutional controls and power allow greater specificity into the role of democracy in trade. Third, as in the Rose paper, Balding decomposes total real trade into a two way observation which allows the isolation of democracy on imports and exports. The isolation of the impact of democracy on specific trade flows permits increased specificity not previously allowed. The advances put forth in the Balding research improve the sample quality and level of detail on how democracy impacts international trade.

The Balding research provides evidence that broad measures of democracy may not best capture its impact on trade, while narrower variables provide better evidence of significance. Balding makes a number of advances to the previous literature. First, broad measures of democracy, primarily from the Polity IV variables, demonstrate no economic or statistical significance. Broad measures of democracy approach zero with little to no economic significance, even when segmenting the data instead of using broader country and time samples. The failure of democratic variables to provide economic or statistical significance may be due to human counting of unquantifiable measurements or it may simply stem from the broad array of democracies and special features of each. More specific variables such as institutional controls and quality of governance demonstrate more consistent economic and statistical significance. Second, Balding provides evidence that refutes the idea that opening up the political process will open up international trade. Theoretical models and empirical results demonstrate that democracy may hinder trade openness and the Balding results provide empirical proof that simple political liberalization may not result in higher trade levels (Grossman and Helpman 1994 and Goldberg and Maggi 1997). The most consistent variable related to higher trade levels are measures of good governance, which includes a variety of less democratic states. There is little evidence that democracy positively impacts international trade levels and Balding provides further evidence that more

specific measures of governance and institutional quality may better capture their impact on trade.

Public Spending and the Impact on International Trade

The final paper focuses on the role of public investment and income transfers in promoting international trade. Little research has studied the role of public investment and income transfers and their impact on international trade. The Balding study further develops the research on the political economics of international trade, focusing here on the role of government spending. As the case study, Balding utilizes specific line items of spending and income transfers in the Chinese budget as provided by the Chinese National Bureau of Statistics following previous research on the impact of public spending (Rozell et al. 1998). Previous research on provincial development focused on public investment, transfers, international trade, or private investment in an attempt to better understand the broad divergence in income levels. Despite years of increasing absolute levels of investment and income transfers in western and inland provinces of China, their development levels have lagged eastern and coastal provinces (Du, Park, and Wang 2005, Fan, Zhang, and Zhang 2004, Yang, 2002, and Yang 1998). According to some research, the increasing intra and inter provincial income inequality in China remains poorly understood in spite the

government best attempts to reduce it and the accompanying migration between rural and urban regions (Fang, Zhang, and Fan 2002).

If the gravity model explains international trade flows and the structural barriers what will it tell us about Chinese development strategy of attempting to promote trade in western and inland provinces? By applying the standard gravity model to Chinese trade, Balding studies if structural barriers will hinder the Chinese development strategy. Research demonstrates the low level of regional linkages in promoting growth (Fu 2002). To accomplish this, Balding creates a new dataset and uses unique methodological techniques. First, he creates a China centered bilateral gravity trading model with distance, land area, and provincial GDP data. This is the first time a gravity model has been used to study Chinese provincial trading patterns and provincial level data. This unique dataset was created from trade, GDP, public investment, and income transfer data from the Chinese Bureau of National Statistics. Second, Balding uses the gravity model to study Chinese provincial trade and the unique geographic characteristics of China. Most uses of the gravity model have focused on cross country studies and not on sub-national international trade patterns. This is the first known use of the gravity model to study Chinese provincial trade. Third, the Balding research ties together the unique Chinese geography with public spending targeting differences in development. Using newly released data

Balding attempts to study if development policy is trying to go against recognized structural impediments to trade promotion.

Using a comprehensive set of fixed year, importer, and exporter effects from Chinese provincial trade data, Balding finds that many public investment and income transfers from government spending do not positively impact trade. Despite the efforts of public investment and income transfers to stimulate trade, the barriers of geography remain a major impediment to western and inland provinces in accessing the wealthy markets of Asia, North America, and Europe. Eastern and coastal provinces in China have the blessings of geography when seeking to drive international trade. Some government income transfers actually appear to negatively impact international trade by diverting consumption to domestic products. Expressways have the best impact in positively promoting trade due to their reduction in geographic barriers facing provinces from accessing markets. In short, development funding and income transfers do not positively impact trade because they do not reduce the structural barriers to trade facing geographically distant provinces, where as expressways lower the barriers to trade. These results have significant implications for Chinese development policy. If structural barriers to markets are the primary problem to western and inland provinces, this implies that the Chinese government should focus on improving infrastructure and market access, not through development funding and income transfers.

Conclusion

The Balding research focuses on the political economics of international trade, specifically the role of institutions, governance, and public outlays. The multiple layers of political involvement in economic processes shape the incentives of policy that promote international trade. The three papers presented here focus on multilateral institutions via the creation and adjudication process of the World Trade Organization. States agree to be bound and adhere to the legal obligations of the WTO and changing their domestic laws and regulatory environments to meet mutually agreed upon standards. The second paper focuses on the role of domestic governance and institutions. The institutional controls and management of democratic and autocratic governments significantly impacts the regulatory structures and incentives for business to invest and take risks that promote economic activity domestically and internationally. The third paper focuses on the role of a domestic central government attempting to stimulate international trade and examining whether certain spending items promote trade. The spending patterns of governments and their role in stimulating international trade and how specific items of public investment and income transfers impact trade. Political economics will play a primary role in the study of international trade with the multiple layers of governmental incentivizing.

Bibliography

Acemoglu, Daron and James Robinson, 2006, *Economic Origins of Dictatorship And Democracy*, Cambridge University Press

Bliss, Harry and Russett, Bruce, 1998, "Democratic Trading Partners: The Liberal Connection 1962-1989", *The Journal of Politics*, Vol. 60, No. 4, pp. 1126-1147

Dai, Xinyuan, 2006, "Dyadic Myth and Monadic Advantage: Conceptualizing the Effects of Democratic Constraints on Trade", *The Journal of Theoretical Politics*, Vol. 18, No. 3, pp. 267-297

Dixon, William and Moon, Bruce, 1993, "Political Similarity and American Foreign Trade Patterns", *Political Research Quarterly*, Vol. 46, No. 1, pp.5-25

Du, Yang, Albert Park, and Sangui Wang, 2005, "Migration and Rural Poverty in China", *Journal of Comparative Economics*, V. 33 n. 4, pp. 688-709

Fan, Shenggen, Linxiu Zhang, and Xiaobo Zhang, 2004, "Reforms, Investment, and Poverty in Rural China", *Economic Development and Cultural Change*, V. 52 n. 2, pp. 395-421

Fang, Cheng, Xiaobo Zhang, and Shenggen Fan, 2002, "Emergence of Urban Poverty and Inequality in China: Evidence from Household Survey", *China Economic Review*, V. 13 n. 4, pp. 430-443

Fu, Xiaolan, 2004, "Limited Linkages from Growth Engines and Regional Disparities in China", *Journal of Comparative Economics*, pp. 148-164

Goldberg, Pinelopi Koujianou and Maggi, Giovanni, 1997, "Protection for Sale: An Empirical Investigation", *American Economic Review*, Vol. 89, No. 5, pp. 1135-1155

Gowa, Joanne and Mansfield, Edward, 1993, "Power Politics and International Trade", *The American Political Science Review*, Vol. 87, No. 2, pp. 408-420

Grossman, Gene and Helpman, Elhanan, 1994, "Protection for Sale", *American Economic Review*, Vol. 84, No. 4, pp. 833-850

Kono, Daniel, 2006, "Optimal Obfuscation: Democracy and Trade Policy Transparency", *American Political Science Review*, August 2006, pp.369-384

Li, Quan and Reuveny, Rafael, 2003, "Economic Globalization and Democracy: An Empirical Analysis", *British Journal of Political Science*, Vol. 33, No. 1, pp. 29-54

Long, Andrew, 2003, "Defense Pacts and International Trade" *Journal of Peace Research*, Vol. 40 No. 5, pp. 537-552

McCallum, John, 1995, "National Borders Matter: Canada-U.S. Regional Trade Patterns", *The American Economic Review*, June 1995, Vol. 85 No. 3

Morrow, James, Siverson, Randolph, and Tabares, Tressa, 1998, "The Political Determinants of International Trade: The Major Powers, 1907-90", *The American Political Science Review*, Vol. 92, No. 3, pp. 649-661

Mueller, Dennis, 2003, *Public Choice III*, Cambridge University Press

Persson, Torsten and Guido Tabellini, 2000, *Political Economics: Explaining Economic Policy*, The MIT Press

Rose, Andrew, 2004, "Do We Really Know the WTO Increases Trade?", *The American Economic Review*, Vol. 94 No.1, March 2004

Rose, Andrew, 2004b, "Does the WTO Make Trade More Stable?", *Open Economies Review*, Volume 16, Number 1, January 2005

Rozell, Scott, Albert Park, Vincent Benziger, and Chanqing Ren, 1998, "Targeted Poverty Investments and Economic Growth", *World Development*, V. 26, n. 12, pp. 2137-2151

Subramanian, Arvind and Wei, Shang-Jin, 2003, "The WTO Promotes Trade, Strongly But Unevenly", *Journal of International Economics* forthcoming
Tomz, Michael, Goldstein, Judith, and Rivers, Douglas, 2005, "Membership Has Its Privileges: The Impact of GATT on International Trade"

Yang, Dennis Tao, 2002, "What has caused regional inequality in China?", *China Economic Review*, V. 13 n. 4, pp. 331-334

Yang, Dennis Tao, 1998, "Urban-Biased Politics and Rising Income Inequality in China", *American Economic Review*, Vol. 89, Issue 2, May 1998, pp. 306-310

Chapter 2

Joining the World Trade Organization

Everyone seems to have a love hate relationship with the World Trade Organization (WTO). Economists, politicians, and anti-globalization protesters all seem to find something to dislike about the WTO. To its supporters, the WTO has freed global trade by lowering tariffs and reducing non-tariff barriers, ushering in unprecedented prosperity and growth. To its critics, the WTO has favored large multinationals and rich countries while ignoring the development concerns of lesser developed countries. Only recently, however has research focused on the impact of the WTO on trade between countries (Rose 2003). Rose concludes, "we currently do not have strong empirical evidence that the GATT/WTO has systematically played a strong role in encouraging trade." This conclusion seems at odds with widely held beliefs. How could the institution responsible for liberalizing international fail to promote trade?

Subramanian and Wei (SW) argue that Rose is incorrect on modeling and methodological grounds. SW argue that the standard gravity model should be regressed against imports rather than the average value of real trade and should include fixed importer and exporter effects. SW conclude that, once these important changes are made, imports rise significantly in developed countries while increasing slightly in developing countries. Tomz, Goldstein, and Rivers (2005) focus on WTO classifications used by Rose, specifically concerning developing countries, but this fails to address the issue of how trade flows

between states and how the WTO impact imports and exports differently. Rose, however, in his rebuttals demonstrates not only is it not possible for both SW and TGR to be right, but that these issues have little impact on overall trade levels.[1] This paper studies the impact of WTO membership on bilateral trade flows between states arriving at the conclusion, in support of both Rose and SW, that its impact is asymmetric across trade and country types. In other words, the WTO impacts country's imports and exports differently based upon their level of economic development.

In this paper, I argue that Rose arrives at an insignificant finding for overall trade because the WTO impacts imports and exports in offsetting ways for many states. Regressing against imports without fixed country effects, it is clear that the WTO impacts imports and exports differently. When utilizing importer and exporter effects, as specified by SW, the difference is less pronounced, but again imports and exports frequently react to WTO membership differently. Though the evidence suggests that the WTO does increase trade, the evidence is ambiguous. High-income countries are the only income group to demonstrate a clear rise in both imports and exports across time, methodological specification, and changes to the data. Other income groups, in line with the SW findings, have either stagnant or declining levels of trade. The major finding of this paper and explanation to reconcile these

[1] Please go to http://faculty.haas.berkeley.edu/arose/ to download his rebuttals with supporting output and data.

conflicting findings is that the WTO impacts imports and exports in different ways causing the non-finding when regressing against overall trade and the significant finding when utilizing real imports. Finally, trade rises significantly between members, but fell when only one country of a trading pair is a member.[2] This supports the conclusion that members join for the exports if pre-existing members divert trade from non-members to new members.

The WTO and its Discontents

The WTO is a controversial institution. The defender and promoter of free trade, the WTO touts its own achievements in opening up markets and facilitating the unparalleled growth of economic interdependence.[3] Until recently however, little systematic research had studied the impact of the WTO. Research that did take place did not attempt to systematically determine the impact of the WTO on its members and their trading patterns (Bagwell and Staiger 1999, Rivera-Batiz and Xie 1992). Rose (2003) filled in this omission by producing a bilateral gravity trading model "searching" for WTO significance in the residual. Rose regressed average real trade against a bilateral gravity model with variables for distance, population, land area, income, and numerous dummy variables representing factors such as language and colonial history. Rose notes that his "empirical strategy is to control for as many 'natural' causes

[2] As has been pointed out this is more of a historical empiricism than a current finding as most countries and international trade are now conducted between WTO member countries.
[3] Please go to www.wto.org and the "10 Benefits of the WTO Trading System."

of trade as possible." After conducting a wide variety of sensitivity, robustness, and classification tests on the initial and derivative models, Rose concludes, "there is little reason to believe that the GATT/WTO has had a dramatic effect on trade." This conclusion matters all the more because research indicates that trade is important to economic growth (Lee, Ricci, Rigobon 2004). This conclusion seems at odds with the popular wisdom.

Subramanian and Wei (2003) produced a paper disputing the Rose conclusions. Using a bilateral gravity trade model and the Rose data, SW make one important modeling change and one econometric change. First, SW argue that Rose fails to include importer and exports effects, which fundamentally change the results.[4] Due to the nature of the model and data considerations, there does seem to be significant theoretical reasons to include importer and exporter effects.[5] When comparing these two methods clear patterns reveal themselves across methodological specification. The results that do seem most prone to significant changes between methods are those that are most fragile to alternative model specifications and most affected by data exclusions.

Second, SW argue that a gravity model is better understood if regressed against imports rather than average bilateral trade as with Rose. A gravity model is helpful in estimating the relationship for imports as well as exports due to the fact that trade between countries is measured as a trade flow with a

[4] Though I may use the term 'country' effects, the econometrics utilized were fixed importer and exporter effects throughout.
[5] I will use the language 'country effects' though this means controlling for importer and exporter effects.

dummy independent variable representing WTO membership of either the importer or exporter in place of the Rose specification of member and non-members. The Rose method of regressing against total trade may obscure important points about the flows of trade and types of trade because, as will be demonstrated, the WTO impact varies widely. Many bilateral trading relationships are extremely unbalanced, with trade flowing primarily in one direction.[6] However, average real trade will only increase if both imports and exports increase. Separating out the trade into two relationships will illuminate these differences. Rose notes that others may wish to explore the impact of the WTO on imports and exports.

The WTO requires members to reduce import barriers but there are significant reasons to expect membership to impact exports as well. First, countries join the WTO and negotiate accession based upon the knowledge of their comparative advantages and disadvantages. Countries pick winners or industries that they hope to protect but also try to gain access for their competitive and politically connected industries. If countries only relaxed import controls and did not gain greater market access, few would actively pursue membership. Countries that join actively tout the access to new markets they gain when joining the WTO. Second, countries work hard and file costly litigation to protect their rights to foreign markets. One of the major advantages of the GATT/WTO system is its dispute resolution mechanism, which permits

[6] It must be noted that though total trade will balance for a country over time or for the world in a specific year, this does not mean that specific bilateral trading pairs will not have unbalanced trade.

aggrieved countries to file costly and time consuming litigation based upon substantial evidence that their products are not being accorded their rights under WTO law. Third, states that join the WTO normally have full ability to export to other members while phasing out domestic protection. This allows new members to get the benefits of free trade, while still getting used to the global trading system. Fourth, joining the WTO frequently involves a costly restructuring of domestic economies. Whether this comes through reduction in tariffs, ending of subsidies, or legal reform, joining the WTO frequently involves large and significant economic reform. This may mean a surge in imports and it may mean that competitive industries are both freed to pursue growth opportunities and obtain access to new markets. SW argue that there are no "theoretical reasons" WTO membership to impact exports, but there are practical reasons to believe it may influence exports.

Questioning Country Effects

A major difference between the Rose and SW research concerns the inclusion of importer and exporter effects in the regression. Research has indicated that the gravity model may over estimate some variables when failing to control for importer and exporter effects. McCallum (1995), omitting fixed importer and exporter effects, found a 2,200% increase in intra-Canadian trade due to the border with the United States. As others have demonstrated, and as these results will support, including country effects may change the results but

more frequently will provide more moderate results and a better estimation of the data (Anderson and van Wincoop 2003, Feenstra 2002, Egger 2000, Egger 2002, Matyas 1997, Matyas 1998). More important, however, is the question about which method provides a better estimation of the data in question. There are significant reasons to believe that utilizing fixed importer and exporter effects better estimates the impact of the WTO on trade. First, as Rose notes, while he attempts to control for many "natural" variables such as language, distance, and land area, he does not control for unnatural country specific variables. It is exceedingly difficult to measure country specific variables that impact trade, but there are undoubtedly a wide range of country specific variables that impact trade (Rodriguez and Rodrik 1999, Anderson 1998, Pritchett 1996). These unnatural influences impact trade through variety of methods including trade costs and political instability that are specific to each country (Anderson and Marcouiller 1999, Anderson and van Wincoop 2004). Including importer and exporter effects will help control for these unnatural variables.

Second, as others have noted (Feenstra 2002, Anderson and Van Wincoop 2003), simply utilizing a gravity model may not correctly estimate key variables. Many possibilities have been proposed to correct for friction, remoteness, and policy. An international border unquestionably brings about additional variables that impact trade (McCallum1995). These effects require controls if an accurate estimation is to be arrived at. Third, due to the nature of the research, a study with 177 countries across 49 years requires time and country controls. The

inclusion of fixed year effects imply that time impacts the results, similarly fixed importer and exporter effects better estimate the data.[7]

The Three Questions

To arrive at a better understanding of the impact of the WTO building upon the work of Rose and SW, I focus on three areas.

1. How important is the modeling difference of regressing against imports rather than average real trade?
2. How important is the inclusion of fixed country effects to the results?
3. How does the WTO impact trade if at all?

Based upon their divergent results, the differences between Rose and SW must stem from the model, the method, or some other unaccounted issues or variables. The modeling differences do allow for some difference due to its inability to isolate certain variables and its tendency to smooth others out. The results of the different regression techniques demonstrate pattern consistency with the fixed country effects moderating the outcomes. Finally, this paper demonstrates that only studying imports in relation to the WTO, overlooks its significant impact on exports.

[7] It is worth noting that in his original paper and in subsequent output provided on his website Rose demonstrates that including fixed country effects does not change his results. My results are broadly supportive of his assertion that including fixed country effects makes minimal changes, as the results demonstrate. More important however, is the data organization method used.

Data and Methodology

The data comes from Rose (2003) downloaded via his website.[8] Rose uses a bilateral gravity model controlling for the "natural" determinants of trade. The gravity model has been used by a wide variety of authors to study a wide variety of trade issues (Feenstra, Markusen, and Rose 2001, Rose and Spiegel 2003, Anderson and van Wincoop 2003, 2004, Feenstra 2002, Glick and Rose 2001, Rose 2003, Rose 2004b, Frankel and Romer 1999). The STATA dataset covers 177 countries with controls for natural variables as distance between trading partners, population, per capita GDP, total GDP, and land area.[9] It also includes a comprehensive set of dummy variables that control for such variables as common language between the trading pair, colonial history, and geographic factors such as land locked or island countries. This research will regress against imports rather than average bilateral trade in an effort to focus on how the WTO membership impacts importing and exporting countries differently. International Monetary Fund Direction of Trade data was extracted from the online database Webstract for the years 1950 to 1999.[10] The natural log of real imports for the importing country was arrived at by averaging the exports of country two with the imports of country one, deflating by the 1982-1984 Urban

[8] To download the data, paper drafts, and supporting output for STATA please go to **faculty.haas.berkley.edu/arose**.
[9] For a complete explanation of the Rose dataset please see Rose (2003).
[10] Please note that in my data set due to direction of trade data, not all countries from the Rose data set have been included. For instance Bhutan, Namibia, and Swaziland were not included as there were not four trade numbers from which to arrive at an average of two import data statistics.

Consumer CPI, and taking the natural log.[11] Variables were added using Rose data for import and export country WTO membership with additional dummy variables added for income and region. Regressions will be run with and without importer and exporter effects as a means of comparison to demonstrate that the fundamental conclusions will hold regardless of method. Other than the natural log of real imports and dummy variables added for importing and exporting country membership with income level classification, all variables and methodology comes from or are based on the Rose dataset. Finally, similar econometric methods are used to facilitate comparison to both Rose and SW results which demonstrate consistency between both papers.

The major methodological change from Rose comes in two areas. First, this study will compare the impact of including and excluding fixed country effects. Though in a later expanded version Rose did include fixed country effects, he did not provide the level of detail that would permit reconciliation of the results. Based upon the results and in line with previous findings, fixed importer and exporter effects appear to have significant impact on the size of the coefficient and minimal impact on the pattern of results. Second, this study will regress against imports rather than average real trade. This produced two numbers: average country one imports and exports or averaged country two

[11] It is worth emphasizing that this method of deflation was used by the Rose and SW and therefore replicated here. The author did not deem it necessary to chose a different deflation method.

exports and imports, depending on the point of view.[12] The country two imports, or country one exports, were then inserted as the dependent variable and all necessary variables inverted. This change did not affect most of the bilateral variables such as distance, language, and border. This change has two major effects. First, it significantly enlarges the dataset. Rose has 234,597 observations of overall trade, this change creates a data set with 419,910 observations.[13]

Second, this permits an examination of the impact of the WTO on exporting country membership. Whereas with Rose, the United States and the United Kingdom had one relationship of overall trade and did not differentiate between import or export trade, now there is a two way relation. Many trading relationships, especially ones involving lesser developed countries, have goods moving in primarily one direction but not both. It is not uncommon for the WTO to impact member trade in widely divergent ways. Furthermore, the method of examining trade flows between states though disaggregating total trade into its component flows, studies the impact of the WTO in the same manner as Rose and SW. Finally, it is worth noting that this data set does not exclude small observations of trade. Where real imports equaled zero, the natural log of one was used as the import value. In other words, many observations of real trade

[12] Though the imports of country 1 should equal the exports of country 2, this is not always the case. As I am regressing against the natural log of real imports, averaging the imports of country 1 with the exports of country 2, and vice versa, creates a smoother, but still realistic number for analysis.
[13] There is not a complete doubling of observation from the Rose dataset due to the fact that I dropped observations where there was not an import and export number available for countries 1 and 2 respectively.

are zero or lower.[14] The method of using ln(trade +1) has been used previously when including observations bounded by 0 (Eichengreen and Irwin 1995). Though this may be a point of contention for some, this more accurately reflects actual trade observations, without excluding the lack of trade as a non-observation.

The Model

To differentiate the importance of the WTO on exports, it is necessary to control for exporting country membership. The basic model will be specified as follows:

$$Ln(M_{ijt}) = \ln D_{ij} + \ln(Area_i Area_j) + \ln(Y_i Y_j) + \ln(Y_i Y_j / Pop_i Pop_j) + Lang_{ij} + Border_{ij} + Landl_{ij} + Island_{ij} + ComCol_{ij} + CurCol_{ij} + Colony_{ij} + Comctry_{ij} + Custrict_{ijt} + FTA_{ijt} + T_t + MWTO_i + XWTO_j$$

where i and j denote trading partners, t denotes times, and the variables are[15]:

- M_{ijt} is real imports of i from j at time t
- D is the distance between i and j
- Y is real GDP
- Pop is population
- Lang is a dummy variable which is unity if i and j have a common language

[14] The natural log of small numbers is negative therefore many observations of real imports are negative observations. 12.8% of all observations of the natural log of real imports were zero or below.
[15] The models, variables, dataset, and descriptions are almost completely from Rose (2003) except as noted previously.

- Border is a dummy variable which is unity if i and j share a land border
- Landl is the number of land locked countries in the country pair (0,1,2)
- Island is the number of island nations in the pair (0,1,2)
- Area is the area of the country (in square kilometers)
- Comcol is a dummy variable which is unity if i and j were ever colonies after 1945 with the same colonizer
- Curcol is a dummy variable which is unity if i is a colony of j at time t or vice versa
- Colony is a dummy variable which is unity if i ever colonized j or vice versa
- Comctry is a dummy variable which is unity if i and j remained a part of the same country during the sample
- Custrict is a dummy variable which is unity if i and j use the same currency at time t
- FTA is a dummy variable which is unity if i and j belong to the same regional trading agreement
- T is a comprehensive set of time "fixed effects"
- MWTO is a dummy variable which is unity if the importing country is a member of the WTO at time t
- XWTO is a dummy variable which is unity if the exporting country is a member of the WTO at time t

This model focuses on how did those countries trade rather than just did they trade? This study adds an additional level of detail by focusing on how trade between states changed as a result of WTO membership.

The Good News and the Bad News

The WTO does appear to impact trade positively. The Baseline Results are presented in Table 1 and the gravity variables all yield expected results. Distance is significant and negative while real GDP, currency union, and colonial variables are positive and significant. The gravity coefficients are similar to the results obtained by Rose and SW for the comparable variables and to the gravity literature in general. A few variables change sign or significance as a result of method. For instance, land area under in the absence of fixed country effects, yields a moderately negative and statistically significant coefficient. The fixed country effects method returns an economically and statistically significant positive coefficient. Fixed country effects have the largest impact on variables with coefficients near zero or less robust results. The general model however, returns the expected relationships.

The WTO impacts exports significantly across methodological specification, though differently across income specification and member trading pairs. In all regressions, member exports rose by economically and statistically significant amounts. Only Country Effects post-1970 had a smaller increase for exports than imports, with virtually no difference between the two coefficients.

The difference between regression methods for importing and exporting country membership without income classification was stark. The regressions without country effects yielded an economically and statistically significant decrease in imports, while fixed importer and exporter effects yields a moderate, but statistically significant rise in imports.[16] Both regression methods yield economically and statistically significant rise in exports.

When classified by income the findings vary more but still yield interesting and consistent findings. High income member imports and exports increased by economically and statistically significant amounts regardless of time or method specification. Least developed members saw decreases in exports across method and time. Many of the middle and low income member results are insignificant or fragile to data or modeling changes. For instance, middle income exporting members without importer and exporter effects, experienced an insignificant drop, while under fixed country effects registered a positive and statistically significant increase. Least developed countries post 1970 without country effects increased imports, while adding country effects makes imports negative. These specific results are susceptible to modeling or data changes, so it is not surprising that a method change would cause a change in the variable.

[16] It is worth noting that when creating a variable for importing country membership in the Rose data and running a regression without country effects, the coefficient returned is .19 with a robust standard error of .04. High income country members yields a coefficient of .67 with a robust standard error of .04. This is strikingly close to the results obtained here. Though not an exactly fair comparison, it is not unreasonable either. Rose divides total trade (x1 + x2 + m1 +m2) by 4, creating almost an import variable. In this paper, I use average real imports (m1 + x2) divided by 2.

The highly significant variables that are robust to changes demonstrate a high degree of consistency with or without country effects.

A major argument of this paper is that Rose obtained an insignificant finding when regressing against total trade, because imports and exports act differently under the WTO. Least developed members under without country effects saw imports rise significantly and exports drop by a similar amount. Opposite signs on import and export country membership may explain why Rose found no WTO impact on total trade. The middle and low income results are frequently insignificant or somewhat fragile with and without country effects. This supports the finding made by SW that membership matters to industrialized countries, but it does not speak well of the WTO's ability to stimulate trade for its lesser developed members. In line with the SW, I find that lesser developed countries have not increased trade levels as a result of joining the WTO.

How Does Trade Then Flow?

When grouping countries by income and WTO membership to determine how the WTO impacts trading flows between countries, the results generally reflect previous findings. High income countries results on Table 2 indicate positive and significant coefficients for imports and exports trading with members and non-members alike. High income countries have increased imports and exports significantly across all income categories, econometric

method, and changes to data. Out of the 42 trade flow coefficients between high income members and other income groups both member and non-member, only 10 coefficients were negative and most of those are insignificant. High income countries have consistently and significantly higher import and export levels, with members and non-members alike.

Middle and low income countries do not seem to have benefited from the WTO the way the high income countries did. This occurred in two ways. First, middle and low income members export primarily to high income countries and almost all other export categories were negative or insignificant. Middle and low income countries did not, for the most part, increase trade with other middle and low income countries. In other words, the WTO did not create trade for middle and low income members, independent of high income members. Least developed members have divergent numbers, but support the previous results that imports rise while exports decline. This result may not reveal as much about the impact of WTO membership on least developed countries as it does about the relative economic strength of lesser developed countries. Finally, this supports the findings of SW that the WTO has an asymmetric impact on countries.

Second, middle and low income members saw exports to high income members rise more than imports from high income members. This does not entirely support the SW idea that the WTO is a rich country club. This indicates that trade diversion may occur away from natural trading partners, and shift to high income members. The WTO has allowed lesser developed members to

liberalize trade at a slower rate than developed countries and the data seems to bear that out. Interestingly, high income members do not appear to demonstrate significantly different import patterns between middle and low income members or non-members.[17] The small difference and statistically borderline results, do not indicate that middle and low income members have economically and statistically higher export levels to high income members than middle and low income non-members. This is all the more important as research has shown that trade composition matters to economic growth (Arora and Vamvakidis 2004). Rich country members may tout the benefits of trade liberalization to lesser developed, but there is little evidence to support the idea they trade more with middle and low income WTO members than middle and low income non-members.

The clearest trends that the data reveals about membership, is its impact on trade between members and non-members. Trade between members, in line with previous results, increases significantly. Interestingly, the member to member trading results are fragile to method change. Nine of the sixteen income and method pairs have opposite signs between coefficients. For instance, high income member trade with other high income members has a small negative and statistically insignificant result without country effects and a moderate, though not as large as SW, but statistically significant increase with country effects.

[17] The results of regressions not presented here confirm this conclusion. Lesser developed member versus lesser developed non-members exports to developed members was economically small and of borderline significance in both methods utilized.

Overall, member to member trade demonstrates a significant increase that is robust to method and changes to the data.

The more interesting results come from trade between members and non-members. It is a curious result that members would have higher export levels than imports. However, when estimating bilateral pairs where one country is a member and the other is not and then disaggregating between importing and exporting states, the solution presents itself. WTO members have significantly lower import level from non-members, while conversely having higher export levels to non-members. A clear result of this data is that members do not import from non-members though they export heavily to non-members. The import result is even greater if only considering low and middle income countries. With the exception of high income members, virtually every sign for members importing from non-members are negative and the coefficients that were not negative were mostly insignificant. Conversely, members increased their exports to non-members by economically and statistically significant amount, though this result was less robust for least developed and low income countries. This indicates a trade diversionary impact, potentially through a cost factor or signaling mechanism whereby members trade more with other members, export to non-members, but import less from those outside the club. It is worth noting that these findings are similar to more general results obtained by Rose and SW,

and explain why members experience higher export levels.[18] Joining the WTO seems to boost exports to members and non-members alike.

Around the World in Under a Page

Breaking down the regression by region and WTO membership largely confirms the previous findings. WTO membership is widely divergent in its impact, both positive and negative, and in its impact on exports and imports. Of the five regional membership dummy variables in Table 3, four of the import coefficients are negative with and without fixed country effects. Export coefficients fared only slightly better. Only East Asia members have robust, economically and statistically significant higher exports. The rest of the regional member variables used here are either negative or insignificantly positive. The regional dummy variables are not incredibly robust and are susceptible to changes in method, data, or country exclusions. The coefficients for Sub-Saharan Africa, for example, go from economically large and statistically significant increased member imports and decreased exports without country effects, to negative imports and positive exports with borderline significance. Three of the export and two of the import coefficients have different signs between methods. These specific results are fragile and prone to change based upon country exclusions and data changes. The country effects method seems to confirm,

[18] Rose covered both the impact of fixed country effects and exports briefly in Appendix 5 of the extended version of his paper available on his website. His results, though minimal in scope, are consistent with the results presented here. SW focused on the import factor but also present findings similar to these results.

though moderate, highly robust findings while changing fragile or insignificant results.

SW have argued that not only is a fixed country effects method more appropriate, but also that WTO impact is extremely different across income classes. The results presented here, support that argument, but also support the claim that the WTO impacts imports and exports differently. Five of the ten import and export pairs have opposite signs, with and without fixed country year effects. The impact of the WTO may vary widely, but its impact on the type of trade also varies dramatically. It does not uniformly raise trade across regional classification or econometric method. Exports for East Asian members rose dramatically regardless of method, while imports fell or rose depending on the method. Interestingly, under fixed country regressions, only East Asian coefficients were positive, highly significant, and robust.

Before and After: Does the WTO Matter?

If the WTO impacts trade and specifically exports, are there examples of this? In other words, are there countries who experienced a surge in international trade following GATT accession? Table 4 presents regressions for countries, which became GATT signatories between 1966 and 1973.[19] The group is a relatively diverse group representing four of the seven continents, a variety

[19] The only countries not included in this selection who joined between 1967 and 1973 are Bangladesh, Barbados, and Soviet bloc countries. The period of 1967 to 1973 was chosen due to the fact that it provided significant before and after periods and a broadly representative sample of countries.

of income levels, development paths, and social variables. A couple of patterns emerge. First, many of the coefficients are insignificant. The WTO does not appear, when focusing on specific countries that have sizeable before and after stories, to have a consistently significant impact. Second, the WTO does not appear to have a statistically significant short term impact. Only a third of the important export coefficients for years 0 to 5 are statistically significant. Third, the WTO may be able to help a country, but it doesn't seem to significantly harm a country. Only one statistically significant coefficient is negative, though there are examples of countries registering economically and statistically significantly higher trade levels. In other words, joining GATT may help, but it doesn't appear to harm a country.

Taking a specific case, Ireland reveals the patterns discussed in detail.[20] There are a number of policy and econometric issues that need discussion in the case of Ireland. First, in years 0 to 5 of WTO membership, both Irish trade coefficients are economically small and statistically insignificant. In other words, the WTO seems to have no short term impact on trade levels. Second, the expansion in export levels in year 6 to 15 and beyond, seems be helped by other policy factors as much as WTO membership. The Irish decision to join GATT coincided closely with dismantling foreign ownership regulation, accelerated depreciation rates, and the implementation of a zero tax rate on manufactured exports (Walsh 1996 and Barry and Bradley 1997). Additionally, EU membership

[20] Ireland was chosen as the example because there is an extensive literature about its economic development and because its pattern is representative of other countries experience with the WTO.

played a major role in increasing trade, both through the common market, structural adjustment funds, and by attracting high levels of export oriented foreign direct investment (Barry, Bradley, and Hannan 2001 and Barry 2000). Furthermore, Irish education rates increased rapidly enough to supply the increasing need for skilled labor which in turn drove productivity increases in high technology sectors (Barry 2000 and Barry and Bradley 1997). As one author notes "virtually all of the decline in relative unit wage costs in a common currency was due to the fact that the rate of growth in labor productivity greatly outpaced that of its trading partners....the dramatic change in the structure of Irish industry and the rapid growth in employment of young relatively well educated workers have facilitated an exceptional rise in productivity." These policy initiatives seem to play as large a role in driving increased trade levels as the WTO. Third, the WTO may not necessarily drive economic growth. Irish economic growth did not experience a rapid acceleration until the mid 1980's, some twenty years after joining GATT (Walsh 1996 and Barry 2000). This growth take off followed previous liberalization policies and prudent macro-economic management.

The Irish experience with GATT and WTO membership indicate that while membership may play a role in promoting higher trade levels, the evidence for its decisive impact remain somewhat ambiguous. While Ireland did experience increased export levels post GATT, it was accompanied by significant overall policy reorientation and did not result in sustained higher trade levels

until five years later or rapid economic growth until twenty years later. Though the econometrics attribute high economic and statistical significance to Irish WTO membership, this may be picking up other policy changes not included or easily observed. This should not lead to an interpretation that Irish WTO membership did not have a positive impact on trade, but rather lead to a fuller consideration of the policy factors that drive international trade. Despite these qualifiers, Ireland is representative of the countries with joined GATT between 1967 and 1973. Six of the nine countries experienced higher export levels; the three that did not all had statistically insignificant coefficients. Five of the nine countries had higher export than import levels post membership and in only one of the remaining four countries was this statistically significant. The results may not perfectly reflect the impact of joining GATT, but it is evidence of its positive impact on trade.

Can the Results Take the Heat?

The overall member results are robust to the removal of high income countries and other interesting data exclusions. Table 5 provides a list of changes made to the basic model testing model sensitivity and method specification issues on baseline results. Excluding high income members from the general member results, with or without country effects, had little effect on the fundamental results. Exports were significantly and positively impacted by WTO membership. The only case in Table 4 where this does not hold is without

country effects excluding real imports of less than $100,000 and $500,000. The results are consistent across method and data alteration methods.

The main argument of this paper however seems to be largely confirmed across method or income class. Though middle and low income members may only have a slight advantage over non-members exporting to high income members, they have higher export levels to many exclusions of data and changes of method. For instance, even for trade entirely within Africa, members have higher export levels in line with the general results. This finding is robust across data exclusions and method. This finding is robust to many changes in the regression and method. The results, with and without country effects, yield consistent results in support of the theory that the WTO has a greater positive impact on exports than imports.

The Stress Tests

The results were subject to a battery of tests detailed in Table 6 including random dummy variables for WTO membership, weighted least squares regressions with a variety of different weightings with and without country effects, and random effects regressions. In all instances, the results held up well. A few brief details on some of the stress tests. First, to make sure it wouldn't be possible to obtain even a small amount of economic or statistical significance random dummy variables for importing and exporting country membership were created. These coefficients came back close to zero and statistically

insignificant. Second, the weighted least squares regressions with both real GDP and real GDP per capita for high income countries reflected the results of SW. Third, the weighted least squares, fixed effects, and random effects regressions reflect the conclusions that the WTO positively and significantly impacts exports. Fourth, WTO membership has a greater impact on exports than imports under these methods. In every case concerning overall membership, imports drop or rise insignificantly, while exports rise in both economically and statistically significant ways. Fifth, the other major argument of this paper is that WTO membership will frequently impact imports and exports in different ways. In fact, in every case except one, weighted least squares with country frequency weighting, overall import and export member coefficients are the opposite sign.

A Few Cautionary Notes

To temper any jubilation or despair that these results might invoke, there are a number of qualifiers that need to accompany this research. First, the impact of the WTO seems to be highly correlated with economic activity. Though industrialized countries would be the most obvious example, East Asian members also have significantly higher trade levels. Economic activity may not be the defining variable in WTO success, as it depends on domestic institutions, but it sure helps (Rodrik 2000). Second, the WTO has not brought the expected gains to its lesser developed members. Developing members have only slightly

higher export levels to high income members than developing non-members.[21] As research has shown, economic liberalization is not significantly correlated with increased trade and growth (Hausmann, Pritchett, and Rodrik 2004). If an objective of the WTO is to integrate developing countries in the global economy, it would seem that it could do a better job.

Third, countries appear to join the WTO more for the most favored nation status than the domestic tariff reductions. High income members are the only income group to demonstrate economically and statistically higher import levels across time, trading partners, and method. Middle and low income members have mixed import records. In some instances, the results seem to imply that the WTO acts as a defense to protection more than a method to liberalize. Even when considering inter-African trade for instance, imports dropped and exports increased. Fourth, though typically used as robustness checks, a weighted least squares model might prove more accurate than the panel OLS by taking into account trade levels, GDP, or country data quality. It is heartening to note however, that the weighted least squares regressions returned similar results to the baseline data.

[21] Creating a developing member exporter dummy variable for high income country imports, yields a coefficient of .14 under the Rose method with a robust standard error of .06. The fixed year method returns a coefficient of .23 and a robust standard error of .07. A moderate economically significant return, though borderline statistically, middle and low income countries do not seem to receive the unambiguous boost to trade promised by the WTO.

Conclusion

The WTO impacts trade but countries join for what they can sell to the world not buy from it. In other words, he WTO has a greater impact on exports than imports. There are practical reasons to believe the WTO impacts exports and the data supports this argument. The asymmetric distinctions between developed and lesser developed countries hold, but more importantly, specifically when trying to reconcile the Rose and SW result, the WTO has an asymmetric impact on the type of trade. In line with the findings of Rose and SW, the WTO significantly impacts trade when both countries are WTO members but has an insignificant to slightly negative impact when only one country of a pair is a WTO member. This lends further support to the argument that the WTO has an economically and statistically significant greater impact on exports.

It is also important to note the difference with and without importer and exporter effects. First, strong robust findings held up across method. A surprising amount of the results were pattern consistent across method. Second, the results that changed from method to method, were somewhat fragile. Robust results that could withstand data or modeling alterations in the original method remained consistent. Third, the results here support previous work comparing the importance of fixed country effects that failing to include them in a gravity model may overstate the impact of key variables. The two methods were presented here because they remained strikingly consistent, but also as a means

of comparison. Fourth, though econometric method undoubtedly raises some discussion points and estimation questions, the major trade patterns when using similar variables hold across method. The results indicate that the WTO has a small but positive impact on trade when both members of a trading pair are members of the WTO. Joining the WTO is all about the exports.

Table 2.1-Baseline Results

	Membership		Income		Post 1970		Post 1970	
	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects
Regional	1.319	.602	1.29	.635	1.26	.372	1.25	.416
	(.196)	(.227)	(.216)	(.225)	(.195)	(.232)	(.213)	(.228)
Currency Union	1.619	1.461	1.80	1.456	1.788	1.68	1.92	1.67
	(.165)	(.287)	(.171)	(.282)	(.189)	(.383)	(.199)	(.378)
Distance	-1.437	-1.66	-1.376	-1.668	-1.500	-1.80	-1.44	-1.803
	(.033)	(.038)	(.033)	(.038)	(.032)	(.036)	(.032)	(036)
Real GDP	1.156	.648	1.154	.699	1.167	.993	1.167	.982
	(.013)	(.078)	(.012)	(.077)	(.013)	(.086)	(.012)	(.087)
Real Per Capita GDP	.534	.119*	.138	.02	.513	-.483	.087	-.489
	(.02)	(.072)	(.022)	(.072)	(.019)	(.081)	(.024)	(.081)
Common Language	.472	.65	.596	.648	.515	.66	.630	.659
	(.057)	(.063)	(.056)	(.063)	(.059)	(.063)	(.058)	(.063)
Border	.698	-.108	.788	-.121	.754	-.146	.837	-.154
	(.167)	(.235)	(.175)	(.234)	(.161)	(.216)	(.169)	(.216)
Landlock	-.018		-.188		-.057		-.245	
	(.047)		(.047)		(.046)		(.046)	
Island	.029	-.189	-.105	.044	.054	-.681	-.088	.718
	(.05)	(.291)	(.049)	(.271)	(.05)	(333.2)	(.05)	(.268)
Land Area	-.12	.534	-.117	.488	-.12	.372	-.115	.475
	(.01)	(.055)	(.01)	(.055)	(.01)	(.058)	(.01)	(.057)
Common Colonizer	.621	.693	.822	.694	.536	.746	.752	.746
	(.087)	(.09)	(.088)	(.09)	(.087)	(.09)	(.09)	(.089)
Current Colony	1.241	1.214	1.33	1.21	1.58	.954	1.56	1.126
	(.326)	(.419)	(.308)	(.394)	(.537)	(.812)	(.469)	(.711)
Colony post-1945	1.776	1.55	1.77	1.561	1.98	1.65	1.99	1.66
	(.167)	(.176)	(.179)	(.174)	(.159)	(.167)	(.168)	(.163)
Common Country	-.472	.366	-.492	.67	-1.284	.261	-1.12	.443
	(1.17)	(1.192)	(.941)	(1.02)	(1.02)	(1.18)	(.739)	(.976)
Import Country Membership	-.25	.18			-.31	.22		
	.04	.04			.04	.04		
High Income Import Members			.75	.64			.76	.42
			.05	.09			.05	.12
Middle Income Import Members			-.55	.01			-.57	.22
			.05	.05			.04	.04
Low Income Import Members			-.05	-.12			.10	-.15
			.06	.04			.06	.09
Least Developed Import Members			.53	-.21			.49	-.31
			.06	.11			.07	.10
Export Country Membership	.89	.38			.86	.21		
	.04	.04			.04	.04		
High Income Country Members			1.36	.55			1.72	.04
			.04	.08			.05	.10
Middle Income Country Members			-.05	.35			-.04	.30
			.04	.08			.04	.05
Low Income Country Members			-.42	-.11			-.49	-.21
			.05	.11			.06	.15
Least Income Country Members			-.64	-.24			-.69	-.21
			.07	.15			.07	.18
R-squared	.525	.634	.540	.634	.546	.666	.564	.667
Observations	419,910	381,625	419,910	381,625	331,651	298,166	331,651	298,166

Robust coefficients with standard error in parentheses.

Table 2.2-Trade Flow Between Members

	W/o Country	Country Effects
Member Country Exports to Other Members	.83 .05	.31 .05
Member Country Exports to Non-Members	1.11 .07	.47 .08
Member Country Imports from Non-Members	-.02 .07	.40 .09
Member Country Imports from Other Members	.28 .04	.13 .04
One Country of Trading Pair WTO Member	-.15 .04	-.03 .04
Both Countries WTO Members	.32 .04	.20 .04

	High Income Importing Member		**Middle Income Importing Member**		**Low Income Importing Member**		**Least Developed Importing Member**	
Exporting NonMem	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects
High Income	.64 .23	1.01 .41	-.69 .26	-.13 .34	-.53 .28	.65 .38	.74 .28	.91 .53
Middle Income	1.27 .13	.56 .20	-.25 .12	.28 .13	-.88 .15	-.39 .35	-.29 .19	-.15 .51
Low Income	1.28 .20	1.13 .33	-.95 .21	.71 .26	-1.10 .23	1.61 .74	.24 .29	.38 .96
Least Developed	1.73 .24	.57 .31	-.71 .23	.89 .33	-.96 .25	2.00 .71	-.27 .28	1.93 .69

	High Income Importing Non		**Middle Income Importing Non**		**Low Income Importing Non**		**Least Developed Importing Non**	
Exporting Memb.	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects
High Income	1.52 .26	.64 .41	2.63 .11	.70 .16	2.26 .19	.45 .27	1.63 .22	.51 .33
Middle Income	.78 .25	.17 .28	.86 .11	.50 .12	.48 .18	-.07 .22	.02 .21	-.19 .29
Low Income	.34 .32	.80 .52	-.94 .14	-.02 .38	-.52 .20	1.08 1.29	-.34 .24	-2.03 1.78
Least Developed	-.19 .46	-.54 .72	-1.67 .19	-.83 .62	-.82 .28	1.59 2.67	-.29 .29	-2.02 1.78

	High Income Importing Member		**Middle Income Importing Member**		**Low Income Importing Member**		**Least Developed Importing Member**	
Exporting Memb	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects	W/o Country	Country Effects
High Income	-.12 .08	.39 .09	-.39 .06	-.13 .05	-.39 .08	.17 .09	-.09 .09	-.05 .10

Middle Income	.99 .10	.21 .20	-.22 .09	.11 .09	.99 .11	-.08 .22	-.23 .13	-.22 .28
Low Income	1.83 .14	.71 .24	-.39 .13	.41 .16	-.13 .14	.50 .30	.76 .16	.50 .38
Least Developed	2.46 .20	.94 .41	-.31 .19	.52 .27	.37 .21	-1.12 .49	.60 .22	-1.28 .52

Robust coefficients with standard error below.

Table 2.3-Sample Regional Data

	W/o Country Effects		Country Effects	
	Import	Export	Import	Export
East Asian Members	-.40 .09	1.01 .07	.63 .12	1.23 .13
Latin America Caribbean Members	-.36 .06	-.44 .06	-.15 .06	.11 .06
Middle East and North African Members	-.19 .12	-.92 .10	-.11 .11	-.39 .14
Sub-Saharan Africa Members	.75 .05	-.39 .07	-.18 .09	.14 .14
South Asian Members	-1.70 .12	.17 .08	-1.00	-.89

Robust coefficients with standard error below.

Table 2.4-Sample Country Data

	Overall		Years 0-5		Years 6-10		Years 11-15	
	Imports	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**
Argentina	-.29	-.03	.26	.15	-.17	-.67	-.32	-.43
	(.31)	(.23)	(.30)	(.19)	(.26)	(.27)	(.27)	(.38)
Egypt	.47	-.30	1.13	.02	-.24	-.98	-.12	-1.03
	(.26)	(.26)	(.29)	(.24)	(.24)	(.36)	(.30)	(.34)
Iceland	.17	-.19	-.10	.22	.03	-.07	.23	.10
	(.34)	(.43)	(.31)	(.38)	(.34)	(.45)	(.44)	(.45)
Ireland	-.25	1.43	.16	-.05	-.37	1.44	-.34	1.27
	(.20)	(.26)	(.23)	(.32)	(.15)	(.29)	(.16)	(.31)
Mauritius	-.29	1.66	-.02	1.18	.33	.35	.06	.71
	(.30)	(.60)	(.22)	(.46)	(.40)	(.45)	(.37)	(.47)
Singapore	.40	.69	-.14	-.17	-.36	-.94	-.57	-1.05
	(.23)	(.15)	(.26)	(.26)	(.19)	(.33)	(.20)	(.36)
South Korea	-1.21	2.90	.83	.34	-.09	1.04	.19	.99
	(.39)	(.39)	(.44)	(.52)	(.25)	(.50)	(.25)	(.51)
Switzerland	.96	.39	.47	.09	.39	.11	.44	.38
	(.23)	(.09)	(.23)	(.07)	(.17)	(.21)	(.17)	(.21)
Zaire	.31	.72	.82	.96	-.66	.34	-1.07	-.37
	(.27)	(.36)	(.27)	(.39)	(.34)	(.43)	(.43)	(.51)

Robust coefficients with standard error below.

Table 2.5-Changing the Data

	Without Country Effects	Country Effects
Member Imports Excluding Industrialized Country Importers	-.39 .04	.06 .04
Member Exports Excluding Industrialized Country Importers	1.09 .05	.43 .05
Member Imports Excluding Industrialized Country Exporters	-.006 .05	.35 .05
Member Exports Excluding Industrialized Country Exports	.48 .05	.27 .05
Member Imports Excluding Industrialized Countries	-.50 .05	.07 .06
Member Exports Excluding Industrialized Countries	.41 .05	.24 .06
Member Imports Excluding Africa, the Pacific, East Europe and Central Asia	-.26 .06	.06 .05
Member Exports Excluding Africa, the Pacific, East Europe and Central Asia	.98 .06	.39 .05
Member Imports for trade only between Latin America, the Middle East, Asia, and Africa	-.25 .04	.18 .04
Member Exports for trade only between Latin America, the Middle East, Asia, and Africa	.89 .04	.38 .04
Member Imports for Trade within Africa only	-.25 .04	.18 .04
Member Exports for Trade within Africa only	.89 .04	.38 .04
Member Imports Excluding Real Imports under $100,000	-.002 .02	.13 .05
Member Exports Excluding Real Imports under $100,000	-.07 .03	.39 .05
Member Imports Excluding Real Imports under $500,000	-.03 .03	.16 .04
Member Exports Excluding Real Imports under $500,000	-.20 .04	.42 .04
One Country of Trading Pair WTO Member under Rose data organization (i.e. prior to adding inverted data)	.01 .04	-.05 .04
One Country of Trading Pair WTO Member with second trading relationships (i.e. inverted data)	-.31 .05	-.15 .05
Both Members of Trading Pair WTO Member under Rose data organization (i.e. prior to adding inverted data)	.21 .05	.15 .05
Both Members of Trading Pair WTO Member with second trading relationships (i.e. inverted data)	.44 .05	.44 .05

Robust coefficients with standard error below.

Table 2.6-Robustness Checks

	Import	High Income	Middle Income	Low Income	Export	High Income	Middle Income	Low Income
OLS Random Member Variable	.007 (.009)				.024 (.009)			
Country Effects Random Member Variable	.002 (.008)				.019 (.009)			
WLS Country Observation Weight	.09 (.11)	1.68 (.22)	.02 (.17)	-.15 (.13)	.54 (.11)	2.48 (.21)	1.01 (.15)	-.04 (.13)
WLS Real GDP Weight	-.24 (.04)	.72 (.06)	-.41 (.05)	-.60 (.06)	.89 (.04)	2.07 (.06)	.74 (.05)	-.15 (.06)
WLS Real GDP Weight w/country effects	.19 .04	.64 .08	.02 .05	-.13 .09	.38 .04	.56 .08	.35 .05	-.11 .12
WLS Real GDP Per Capita Weight	-.25 (.04)	.67 (.06)	-.41 (.05)	-.61 (.06)	.91 (.04)	2.04 (.06)	.73 (.05)	-.16 (.06)
WLS Real GDP Per Capita w/ country effects	.18 .04	.62 .08	.02 .04	-.13 .08	.38 .04	.54 .08	.35 .05	-.13 .12
WLS Real Trade Weight	-.14 (.03)	.40 (.04)	-.15 (.03)	-.43 (.04)	.29 (.03)	.98 (.04)	.04 (.04)	-.24 (.04)
WLS Real Trade Weight w/country effects	.15 .02	.22 .05	.10 .03	.04 .05	.12 .03	.42 .05	.04 .03	-.34 .07
Fixed Effects	-.23 (.01)	-.08 (.03)	-.21 (.02)	-.18 (.05)	.91 (.01)	1.25 (.03)	.94 (.02)	.88 (.05
Random Effects	-.33 (.01)	.33 (.02)	-.33 (.02)	-.75 (.04)	.81 (.01)	1.66 (.02)	.83 (.02)	.30 (.04)

Robust coefficients with standard error in parentheses.

References

Anderson, James, 1998, "Trade Restrictiveness Benchmarks", *The Economic Journal*, July 1998

Anderson, James and Marcouiller, Douglas, 1999, "Trade, Insecurity, and Home Bias: An Empirical Investigation", NBER Working Paper 7000

Anderson, J.E. and van Wincoop, Eric, 2004, "Trade Costs", NBER Working Paper No. 10480

Anderson, J.E. and van Wincoop, Eric, 2003, "Gravity with Gravitas: A Solution to the Border Puzzle", *The American Economic Review*, Vol. 93 No. 1, March 2003

Arora, Vivek and Vamvakidis, Athanasios, 2004, "How Much Do Trading Partners Matter for Economic Growth?", *IMF Working Paper*

Bagwell, Kyle and Staiger, Robert, 1999, "An Economic Theory of GATT", *The American Economic Review*, March 1999

Barry, Frank, John Bradley, and Aoife Hannan, 2001, "The Single Market, the Structural Funds, and Irelands Recent Economic Growth", *Journal of Common Market Studies*, Vol 39 No. 3, September 2001

Barry, Frank, 2000, "Convergence is not Automatic: Lessons from Ireland for Central and Eastern Europe", *The World Economy*, Vol. 23 No. 10, November 2000

Barry, Frank and Bradley, John, 1997, "FDI and Trade: The Irish Host Country Experience", *The Economic Journal*, Vol. 107 No. 445, November 1997

Eichengreen, Barry and Douglas Irwin, 1995, "Trade blocs, currency blocs, and the Reorientation of World Trade in the 1930's", *Journal of International Economics*, 38:1-24

Egger, Peter, 2002, "An Econometric View on the Estimation Gravity Models and the Calculation of Trade Potentials", *The World Economy*, Vol. 25 No 2, February 2002

Egger, Peter, 2000, "A Note on the Proper Econometric Specification of the Gravity Equation", *Economic Letters*

Feenstra, Robert, 2002, "Border Effects and the Gravity Equation: Consistent Methods for Estimation", *Scottish Journal of Political Economy*, Vol. 49 No.5, November 2002

Feenstra, Rober, Markusen, James, and Rose, Andrew, 2001, "Using the Gravity Equation to Differentiate Among Alternative Theories of Trade", *Canadian Journal of Economics*, V. 34 N. 2, May 2001

Frankel, Jeffrey and Romer, David, 1999, "Does Trade Cause Growth?", *The American Economic Review*, June 1999

Glick, Reuven and Rose, Andrew, 2001, "Does a Currency Union Affect Trade? The Time Series Evidence", *European Economic Review*, Volume 46, Issue 6, June 2002

Hausmann, Ricardo, Pritchett, Lant, and Rodrik, Dani, 2004, "Growth Accelerations", *Journal of Economic Growth*, Volume 10 Number 4, December 2005

Lee, Ha Yan, Ricci, Luca Antonio, and Rigobon, Roberto, 2004 "Once Again, is Openness Good for Growth?", *IMF Working Papers*

Matyas, Laszlo, 1997, "Proper Econometric Specification of the Gravity Model", *The World Economy*, Vol. 20 No. 3, May 1997

Matyas, Laszlo, 1998, "The Gravity Model: Some Econometric Considerations", *The World Economy*,Vol. 21 No. 3, May 1998

McCallum, John, 1995, "National Borders Matter: Canada-U.S. Regional Trade Patterns", *The American Economic Review*, June 1995, Vol. 85 No. 3

Pritchett, Lant, 1996, "Measuring Outward Orientation in LDC's: Can it Be Done?", *Journal of Development Economics*, Vol 49, 1996

Rivera-Batiz, Luis and Xie, Danyang, 1992, "GATT, Trade, and Growth", *American Economic Review*,

Rodriguez, Francisco and Dani Rodrik, 1999, "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross National Evidence", NBER Working Paper 9912

Rodrik, Dani, 2000, "Trade Policy Reform as Institutional Reform", *Developing Countries and the Next Round of WTO Negotiations*, 2000

Rose, Andrew, 2004, "Do We Really Know the WTO Increases Trade?", *The American Economic Review*, Vol. 94 No.1, March 2004

Rose, Andrew, 2004b, "Does the WTO Make Trade More Stable?", *Open Economies Review*, Volume 16, Number 1, January 2005

Rose, Andrew, 2003, "Which International Institutions Promote International Trade?", *Review of International Economics*, Volume 13 No. 4, September 2005

Rose, Andrew, 2002, "Do WTO Members Have More Liberal Trade Policy?", *Journal of International Economics*, Volume 63 Issue 2, July 2004

Rose, Andrew and Spiegel, Mark, 2003, "A Gravity Model of Sovereign Lending: Trade Default and Credit", NBER Working Paper 9285

Subramanian, Arvind and Wei, Shang-Jin, 2003, "The WTO Promotes Trade, Strongly But Unevenly", *Journal of International Economics* forthcoming

Tomz, Michael, Goldstein, Judith, and Rivers, Douglas, 2005, "Membership Has Its Privileges: The Impact of GATT on International Trade"

Walsh, Brendan, 1996, "Stabilization and Adjustment in a Small Open Economy: Ireland 1979-95", *Oxford Review of Economic Policy*, Vol. 12 No. 3, 1996

Chapter 3

Re-Examining the Impact of Democracy on International Trade

Scholars and policy makers believe that democracy will bring prosperity through integration into the global economy via increased international trade. The underlying assumption of the democracy and prosperity theory is that democratic states trade more than non-democratic states, increasing their national income and support for democracy in mutually reinforcing feedbacks (Oneal and Russett 1997, Oneal, Oneal, Maoz, and Russett 1996). The empirical evidence to support this claim, however, is thin and debated. Existing research is plagued by methodological problems that obscure the empirics and avoid the theoretical problem of why democracies may or may not trade more. Empirically, previous research has tended to focus on dyadic pairs and major powers utilizing small samples, thus introducing a number of biases (Morrow, Siverson, and Tabares 1998). Two democratic countries may trade more than other pairs of countries, but this does not answer whether democratic countries trade more than non-democratic countries. This makes any conclusion about the impact of democracy explicitly dependent on a country's trading partners rather than isolating the impact of democracy. Theoretically, the work has failed to provide a theory as to why a democracy would trade more than a non-democracy, instead studying dyadic pairs focusing on alliances or trade agreements, rather than whether a democratic state will engage in higher levels of international trade. In fact, much of the debate has argued that democracy

increases trade while empirically using country pairs. Using dyadic pairs, however, asks a subtly different question than whether democracy increases trade relying on the relationship between two countries rather than the impact of democracy on a country.

In this paper, I seek to correct these shortcomings and determine whether democracies trade more than autocratic states, and, furthermore, the transmission mechanisms for democracy to impact international trade. I test two theories as to why democracies might trade more. First, political freedom may be correlated with economic freedom, thus prompting higher levels of economic activity thereby driving states to trade more. The implicit assumption made by scholars and policy makers is that opening up the political process implies increased economic freedom thereby resulting in increased international trade. Second, democracy implies higher quality governance either through institutions or policy making procedures. This implies that regulatory quality, democratic structures, or legal frameworks might be a channel through which democracy impacts trade. In other words, a well managed state results in a more prosperous state. There is some theoretical reason to pursue this line as game theoretic research implies that a monadic rather than dyadic approach may provide useful insights to trade policy (Dai 2006). The approach here differs from previous studies by focusing on importing or exporting country democratic

variables independent of their partner and on the potential transmission mechanism which might drive trade.

To test the impact of democracy on trade and the potential transmission mechanisms, I utilize a bilateral gravity trade model covering approximately 150 countries from 1950 to 1999, with fixed effects for time, importers, and exporters. A model commonly used by economists to study the impact of the natural determinants of trade, the gravity model is considered both theoretically and empirically successful in explaining trade flows between states. Utilizing the Goteborg University Quality of Governance Time Series Database, I study the impact of democracy, economic freedom, and institutions on international trade (Goteborg 2006). By "searching for significance in the residual" of the gravity model, I test whether the commonly held assumption that democratic states trade more than autocracies holds empirically. I also test potential transmission mechanisms which may provide evidence of how democracy may promote international trade. I find the theory that democracy, and many of its components, promotes international trade unconvincing. The coefficients are the theoretically correct sign; however, many are statistically or economically insignificant and fragile to changes in modeling or data. Economic freedom does not have the expected impact on international trade levels, but quality of governance variables have broad economic and statistical significance. Democracy may not have the impact on trade that others have claimed.

The Theory of International Trade and Democracy

Despite policy declarations and academic research demonstrating the positive relationship between international trade and democracy, there is little theoretical reason why democracy should raise trade levels. The empirical work linking international trade and democracy has focused on dyadic trade which, while valuable as an empirical result, does not answer the question whether democracy impacts trade in one country (Rogowski 1987, Mansfield and Busch 1995, Bliss and Russett 1998, Mansfield, Milner, and Rosendorff 2000). The use of dyadic trade research explicitly links the impact to democracy in both countries and potential reasons they may trade more such as military alliances, language, and trade agreements. Though it is empirically interesting why pairs of countries trade more than other pairs of countries, this dyadic focus does not answer what impact democracy has on international trade levels in one country. In other words, using dyadic trade measures does not answer whether improving democracy in country A will increase international trade levels in country A. Numerous methodological reasons exist that utilizing dyadic trade will obscure the results. First, focusing on dyads introduces a rich country bias because observed international trade typically involves a rich democratized country in the pair, thereby biasing results upward. Poor democratic pairs which fail to engage in international trade would reduce the democratic result

but are not observed. Second, previous work omitted important variables or methods which significantly impact trade. In other words, more rigorous gravity models may reduce the impact of democracy on international trade. Third, the result that pairs of democracies trade more, while empirically interesting, is a subtly different question from whether democratic states trade more. This question fails to isolate the impact of democracy on one country, making it explicitly dependent on other states. A better test of the impact of democracy on trade is whether democracies trade more than non-democratic states.

Though previous research has argued that international trade increases with democracy, political scientists and economists have demonstrated how international trade may be restrained by the democratic process (Kono 2006, Yu 2006, Grossman and Helpman 1994, Goldberg and Maggi 1997, O'Reilly 2005). Others have focused on how democratic systems, such as presidential or parliamentary, impact international trade levels (Ang, Drury, Peksen, and Rudy 2005, Roelfsema, 2004, and Nielson 2003). Going further, democracy's impact on related economic processes is just as shaky. Research indicates that democracy has little to no impact on economic growth and may even restrain it past certain levels of income primarily in higher income countries (Rodrik and Wacziarg 2005, Baum and Lake 2003). Similarly, others have argued that increased levels of trade openness and foreign investment negatively impact democracy (Li and Reuveny 2003). These findings by a variety of scholars are difficult to reconcile

with the idea that democracy positively impacts trade. Democracy may be a positive end, but the evidence that it can be used as a means to drive international trade and support economic growth is shaky.

Previous research, has formulated a theory of why democratic dyads may trade more, focusing on pair-wise reasoning. Proponents cite a few major arguments as to why democratic pairs trade more. First, democratic states use trade agreements to promote trade between themselves (Gowa and Mansfield 1993). Second, states use trade to reduce insecurity between partners (Long 2003). Third, business feels more secure dealing with similar political environments (Dixon and Moon 1993). These arguments do not pertain to the question of whether a democratic state will trade more than an autocratic state for a few reasons. First, the majority of states that enter into trade agreements are rich countries which tend to extend trade benefits to states for a variety of reasons ranging from geopolitical importance to colonial history among others. This biases the observation of trade agreements to those rich states where trade is already higher due to income or other factors. Second, while business may feel better dealing with democratic states and ensuring security between alliance partners, these factors may be captured by more rigorous use of the gravity equation including factors like language, religion, or colonial history. In other words, democracy may not be the key variable.

Decomposing the trade and democracy relationship into its impact on importers or exporters, why should democracies enjoy higher levels of international trade than non-democracies? There are two implicit arguments made by proponents of the trade and democracy theory. First, political freedom promotes with economic freedom. When making the argument that democracy positively impacts trade, scholars and policy makers alike make the argument that there is a strong relationship between political and economic freedom. Theoretically speaking, the assumption is that democracy results in increased political liberties and subsequently in increased economic freedoms, which promotes economic activity and international trade. Conversely, the many assume that autocracies trade less due to their lower levels of political freedom. In other words, if countries do not permit basic political rights then they will most likely deny economic rights that would promote commerce and international trade. Empirically, this requires that democratic variables proxy for economic freedom. There is some empirical evidence to support this theory.

Figure 3.1-The Economic and Political Freedom Relationship

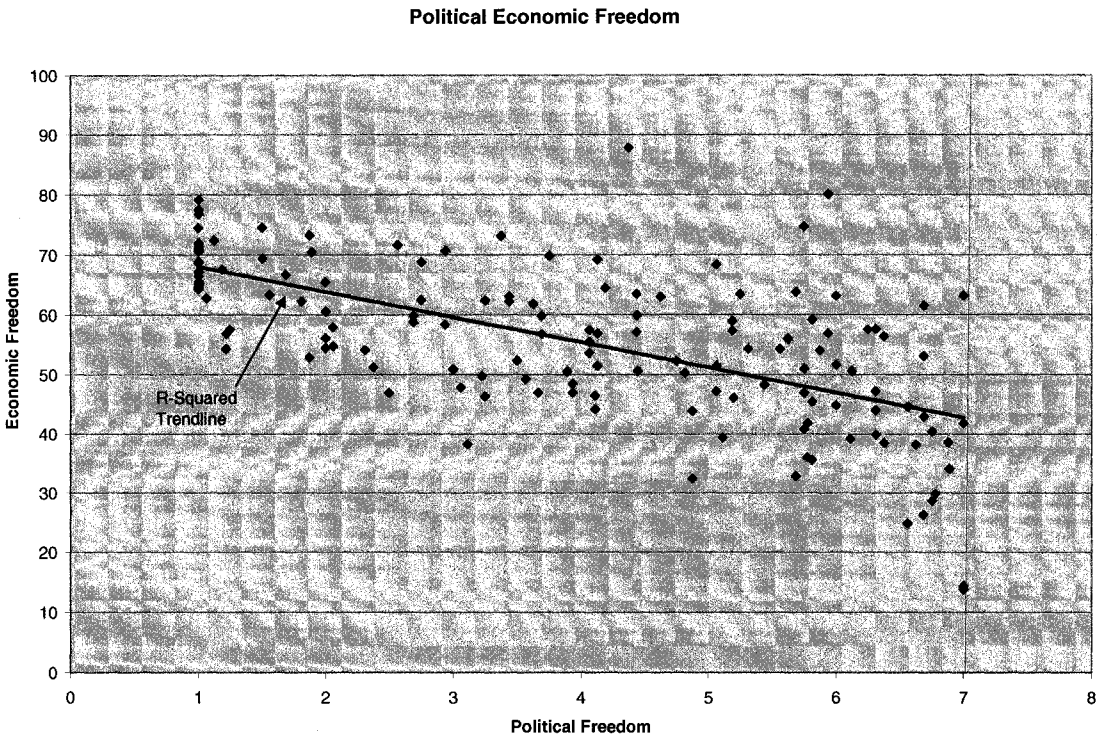


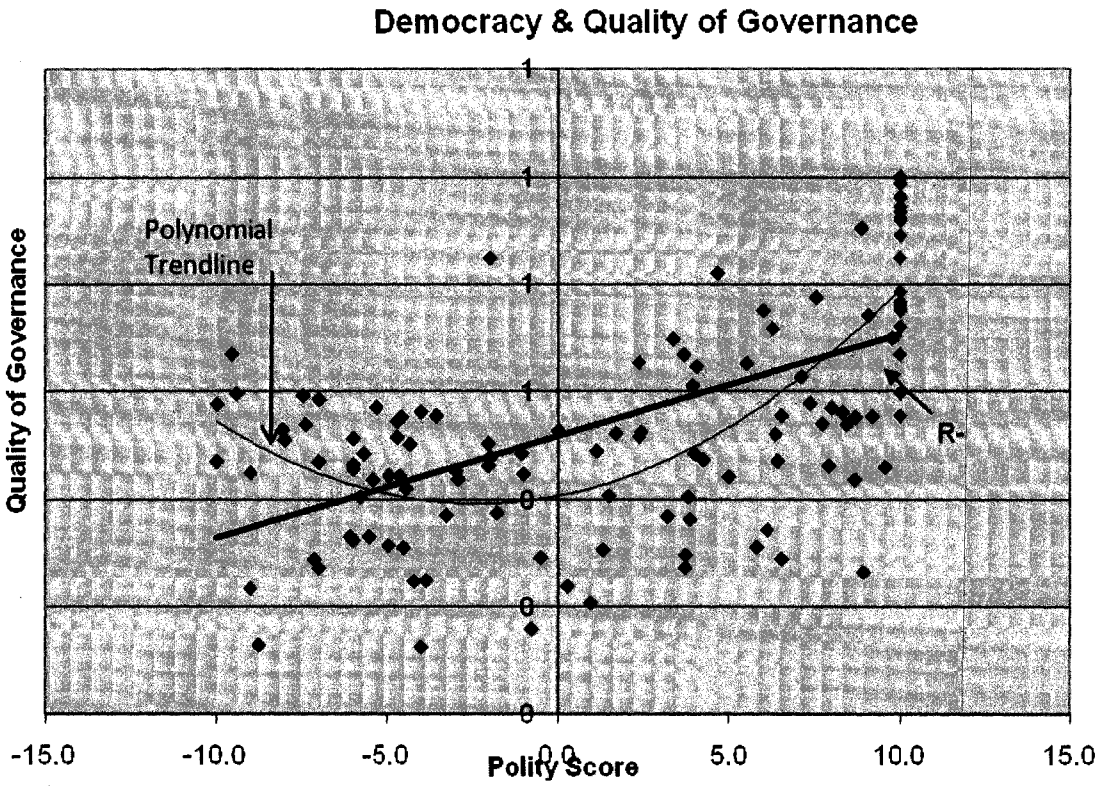
Table 1 uses the Heritage Foundation Economic Freedom Index and the Freedom House Political Rights Index and demonstrates a correlation between economic freedom and political liberties.[22]

Second, democracy is related to improved governance, policy making, regulation, or rule of law. Economists have argued that institutions and the rule of law matter to economic growth and international trade via the confidence that business will have in making investments and move goods. Theoretically

[22] In this plot on the Political Freedom axis, 1 is free and 7 is not free. On the Economic Freedom axis 100 is considered free and 0 is considered not free. Therefore, points in the upper left hand corner are both politically and economically free while those in the lower right hand corner are not free.

speaking, as politicians become increasingly responsible to the electorate, the democratic process should bring about a more open and transparent system of government that will allow businessmen to pursue increased economic activity secure in the knowledge that their activities will be governed by predictable laws and regulatory frameworks managed by responsible bureaucrats. Turning this around, while democracy correlates closely with improved governance, numerous examples of well governed non-democratic states exist. Therefore, non-democratic states with quality government that seeks to promote economic development may have higher levels of international trade than poorly governed democratic states. However, as democracy is correlated with improved quality of governance it is more likely that non-democracies will theoretically trade less. Empirically speaking, acting as an instrumental variable in the place of democracy, it should be possible to detect the impact of institutional, rule of law, or regulatory quality measures on international trade if economic activity depends on these variables. Looking at a broad measure of the quality of governance, first glances are not promising.

Figure 3.2



Taken from the International Country Risk Guide Quality of Governance and the Polity IV datasets, only a weak relationship exists between the quality of governance and democracy. Though more specific governance measures such as the Governance Effectiveness and Regulatory Quality Index exhibit a greater correlation with democracy, as will be seen later, they exhibit similar empirical results.[23]

[23] Please see Appendix 1 for the Polity, Governance Effectiveness, and Regulatory Quality scatter plots.

Data and Methodology

The data comes from Andrew Rose (2003) downloaded from his website.[24] Rose uses a bilateral gravity model controlling for the "natural" determinants of trade. The gravity model has been used by a wide variety of authors to study a wide variety of trade issues (Feenstra, Markusen, and Rose 2000, Rose and Spiegel 2003, Anderson and van Wincoop 2003, 2004, Feenstra 2002, Glick and Rose 2001, Rose 2003, Rose 2004b, Frankel and Romer 1999). The STATA dataset covers 177 countries with controls for natural variables like distance, GDP, and land area.[25] It also includes a comprehensive set of dummy variables that control for such variables as common language between the trading pair, colonial history, and geographic factors such as land locked countries. International Monetary Fund Direction of Trade data was extracted from the online database Webstract for the years 1950 to 1999.[26] The natural log of real imports for the importing country was arrived at by averaging the exports of country two with the imports of country one, deflating by the 1982-1984 Urban Consumer CPI, and taking the natural log. Finally, time series democratic variables were extracted from the Polity IV and the Quality of Government datasets. The Polity IV dataset included observations about the transfer of power, institutional quality, and scores ranging from democratic to autocratic. These observations consisted of

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[24] To download the data, paper drafts, and supporting output for STATA please go to **haas.berkley.edu/arose**.

[25] For a complete explanation of the Rose dataset please see Rose (2003).

[26] Please note that in my data set due to direction of trade data, not all countries from the Rose data set have been included. For instance Bhutan, Namibia, and Swaziland were not included as there were not four trade numbers from which to arrive at an average of two import data statistics.

scores on a range from –10 to 10 with 10 being completely democratic.[27] The Quality of Government Institute (QOG) at the University of Goteborg compiled a wide variety of democracy and related measures of the overall quality of government from different datasets. The QOG variables are used to compare against the Polity IV where possible and study potential transmission mechanisms and test whether references to democracy in fact proxy for other measures of freedom or institutional considerations. In other words, potential secondary factors that correlate with democracy may act as transmission mechanisms for how democracy impacts international trade.

There are number of methodological issues that should be mentioned. First, this study regresses against imports rather than average real trade. This allows us to isolate the impact on exporters or importers. Second, country one import data was averaged with country two export data and vice versa. This produced two numbers: average country one imports and exports or averaged country two exports and imports, depending on the point of view.[28] The country two imports, or country one exports, were then inserted as the dependent variable and all necessary variables inverted. This change did not affect most of the bilateral variables such as distance, language, and border.

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[27] Some of the variables are mere addition and or subtraction, so for this limited study, I will focus only on the single variable rather than introducing multi-dimensional variables of democracy though they are important.

[28] Though the imports of country 1 should equal the exports of country 2, this is not always the case. As I am regressing against the natural log of real imports, averaging the imports of country 1 with the exports of country 2, and vice versa, creates a smoother number for analysis.

This change has two major effects. First, it significantly enlarges the dataset. Rose has 234,597 observations of overall trade; this change creates a data set when merging with Polity IV democracy variables consisting of 326,483 observations. Second, this permits an examination of the impact of democracy on imports and exports. With average real trade, the United States and the United Kingdom had one relationship of overall trade and did not differentiate between import or export trade; now there is a two way relationship. This is not a minor point. Many trading relationships, especially ones involving lesser developed countries, have goods moving in one direction but not both, that is highly unbalanced trade between two countries. Where real imports equaled zero, the natural log of one was used as the import value. In other words, many observations of real trade are zero or lower.[29] Though this may be a point of contention for some, it more accurately reflects actual trade observations, without excluding the lack of trade as a non-observation.

Third, I run regressions with fixed importer and exporter effects. Whether or not to utilize fixed importer and exporter effects remains an open question among regular gravity model users. However, there is significant, though as of yet unresolved, reason to believe that including fixed importer and exporter effects reduces the tendency to over estimate coefficients and increases the quality of estimation. As others have noted (Feenstra 2002, Anderson and Van

[29] The natural log of small numbers is negative therefore many observations of real imports are negative observations. 12.8% of all observations of the natural log of real imports were zero or below.

Wincoop 2003), utilizing a gravity model may not correctly estimate key variables. Many possibilities have been proposed to correct for friction, remoteness, policy, country, and time. An international border unquestionably brings about additional variables that impact the flow of trade as demonstrated most notably by McCallum (1995). McCallum, omitting fixed importer and exporter effects, found an implausible 2,200% increase in intra-Canadian trade due to the border with the United States. As others have demonstrated, including country effects change the results but will provide more moderate results and a better estimation of the data (Anderson and van Wincoop 2003, Feenstra 2002, Egger 2000, Egger 2002, Matyas 1997, Matyas 1998). I include a comprehensive set of fixed effects for importers, exporters, and time. In other words, every importing country has a unique variable coded 1 when they are the importing country and 0 otherwise; every exporting country has a unique variable coded 1 when they are the exporting country and 0 otherwise; every year has a variable coded 1 during that year and 0 otherwise. Though this significantly increases the number of variables used in the model, as other research indicates, this provides a much better estimation of gravity model coefficients. To the best of the author's knowledge, no other research studying the relationship between international trade and democracy has utilized fixed year, importer, and exporter effects. I seek to correct this oversight.

Fourth, measures of democracy, with no offense intended to the hard working and diligent compilers of datasets, remain inherently subjective snap shots. Despite the rigor applied by hard working social scientists and policy makers, statistics on democracy remain qualitative variables which do not capture the same meaning as observed statistics of distance, for instance, or GDP. Scholars have sought to get around this by using an instrumental variable which is highly correlated with democracy such as the death penalty or related factors (Yu 2006 and Harrelson-Stephens and Callaway 2003). However, in a separate study comparing three measures of democracy with high level of correlation, each measure of democracy produces different results (Casper and Tufis 2002). As the results here support, measures of democracy which attempt to capture the same qualitative phenomenon may produce different results. Though the empirical evidence that democracy positively impacts international trade is lacking, it may stem from the inability of measures of democracy to properly capture and quantify it.

Fifth and finally, work to date studying international trade and democracy has failed to fully correct for the role of income. Cross country studies have typically failed to correct for the role of income in democracy and international trade. Some cross country studies of trade and democracy have gone so far as to focus on major powers, primarily rich democracies, and proclaim statistical significance (Morrow, Siverson, and Tabares 1998). It is not enough to control for

real GDP. The gravity model requires additional controls to correct for the rich country bias in international trade especially when focusing on dyadic pairs. Most international trade involves at least one rich country, which is likely to be a democracy. This failure to do correct for these empirical issues has biased results upward and consequently found that democracy has a large and statistically significant impact. Other bilateral gravity model studies have demonstrated that when the impact of rich countries is controlled for, the cross country significance drops dramatically and heads to zero for middle and low income countries (Subramanian and Wei 2006). My research will include a variety of tests or controls for the impact of rich democracies, isolating the impact of democracy on international trade.

The Model

To study the impact of democracy on international trade, I utilize a standard gravity equation model. To differentiate the importance of democracy on imports and exports, it is necessary to control for the potential range of democracy within each country. The basic model will be specified as follows:

$$Ln(M_{ijt}) = lnD_{ij} + ln(Area_iArea_j) + ln(Y_iY_j) + ln(Y_iY_j/Pop_iPop_j) + Lang_{ij} + Border_{ij} + Landl_{ij} + Island_{ij} + ComCol_{ij} + CurCol_{ij} + Colony_{ij} + Comctry_{ij} + Custrict_{ijt} + FTA_{ijt} + T_t + MDem_i + XDem_j$$

where i and j denote trading partners, t denotes times, and the variables are[30]:

- M_{ijt} is the real imports of i from j at time t
- D is the distance between i and j
- Y is real GDP
- Pop is population
- Lang is a dummy variable which is unity if i and j have a common language
- Border is a dummy variable which is unity if i and j share a land border
- Landl is the number of land locked countries in the country pair (0,1,2)
- Island is the number of island nations in the pair (0,1,2)
- Area is the area of the country (in square kilometers)
- Comcol is a dummy variable which is unity if i and j were ever colonies after 1945 with the same colonizer
- Curcol is a dummy variable which is unity if i is a colony of j at time t or vice versa
- Colony is a dummy variable which is unity if i ever colonized j or vice versa
- Comctry is a dummy variable which is unity if i and j were a part of the same country at some point during the sample
- Custrict is a dummy variable which is unity if i and j use the same currency at time t
- FTA is a dummy variable which is unity if i and j belong to the same regional trading agreement

[30] The models, variables, dataset, and descriptions are almost completely from Rose (2003) except as noted previously.

- T is a comprehensive set of annual time "fixed effects" with one dummy per year
- MDem is a measure of democracy in the importing country i at time t
- XDem is a measure of democracy in the exporting country j at time t

This model disaggregates trade into the impact of democracy on importers and exporters. The regressions utilized an importer or exporter democratic variable, but not both simultaneously. Taking this approach, I seek to isolate the impact of democracy rather than introducing controls for the political regime of the trading partner. In other words, do autocratic states import more by restricting domestic production or do democratic states avoid buying from non-democratic states that treat their citizenry poorly? This model will answer these questions.

The Results

The biggest result from the model is no result at all. The baseline results, presented in Table 1, indicate that though the democracy variables may have a statistically significant impact on trade, the economic impact is minimal. Before turning to the democracy variables, it is important to note in brief that the gravity variables returned the expected results in line with the literature.[31] The coefficient for distance was large and negative while that for GDP was large and

[31] Table 1 does not present the results of all baseline regressions as all basic gravity model variables such as distance and GDP returned nearly identical coefficients across regressions. The focus of this study is on the democratic, autocratic, and polity variables rather than the impact of distance.

positive.[32] The gravity model preformed as expected. The interesting portion of the model came from the democracy variables. The baseline results come from three democratic variables. The first is a democratic index on a scale of 0 to 10 with a 10 indicating complete democracy. The second is an autocratic index on a scale of 0 to 10 with a 10 indicating complete autocracy. The third is a combination of the democratic and autocratic indexes which equals the democratic score minus the autocratic score and it is called the Polity index. This last index ranges from –10 to 10. Though this last index may seem redundant it is worth emphasizing that most countries throughout the world have some democratic features as well as some autocratic features. Most are somewhere in between rather than either/or.

The democracy variables taken from the Polity IV database indicate that democracy has a statistically significant but substantively minimal impact on international trade. All of the coefficients are small though statistically significant. As expected, democracy increases trade while autocracy has no economically or statistically impact on trade. The polity index returns coefficients that are almost zero with the only economically significant variable indicating that if a country went from absolute autocracy to absolute democracy

[32] It is worth noting and emphasizing that due to econometric issues not every variable will appear in each variation of the model especially between the perturbations with and without country effects. This is in keeping with the gravity model literature and observation of plausibility. It is worth emphasizing that there is a significant degree of similarity between the regressions with or without fixed country effects.

exports would increase 2%.[33] Finally, though the coefficients return the expected sign and demonstrate statistical significance, this should be considered based upon the amount of data used. In other words, as the number of observations increases almost everything will become statistically significant. The statistical significance and economic insignificance imply that democracy is statistically significant because of the sample size implying that democracy may have an even lower level of importance than the data indicates. The largest impact on trade comes from the importer polity variable which if maximized would result in a 4% higher imports.

A Second Level of Variables

Included in the Polity IV database are variables which are generally associated with the characteristics of democracy. Though they do not measure democracy per se, they are generally recognized to be characteristics of the democratic process. There are a few basic points that need to be made about the results. First, the basic result is that the coefficients are economically and statistically insignificant. Even at high levels, they would only increase imports by 2%. Second, even though they claim to measure different aspects of the democratic process, all variables from the Polity IV dataset such as Executive

[33] It is worth noting that the gravity model in the absence of fixed country effects returned some rather large returns to certain variables. In fact many users of the gravity model now include fixed country effects to moderate implausibly large returns on variables. In fact the Polity Exporter variable comes back close to zero indicating the coefficient without fixed country effects should be taken with a grain of salt.

Constraints and Regulation of Participation, except Durability, presented in Table 2 perform similarly in the gravity model. Though these variables attempt to measure different aspects of the democratic process, they do not appear to succeed. Third, the lack of statistical or economic significance is not necessarily a negative finding. There is little political science or economic reasoning to believe that the democratic characteristics presented in Table 2 would have a significant impact on trade except in rather indirect ways and the results support that. For instance, there is little reason to expect that the Competitiveness of Executive Recruitment would significantly and directly impact imports or exports and I find little economic impact.

Democracy and the Rest of the Story

Literature arguing that democracy positively impacts trade implies that democracy has an indirect effect through economic freedom or quality of governance. In Table 3, I present a range of variables taken from the Quality of Government dataset and test them against the gravity model.[34] These are variables that proxy for democracy via their correlation with characteristics one would associate with an open and free government. Two things are important to remember. First, though I do not present every government related variable from the QOG dataset, the results are broadly representative. Second, just

[34] As previously noted, all regressions were done using STATA with fixed importer and exporter effects and one importer or exporter democratic variable, but not both simultaneously, used.

because a coefficient is negative does not mean a negative relationship between democracy and trade due to the scaling relationship used in the specific variable. In other words, some variables imply improvement moving towards 1 while others imply improvement moving away from 1.

There are some broad patterns and interesting results. First, while the coefficient signs are what would be expected, the consistency of economic or statistical significance is underwhelming. Statistical significance for democratic related variables is achieved in roughly 2/3 of cases while, similar to the Polity IV results, economic significance is lacking in other cases. This does not mean the democracy is irrelevant to trade, just that strong evidence of its impact remains wanting. Second, many of the coefficients, when comparing between imports and exports, are either signed differently or insignificant. When counting economic and statistical insignificance, 20 of the 27 coefficients have either opposite signed import and export coefficients or at least one insignificant coefficient. This implies that democracy and its characteristics may not be as unequivocally good at raising trade as argued and may potentially cause overall trade to cancel out if imports and exports move in opposite directions.

Taking a closer look, however, some of the coefficients lend themselves to economic incentive explanations. First, the freedom of association type variables which come from CIRI indicate that civil liberties increase imports but have either a negative or insignificant impact on exports. It may be possible that

societies when exposed to freedom desire foreign goods, but there would seem little reason for freedom of association to drive exports. Second, Transparency International corruption coefficients are insignificant while World Bank corruption statistics are negative, economically, and statistically significant, reducing imports but driving exports. Research indicates that corruption harms growth via the reduction in investment and these results tentatively support those conclusions (Mauro 1995). However, it is not an implausible scenario to imagine where large rich and politically connected exporters seek favors from the government which promotes their products while harming foreign producers. Third, legal and economic security variables are largely insignificant for imports but have a large impact on exports. Fraser Institute, Heritage Foundation, and World Bank all seem to have no effect on imports while positively impacting exports.[35] Though initially counter intuitive, this makes economic sense as exporters to country A care little about the legal framework in country A and more about the credit worthiness of their trading partner. Conversely, an exporter from Country A will be significantly impacted if they face potential expropriation or harassment while attempting to export their goods abroad not faced by a company in a well governed country. Fourth, the quality of governance results have a range of coefficients on imports but are generally economically and statistically significant on exports. The only negative

[35] It is important to remember that due to scales used, some coefficients maybe negative and imply positive findings. Freedom House utilizes a 1 as most free and 7 as least free which results in a negative coefficient.

coefficients are insignificant and only on the import side. There are a few potential factors at work. Governance would seem to have little impact on import demand and instead would flow through via increased income indirectly raising imports. Governments, even of the democratic variety, tend to dislike imports while actively promoting exports which may explain the divergence in import and export coefficients. Furthermore, these finding bolster research indicating that democracy has a positive but fragile relationship to income, while institutional quality is much more robust (Rigobon and Rodrik 2005). This supports one of the theories of this paper, that democracy increases trade via an increase in the quality of governance. Fifth, economic freedom appears to have no impact on levels of international trade. Economic freedom has no impact on imports or exports economically or statistically. In other words, the one consistent variable that impacts international trade is quality of governance measures.

The Income Effect

Studies on trade and democracy have failed to adequately control for income levels. Research has found that when differences in income levels are controlled for in the gravity model, the impact across countries drops considerably or disappears completely (Subramanian and Wei 2006). Surprisingly, previous research on trade and democracy has failed to control for

the interaction between trade, democracy, and income levels. When I control for the interaction of income levels and democracy, using a variety of interaction terms and data exclusions, I find the positive effects of democracy relating directly to income levels diminish. Rich countries have economically and statistically significant gains from trade with all the coefficients signed as expected. Middle and low income countries have mostly insignificant coefficients and some theoretically incorrect signs. Middle and low income autocracies have positive export coefficients, though only significant at the 5% level, revealing the fragility of declaring democracy important to expanding international trade. This does not mean that democracy is not important to increasing trade levels only that the democracies that demonstrate the most consistent gains from trade during the period under consideration are rich democracies. In short, any declaration that international trade and democracy are related is highly dependent on income levels of the countries being studied. There is no reason to believe that most countries would increase international trade simply by become more democratic.

Democratic Transitions or The Before and After Effect

Though a double blind comparison between identical countries is impossible in the social sciences, it does help to consider changes in the levels of democracy. Some results are presented in Table 5 of democratic transitions. In

other words, when democratic, or autocratic, transitions occur do we witness significant shifts in their level of international trade? If as democracy resulting in prosperity advocates claim, that a unilateral movement toward higher democratic standards result in higher international trade levels, then one might find that after a democratic transition higher levels of international trade. The results while providing some support of this argument do not provide overwhelming support for this position. To focus more clearly on the impact of democracy, three additional types of variables were created. First, one and two year lagged variables were created to test the importance of establishing democracy. Second, increases or decreases in democratic variables including democratic or autocratic transitions. Third, country regressions focused on countries that experienced large and sudden changes in their democracies. These new variables seek to target the countries and time periods which endured large changes in their polity score, either becoming more autocratic or more democratic, to test if large movements are more important than incremental change. Many states that endured large changes, either positive or negative, in their polity score either enter into or leave a period of severe political and or military conflict. Positive changes towards improved democracy may involve decreased conflict while many states that become more autocratic suffer from higher levels of conflict as well as many other problems that prevent international trade. Finally, many states that endured large changes in their democratic polity scores promoted a wide range of economic policy from

varieties of socialism to free market export oriented growth policies. For instance, lesser developed countries like Brazil which experienced large democratic transitions, followed economic policies designed to reduce international trade and promote domestic industrialization. The policy orientation of developing states especially those involved in large democratic transitions, significantly influenced their economic development objectives and targets impacting their international trade levels.

The results present a mixed bag. First, lagged variables generally demonstrated statistical significance but virtually irrelevant economically. Lagged variables max out economically at approximately 2%, with a smattering of insignificant variables, or only significant at the 5-10% level. In other words, while the results generally provide the expected sign, the economic and statistical significance do not inspire confidence. Second, we used differences between the current democratic variable and lagged variables to measure the impact of changes in democratic standing. This was further broken down into two separate types of variables. The first was simple year to year differences where most observations captured small movements. For instance, most Polity IV year to year differences were 1 or 2 point differences. In the second instance, we excluded year to year fluctuations focusing on democratic or autocratic transitions where polity data differed significantly year to year. The variables measuring yearly differences in democracy returned economically and

statistically insignificant results. When excluding the small year to year differences and focusing on large democratic or autocratic transitions, the transitions to democracy indicate borderline statistical significance but transitions to autocracy clearly demonstrate economically and statistically significant drops in international trade. In other words, moving from autocracy to democracy doesn't mean you will trade more, but moving from democracy to autocracy means you will trade less. Third, when focusing on specific countries that experienced transitions, the results backup the cross country data of somewhat positive but inconsistent and not incredibly strong results. For instance, some of the countries significantly increase trade after democratic transitions, others experience significant decreases in trade under democracy, and others demonstrate borderline statistical significance. As indicated in Table 5, European countries such as Spain and Portugal increased trade under democracy while Uganda and Zimbabwe traded less and Brazil while trading more was barely significant at the 10% level. While Spain and Portugal made democratic transitions and joined the European Union with significant infrastructure already in place, Uganda and Zimbabwe enjoyed none of those benefits as land locked African countries surrounded by poor conflict prone states. None of the evidence here supports an argument that democracy is bad for business as coefficient signs support the basic hypothesis, only that the results are not nearly as conclusive as proponents believe.

Conclusion

While evidence supporting the argument that democracy increases international trade exists, it is fragile, small, and weak. The reason for the weakness of the finding stems from two factors. First, democracy is a weak proxy for what implicitly or explicitly represents democracy: well run government. When using more explicit measurements of what democracy represents rather than broad measures, the results imply that that international trade increases due to well managed and governed economic environment. Second, previous research has failed to properly estimate the gravity equation and has therefore overestimated the impact of democracy on international trade levels. The inclusion of fixed importer, exporter, and time effects properly estimate the gravity model and imply that while democracy may increase international trade, the evidence is weak and not robust to change.

Table 3.1-Baseline Results

Regional	.18 (.26)
Currency Union	.99 (.36)
Distance	-1.59 (.04)
Real GDP	.69 (.08)
Real Per Capita GDP	.11 (.08)
Common Language	.68 (.07)
Border	.18 (.22)
Landlock	.36 (.26)
Island	-.72 (.56)
Land Area	.54 (.06)
Common Colonizer	.69 (.10)
Current Colony	1.98 (.62)
Colony post-1945	1.54

	(.17)
Common Country	.66 (.18)
Importer Democracy	.003 (.0004)
Exporter Democracy	.001 (.0005)
Importer Autocracy	.0005 (.0004)
Exporter Autocracy	.0003 (.0005)
Importer Polity	.004 (.0005)
Exporter Polity	.002 (.0005)
R-squared	.63
Observations	333,798

Robust coefficients with standard error in parentheses.

Table 3.2-Additional Democracy Variables

	Importer	Exporter
Durability	-.005*** (.001)	-.003*** (.001)
Regulation of Executive Recruitment XRREG	.002*** (.0004)	.0008 (.0005)
Competitiveness of Executive Recruitment XRCOMP	.002*** (.0004)	.0009 (.0005)
Openness of Executive Recruitment XROPEN	.002*** (.0004)	.001 (.0005)
Executive Constraints XCONST	.002*** (.0004)	.001** (.0005)
Regulation of Participation PARREG	.002*** (.0004)	.0006 (.0005)
Competitiveness of Participation PARCOMP	.002*** (.0004)	.001** (.0005)

Table 3.3 – The Rest of the Story

	Importing Country	Exporting Country
CHGA Regime Type	-.36***	-.19***
	(.04)	(.03)
CIRI Freedom of Assembly and Association	.12***	-.07***
	(.02)	(.02)
CIRI Freedom of Movement	.11***	-.18***
	(.03)	(.03)
CIRI Political Participation	.11***	-.03
	(.02)	(.02)
CIRI Religious Freedom	-.0008	-.14***
	(.02)	(.03)
CIRI Freedom of Speech	.006	-.02
	(.02)	(.02)
CIRI Women's Economic Rights	-.08***	.02
	(.02)	(.02)
CIRI Women's Political Rights	.06**	.04**
	(.02)	(.02)
DPI Plurality	-.33***	.10
	(.08)	(.06)
DPI Proportional Representation	.17*	-.03
	(.09)	(.08)
FH Civil Liberties	-.06***	-.06***
	(.01)	(.01)
FH Democracy	.04***	.02***

	(.01)	(.006)
FI Legal Structure and Security of Property Rights	-.01 (.02)	-.04*** (.01)
HF Economic Freedom	-.003 (.008)	-.005 (.008)
HF Property Rights	-.03 (.03)	-.18*** (.03)
PT Majoritarian	-.12 (.10)	-.27** (.13)
SGPS Bicameral System	.06 (.08)	-.04 (.08)
SGPS One Party System	.13* (.07)	-.09 (.08)
TI Corruption Perception Index	-.03 (.03)	.03 (.02)
Vanhanen Index of Competition	.007*** (.0006)	.002*** (.0005)
Vanhanen Index of Democratization	.02*** (.001)	.009*** (.001)
Vanhanen Index of Participation	.006*** (.0007)	.005*** (.0006)
ICRG Quality of Governance	.63*** (.12)	.85*** (.11)
WBGI Control of Corruption Estimate	-.23*** (.06)	.23*** (.06)
WBGI Government	.03	.32***

Effectiveness Indicator	(.07)	(.07)

Table 3 – The Rest of the Story cont.

WBGI Political Stability Estimate	-.17** (.07)	.16** (.07)
WBGI Rule of Law Estimate	-.002 (.08)	.51*** (.09)
WBGI Regulatory Quality Estimate	.23*** (.06)	.26*** (.07)
WBGI Voice and Accountability Estimate	-.08 (.09)	.61*** (.09)

Table 3.4 – The Income Effect

	Importer	Exporter
High Income Democracy	.11 (.01)	.04 (.01)
High Income Autocracy	-.14 (.02)	-.06 (.01)
High Income Polity	.06 (.008)	.03 (.006)
Middle and Low Income Democracy	.02 (.006)	.005 (.005)
Middle and Low Income Autocracy	-.008 (.006)	.01** (.006)
Middle and Low Income Polity	.008 (.003)	-.002 (.003)
Middle and Low Income Democracies wo High Income Partners	.02 (.006)	-.002 (.006)
Middle and Low Income Autocracy wo High Income Partners	-.01 (.007)	.02** (.007)
Middle and Low Income Polity wo High Income Partners	.009 (.003)	-.005 (.003)

Table 3.5 – Democratic Transitions

	Importer	Exporter
1 Year Polity Lag	.004*	.003*
	(.00)	(.00)
2 Year Polity Lag	.003*	.002*
	(.00)	(.00)
1 Year FH Polity Lag	.04*	.01**
	(.00)	(.01)
2 Year Polity Lag	.05*	.007
	(.01)	(.005)
1 Year Quality of Governance Lag	.02*	.008*
	(.00)	(.00)
2 Year Quality of Governance Lag	.02*	.006*
	(.00)	(.00)
Polity 1 Year Difference	.001***	-.000*
($Polity_t$ - $Polity_{t-1}$)	(.000)	(.00)
Polity 2 Year Difference	.000	-.000***
($Polity_t$ - $Polity_{t-2}$)	(.000)	(.00)
FH Polity 1 Year Difference	-.01**	.007
($Polity_t$ - $Polity_{t-1}$)	(.01)	(.007)
FH Polity 2 Year Difference	-.01***	-.000
($Polity_t$ - $Polity_{t-2}$)	(.01)	(.00)
Quality of Governance 1 Year Difference (QOG_t - QOG_{t-1})	-.02*	-.002
	(.00)	(.001)

Quality of Governance 2 Year Difference (QOG_t - QOG_{t-1})	-.02*	-.002
	(.00)	(.001)
1 Year Democratic Transition	.07**	.08***
(Polity difference >3)	(.03)	(.04)
2 Year Democratic Transition	.03	.03
(Polity difference >3)	(.03)	(.03)
1 Year Autocratic Transition	-.16*	-.05
(Polity difference <-3)	(.03)	(.03)
2 Year Democratic Transition	-.22*	-.08
(Polity difference < -3)	(.03)	(.03)
Brazilian Democratic Transition	.34***	.02
	(.20)	(.38)
Portuguese Democratic Transition	1.51*	-.70*
	(.23)	(.26)
Spanish Democratic Transition	1.29*	-1.27*
	(.18)	(.27)
Ugandan Democratic Transition	-1.02*	.84***
	(.33)	(.44)
Zimbabwean Democratic Transition	-.44***	1.74*
	(.25)	(.37)
Thai Democratic Transition	1.00*	-.24
	(.20)	(.29)
South Korean Democratic Transition	.58*	.001
	(.19)	(.32)

***Significant at the 10% level ** Significant at the 5% level *Significant at the 1% level

All regressions with fixed importer, exporter, and year effects with standard errors in parentheses

Bibliography

Anderson, J.E. and van Wincoop, Eric, 2004, "Trade Costs", NBER Working Paper No. 10480

Ang, Adrian, Drury, A. Cooper, Peksen, Dursun, and Rudy, Michael, 2005, "Presidents, Prime Ministers, and Trade: The Impact The Type of Democracy Has on Trade", unpublished manuscript

Anderson, J.E. and van Wincoop, Eric, 2003, "Gravity with Gravitas: A Solution to the Border Puzzle", *The American Economic Review*, Vol. 93 No. 1, March 2003

Baum, Matthew and Lake, David, 2003, "The Political Economy of Growth: Democracy and Human Capital", *American Journal of Political Science*, Vol. 47, No. 2, pp. 333-347

Bliss, Harry and Russett, Bruce, 1998, "Democratic Trading Partners: The Liberal Connection 1962-1989", *The Journal of Politics*, Vol. 60, No. 4, pp. 1126-1147

Casper, Gretchen and Tufis, Claudiu, 2002, "Correlation Versus Interchangeability: The Limited Robustness of Empirical Findings on Democracy Using Highly Correlated Data Sets", *Political Analysis*, Vol. 11, No. 2, pp. 196-203

Dai, Xinyuan, 2006, "Dyadic Myth and Monadic Advantage: Conceptualizing the Effects of Democratic Constraints on Trade", *The Journal of Theoretical Politics*, Vol. 18, No. 3, pp. 267-297

Dixon, William and Moon, Bruce, 1993, "Political Similarity and American Foreign Trade Patterns", *Political Research Quarterly*, Vol. 46, No. 1, pp.5-25

Egger, Peter, 2002, "An Econometric View on the Estimation Gravity Models and the Calculation of Trade Potentials", *The World Economy*, Vol. 25 No 2, February 2002

Egger, Peter, 2000, "A Note on the Proper Econometric Specification of the Gravity Equation", *Economic Letters*

Feenstra, Robert, 2002, "Border Effects and the Gravity Equation: Consistent Methods for Estimation", *Scottish Journal of Political Economy*, Vol. 49 No.5, November 2002

Feenstra, Rober, Markusen, James, and Rose, Andrew, 2000, "Using the Gravity Equation to Differentiate Among Alternative Theories of Trade", NBER Working Paper 6804

Frankel, Jeffrey and Romer, David, 1999, "Does Trade Cause Growth?", *The American Economic Review*, June 1999

Glick, Reuven and Rose, Andrew, 2001, "Does a Currency Union Affect Trade? The Time Series Evidence", NBER Working Paper 8396

Goldberg, Pinelopi Koujianou and Maggi, Giovanni, 1997, "Protection for Sale: An Empirical Investigation", *American Economic Review*, Vol. 89, No. 5, pp. 1135-1155

Goteborg University Quality of Governance Database, 2006, www.qog.pol.gu.se

Gowa, Joanne and Mansfield, Edward, 1993, "Power Politics and International Trade", *The American Political Science Review*, Vol. 87, No. 2, pp. 408-420

Grossman, Gene and Helpman, Elhanan, 1994, "Protection for Sale", *American Economic Review*, Vol. 84, No. 4, pp. 833-850

Harrelson-Stephens, Julie and Callaway, Rhonda, 2003, "Does Trade Openness Promote Security Rights in Developing Countries? Examining the Liberal Perspective", *International Interactions*, Vol. 29, No. 2, pp. 143-158

Kono, Daniel, 2006, "Optimal Obfuscation: Democracy and Trade Policy Transparency", *American Political Science Review*, Vol. 100 No. 1, pp. 369-384

Li, Quan and Reuveny, Rafael, 2003, "Economic Globalization and Democracy: An Empirical Analysis", *British Journal of Political Science*, Vol. 33, No. 1, pp. 29-54

Long, Andrew, 2003, "Defense Pacts and International Trade" *Journal of Peace Research*, Vol. 40 No. 5, pp. 537-552

Mansfield, Edward, Milner, Helen, and B. Peter Rosendorff, 2000, "Free to Trade: Democracies, Autocracies, and International Trade", *American Political Science Review*, Vol. 94 No. 2

Mansfield, Edward, and Busch, Marc, 1995, "The Political Economy of Nontariff Barriers: A Cross-National Analysis", *International Organization*, Vol. 49 No. 4, pp. 723-749

Matyas, Laszlo, 1997, "Proper Econometric Specification of the Gravity Model", *The World Economy*, Vol. 20 No. 3, May 1997

Matyas, Laszlo, 1998, "The Gravity Model: Some Econometric Considerations", *The World Economy*,Vol. 21 No. 3, May 1998

Mauro, Paolo, 1995, "Corruption and Growth", *The Quarterly Journal of Economics*, Vol. 110, No. 3, pp. 681-712

McCallum, John, 1995, "National Borders Matter: Canada-U.S. Regional Trade Patterns", *The American Economic Review*, June 1995, Vol. 85 No. 3

Morrow, James, Siverson, Randolph, and Tabares, Tressa, 1998, "The Political Determinants of International Trade: The Major Powers, 1907-90", *The American Political Science Review*, Vol. 92, No. 3, pp. 649-661

Nielson, Daniel, 2003, "Supplying Trade Reform: Political Institutions and Liberalization in Middle Income Presidential Democracies", *American Journal of Political Science*, Vol. 47 No. 3, pp. 470-491

Oneal, John and Russett, Bruce, 1997, "The Classical Liberals Were Right: Democracy, Interdependence, and Conflict 1950-1985, *International Studies Quarterly*, Vol. 41 No. 2, pp. 267-294

Oneal, John, Oneal Frances, Maoz, Zeev, and Russett, Bruce, 1996, "The Liberal Peace: Interdependence, Democracy, and International Conflict, 1950-1985", *Journal of Peace Research*, Vol. 33 No. 1, pp. 11-28

O'Reilly, Robert, 2005, "Veto Points, Veto Players, and International Trade Policy", *Comparative Political Studies*, Vol. 38 No. 6, August 2005, pp. 652-675

Rigobon, Roberto and Rodrik, Dani, 2005, "Rule of Law, Democracy, Openness, and Income", *Economics of Transition*, Vol. 13, No. 3, pp. 533-564

Rodrik, Dani and Wacziarg, Roman, 2005, "Do Democratic Transitions Produce Bad Economic Outcomes?", *American Economic Review*, Vol. 95, No. 2, pp. 50-55

Roelfsema, Hein, 2004, "Political Institutions and Trade Protection", *Tjalling C. Koopmans Research Institute Discussion Paper Series*, January 2004

Rogowski, Ronald, 1987, "Trade and the Variety of Democratic Institutions", *International Organization*, Vol. 41 No. 2, pp. 203-223

Rose, Andrew, 2004, "Do We Really Know the WTO Increases Trade?", *The American Economic Review*, Vol. 94 No.1, March 2004

Rose, Andrew, 2004b, "Does the WTO Make Trade More Stable?", NBER Working Paper 10207

Rose, Andrew, 2003, "Which International Institutions Promote International Trade?", Center For Economic Policy Research Paper

Rose, Andrew, 2002, "Do WTO Members Have More Liberal Trade Policy?", NBER Working Paper 9347

Rose, Andrew and Spiegel, Mark, 2003, "A Gravity Model of Sovereign Lending: Trade Default and Credit", NBER Working Paper 9285

Subramanian, Arvind and Wei, Shang-Jin, 2006, "The WTO Promotes Trade: Strongly but Unevenly", *The Journal of International Economics*, Forthcoming

Yu, Miaojie, 2006, "Trade, Democracy, and the Gravity Equation", China Center for Economic Research Working Paper

Chapter 4

Government Spending, Investment, and Trade

During the last decade, Chinese international trade levels increased rapidly, rising from $474 billion in 2000 to $2.2 trillion in 2007. The gains from trade however have proven to be unevenly distributed with some regions benefiting from improved access to world markets, while other regions are falling further behind. Over time large variations between Chinese provinces have developed with significant differences in per capita income, investment, and international trade, as well as social indicators such as governance and human development (Huang, Li, and Rozelle 2003). The geographic poverty traps may exacerbate rising inequality and prevent reductions in absolute and relative inequality (Ravallion and Jalan 1999). Inequality measures both within and between Chinese regions are at all time highs and increasing.

To stimulate economic growth, the Chinese government has focused on driving international trade facilitated by high levels of public and private investment. Chinese regions which have rapidly increased their international trade levels have also received high levels of foreign direct investment and have high levels of human capital and infrastructure. These regions which have increased their international trade levels the most, have also benefited from rapid economic growth, primarily located in the coastal areas of China. Research studying the differences between Chinese provinces has focused on attracting foreign investment, governance, human capital, infrastructure, and subsidies

among other major factors. However, little research has focused on the pure exogenous factors of Chinese geography in relation to international markets. The Chinese provinces with the highest level of international trade and investment also benefit from close geographic proximity to wealthy states and excellent transportation links.

As the Chinese government and development research focuses on the importance of policy factors, given the demonstrated empirical importance of exogenous factors to international trade, it is important to study the impact of investment and government transfers in stimulating trade (Yang 2002). In other words, after we account for the exogenous determinants of international trade, how big an impact does government investment and transfers have on the international trading patterns of Chinese provinces? To study this question, I create a bilateral gravity trading model of Chinese provinces trading patterns with foreign countries during 2004 and 2005. I find that governmental budgetary outlays designed to increase international trade has a minimal impact on increasing international trade in the period under review. Furthermore, western and inland Chinese provinces face major barriers to higher trade levels through their lack of geographic proximity and lack of market access available to coastal provinces. This paper is broken up into four remaining sections. The first section is a study of the divergence between Chinese provinces' levels of development. Second, a description of the gravity trade model and its

applicability to studying the patterns of international trade at the Chinese provincial level. Third, I detail the data, sources, and potential sampling problems. Fourth, I discuss the results, robustness tests, and implications of the findings.

Divergent Development Across China

Economic growth in China over the past three decades has averaged nearly 10% annually. During that time, China has moved towards a free market system and embraced capital markets (Yao 2000). At the same time the Communist party began admitting capitalists. However, the economic benefits of rapid growth have not been spread evenly across China (Riskin 1994). The eastern coastal provinces of China stretching from Beijing and Tianjin in the north to Guangdong and Fujian in the south have benefited the most from rapid economic growth.[36] Western and central provinces of China have suffered from lower economic growth due to the slow shift away from agriculture and into higher productivity industries (Kuijs and Wang 2005). Now income levels vary widely throughout China with the provincial cities of Shanghai and Beijing having the highest levels at $6,308 and $5,609 respectively in 2005 ranging to a low of $960 and $914 in Yunnan and Gansu respectively. Coastal provinces uniformly have higher per capita GDP numbers than inland provinces, typically

[36] Please see Table 1 for a listing of provincial geography and income characteristics. It is worth noting that of all high income Chinese provinces only Beijing and Inner Mongolia are not coastal provinces.

by a factor of two to three though research is mixed on the idea that increased trade leads to lower inequality (Wei and Yu 2001 and Zhang and Zhang 2003). This divergence in income levels holds true even for provinces that border each other with significant divergence in economic patterns remaining (Xu 2002 and Poncet 2003).

The source of this divergence in income is of great concern for numerous reasons. First, it is of great concern to Chinese politicians who fear a potential backlash if inequality rises too rapidly. Inequality has risen in China not just between provinces but within provinces prompting concerns that this may cause political instability and a if the economic benefits of free market reform are not spread wider. Second, China needs to deliver robust economic growth to manage the inflow of job market entrants, the migration from an agrarian to industrial society, and those displaced from economic reform. The Chinese central government needs all provinces to deliver high economic growth rates to prevent political instability which may spill over into other provinces. The Chinese government already reports increasing numbers of "mass incidents". Third, the large divergence in income is putting increasing strain on local governments and cities in the east through higher migration levels from inland areas. High migration levels to successful provinces or cities provides added stress as internal migrants move to rapidly growing job centers and remit significant portions of their earnings to family members back home though this is

not a growing problem (Du, Park, and Wang 2005). This places significant stress on cities and provinces already struggling to keep up with rapid economic change creating a shadow labor and housing market. The fundamental concern of the Chinese government remains too large a dislocation between the haves and the have nots leading to political unrest.

The cause of this rising inequality between regions however is poorly understood (Yao, Zhang, and Hanmer 2004). A number of theories have been put forth to explain the divergent levels of development across provinces. First, some have argued that the quality of governance across provinces differs substantially resulting in the varying levels of income (World Bank 2006). Quality of governance has been demonstrated to impact development and trade levels, there seems little reason to believe it significantly impacts Chinese provincial development. Governance indicators fail to demonstrate that only the coastal provinces of China enjoy quality management. Furthermore, even if governance measures did indicate a strong relationship to coastal provinces, there would seem to be other factors at play explaining only that well managed provinces in China were in the coastal regions. It would seem highly unlikely in a randomly distributed sample that only coastal provinces would be well governed. Additionally, other studies have indicated, in the relationship between governance and income the causation arrow is difficult to disentangle. Higher income may lead to higher quality governance just as much as higher

quality governance may lead to higher income. Quality of governance will matter but it seems unlikely to cause the divergence in income witnessed across China.

Second, researchers have argued that the government has systematically favored eastern coastal regions over western inland regions to explain the large and increasing income disparity. There are numerous examples to support this argument. Coastal regions benefit from large central government transfers to households which in some cases are larger than the per capita GDP of other provinces. Coastal regions benefit from free trade zones, higher levels of government transfers, and foreign direct investment (Fan, Zhang, and Zhang 2004 and Zhang and Felmingham 2001). Research confirms the impact of urban biased growth driven by government transfers has significantly impacted inequality in China (Yang 1998). This argument however is not without problems. Even as the Chinese government has made development of inland provinces a higher priority after 2000, inequality has continued to increase with little evidence of the efficacy of increased governmental transfers or investment (Zhang and Zou 1998). Despite the policy and research focus on the reasons for widely divergent income levels across Chinese provinces there is little solid evidence as to what drives the varying development levels (Rozelle, Park, Benziger, and Ren 1998).

A New Framework For Analyzing the Chinese Development Puzzle

Previous work on the Chinese provincial development puzzle, has focused on endogenous problems: the level of human capital, governance, and investment. Little work has been done to study exogenous variables and their impact on the divergent development pattern of Chinese provinces. Research indicates that numerous problems related to international trade are structural in nature and less dependent on specific policy prescriptions (Anderson and Marcouiller 1999). Specifically when considering trade, research demonstrates that a large amount of trade can be attributed to exogenous structural variables rather than policy directives (McCallum 1995). For instance, countries separated by large distances trade less than countries that share a common border. Research demonstrates that these structural factors of trade significantly impact trade levels (Anderson and Van Wincoop 2004) Countries which share a common language will trade more than countries that do not. These exogenous structural factors have been incorporated into that widely used and empirically trusted gravity model. The gravity model has expanded to include a range of exogenous factors such as distance, land area, GDP, per capita GDP, common language, common border, colonization history, or currency or free trade union (Rose 2004a and 2004b). These exogenous factors explain a large amount of the bilateral trading relationships between states. If structural factors help explain the trading relationships between states, there appears some reason to believe it

might help explain the divergent trading and development patterns of Chinese provinces.

China has embraced the world market. Completed with its gaining membership in the World Trade Organization, China promoted export growth for many years as a way to increase economic growth. Exports have grown rapidly, significantly outpacing GDP growth. Exports as a percentage of GDP has risen substantially as exports have continued to increase rapidly through 2007. Others argue that export growth plays a smaller role in GDP growth than believed, noting that GDP is a value added measurement while trade measurements are revenue based. Even if Chinese growth does not depend on exports to drive growth, provinces that have the highest income levels have the highest export levels and receive the highest amount of public and private investment (Zhang and Song 2000).

Provincial differences in investment levels exist. Public and private investment has grown rapidly in China, but remains heavily concentrated in coastal exporting regions. The eastern coastal regions benefit from the blessings of geography and history, while the western inland regions suffer their consequences. Eastern coastal provinces enjoy close geographic proximity to the rich industrialized nations of South Korea, Japan, and Hong Kong[37]. The

[37] It is noted that Hong Kong and Macau are legal parts of China while disputes currently exist about the status of Taiwan. For purposes of this study, Hong Kong, Macau, and Taiwan are treated as separate states *only* because the Chinese National Bureau of Statistics lists trade with these entities as international trade.

provinces of Shanghai, Guangdong, Shandong, and Fujian all have excellent deep water ports that provide easy access to world markets. Industrial and trade oriented provinces of China have evolved around Shanghai and in Guangdong, just north of Hong Kong, in Shenzhen and Guangzhou. Shanghai has excellent sea and air transport links to promote international trade with other east Asian countries as well as the United States. Guangdong borders the wealthier Hong Kong with excellent sea and air transport links. Trading partner income level matters to both trade levels and economic growth (Arora and Vamvakidis 2004). It is also important to note that Shanghai and Hong Kong are financial centers for both China and south east Asia, providing easy access to capital for growing businesses. China specific industrial level research supports the conceptual use of the gravity model (Amiti and Javorcik 2006).

Inland western provinces enjoy none of the geographic blessings. When not surrounded by other Chinese provinces, they border countries such as India, Pakistan, Laos, Myanmar, Tajikistan, Mongolia, Nepal, and remote empty regions of Russia. These provinces do not benefit from easy access to the Hong Kong, South Korean, and Japanese markets and sophisticated finance centers. Even when western provinces share an international border, there is little access to larger international markets. There are no deep water sea ports in the inland and western provinces that would facilitate trade and virtually no international

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No linguistic or political inference should be drawn from treating Hong Kong, Macau, and Taiwan as separate states for economic measurement purposes.

air transport links even to major cities or provinces like Chongqing. Road transport links to major ports or transport hubs are expensive and lengthy. Traveling from some major inland western provinces to a major sea port can be the equivalent of crossing the continental United States. Additionally, Chinese government transfers and investment have been concentrated in eastern coastal provinces and foreign direct investment has focused on wealthier areas with easy access to Chinese and foreign markets. Nor does there appear to be large spillover effects from coastal to non-coastal regions (Brun, Combes, and Renard 2002). Inland western provinces face significant geographic hurdles as well as policy and investment impediments which hinder growth prospects.

The eastern coastal provinces have benefited from the blessings of geography and public investment and transfers (Fang, Zhang, and Fan 2002). However, if the gravity model of trade is empirically accurate in its depiction of international trade, how much of the divergence in international trade levels between Chinese provinces can be attributed to the investment and income transfers rather than the blessings of geography? Politicians and scholars quick to analyze endogenous variables of government largesse and human capital seem ready to overlook exogenous structural variables which have been demonstrated to accurately describe trading patterns. This paper will control for exogenous variables demonstrated to significantly impact international trade levels to determine the impact of public investment and income transfers on

Chinese provinces international trade levels. Only by controlling for the exogenous international trade variables can a fair estimation of the importance of public and private investment be reached.

The Trade Model

To control for the importance of exogenous variables on the impact of international trade levels of Chinese provinces, I use a modified bilateral gravity model. The basic model is specified as follows:

$$Ln(M_{ijt}) = lnD_{ij} + ln(Y_iY_j) + ln(Pop_iPop_j) + Landl_{ij} + T_t + M + X + Gov$$

where i and j denote trading partners, t denotes times, and the variables are:

- M_{ijt} is real imports of i from j at time t
- D is the distance between the capitals of i and j
- Y is real GDP
- Pop is population
- Border is a dummy variable which is unity if i and j share a land border
- Landl is 1 if the Chinese province is land locked and 0 otherwise
- T is a dummy variable of fixed time effects
- M is a dummy variable of fixed importer effects
- X is a dummy variable of fixed exporter effects
- Gov are government transfers to province i

It is important to note changes made to this version of the gravity model. First, this specific model treats each Chinese province as an individual observation unit. This means that only provincial level variables are included. For instance, if China shares a land border with the country but the province does not, then the land border variable is coded as 0. Second, in the interest of parsimony, numerous variables that have been used before in gravity models are excluded. For instance, language is excluded because virtually no other countries speak Chinese except Taiwan, Hong Kong, and Macau[38]. Third, keeping with recent econometric advances, I will utilize a comprehensive set of fixed time, importer, and exporter effects. Research demonstrates that failure to use fixed effects in a gravity model will tend to overestimate key variables. This reduced form bilateral gravity trading model will permit us to isolate key factors in driving the international trading patterns of Chinese provinces.

The data was compiled using standard data sources. The Chinese provincial bilateral international trade and provincial investment data was compiled from the National Bureau of Chinese Statistics (NBCS) via the website chinadataonline.com.[39] Distance between provincial and country capitals was computed via the online website mapcrow.info. Land area was taken from the NBCS for Chinese provinces and the CIA World Fact Book for countries. The

[38] It has been noted that numerous regional dialects of Chinese exist and this may impact language. This is less important for two reasons. First, language is not used as a control variable. Second, to the best of the authors knowledge, gravity models have never controlled for regional dialects. Though this may impact internal Chinese trade, it is less important for international trade.

[39] Most provincial trade data was already in English, though I did require translation assistance for a few provinces.

International Monetary Fund (IMF) and NBCS provided GDP and per capita GDP statistics.[40] Geographic data was coded using public domain maps of China. Public investment and income transfers are specific budgetary line items in Chinese provinces was taken from the NBCS and normalized for population. It is important to note two issues about the data. First, the data covers only 2004 and 2005 because provincial bilateral trading data only goes back to 2004. Second, the data does not include all provinces because not all provinces maintain bilateral trading data. This should not constrain the findings because existing observations cover nearly 70% of Chinese population with coastal and inland provinces represented in the sample.

Baseline Results

The baseline results for the regressions are presented in Table 2. The gravity variables all return as expected in sign, size, and significance. Distance and landlocked variables are negative, large, and significant while GDP is positive, large, and significant. These are all consistent with previous gravity work demonstrating that the level of trade will depend significantly on distance, partner GDP, and coastal access. For our purposes the more interesting variables are government policy variables. A few brief notes. First, public budgetary or

[40] In this instance, I deemed it appropriate to use exchange rate based GDP measurements rather than purchasing power (PPP) adjusted numbers. This was done for two reasons. First, trade is conducted as an exchange rate transaction not a normalized PPP basis. Second, Chinese provincial GDP was not normalized for PPP.

policy variables chosen for the baseline result are the line items of state investment, capital construction, under development, and expressway. Second, budgetary items are calculated as the natural log per capita basis whereas we use the total expressway kilometers in a province. Third, policy variables are differentiated in separate regressions so as to distinguish their impact on imports or exports. As others have noted, it is not unusual for policy to have divergent impact on imports and exports (Balding 2008).

The baseline results indicate that Chinese public investment and income transfers have a mixed impact on promoting trade. A number of points about the results require elucidation. First, GDP in the Chinese export regressions is insignificant. This should not however be surprising as numerous large economies do not necessarily trade more with Chinese provinces than smaller but richer economies. Second, most governmental investment and transfer variables are economically small or statistically insignificant. Only three of the eight governmental policy variables are significant at the 5% level. Though all three impact exports, under development funds negatively impact exports though the impact is not large. Third, governmental policy appears to have no statistically significant impact on imports. Coefficients are both economically small in some cases and do not approach statistical significance for any governmental line item. Fourth, the variable with the largest impact on exports is the total provincial kilometers of expressways. Geography appears to have a

larger impact than governmental policy and the variable that most attempts to lower the geographical barriers has the largest impact on raising international trade levels.

Cross Sectional Data

I turn now to presenting cross sectional regressions including total income transfers and rural income transfers for 2004 and 2005 respectively. Cross sectional results may differ from panel results so it is important to compare them. The cross sectional regressions reveal some interesting results. First, as in the panel regressions state budget investment is statistically insignificant in all but one instance. There appears to be no statistically or economically significant impact of state budget investment to increasing trade. Second, capital construction is both economically large and statistically significant in all regressions. Many studies have demonstrated the need for increased spending on infrastructure and capital projects and the cross sectional regressions presented here confirm this. Third, underdevelopment funding in 2004 is economically and statistically significant while in 2005 it is neither. Coupled with the panel results this implies that underdevelopment funding may not as significant an impact as believed.

Fourth, expressways are economically large but statistically significant only for imports. Coupled with the panel data which indicates that expressway impact on imports is statistically insignificant but large and statistically significant on exports, these results presents some initially puzzling results. Cross sectional in individual years may produce significant import coefficients and insignificant export coefficients due to the concentration of export activities clustered in smaller coastal provinces with less need for expressways. Consequently, while inland provinces may import goods, export activity will lag the construction of infrastructure necessary to export.

Fifth, government income transfers in 2004 are economically large and statistically significantly and somewhat surprisingly negatively impact imports and exports.[41] Government income transfers may negatively impact trade through two channels. First, because these are household transfers they increase consumption of primary goods. Second, income transfers to households have little reason to stimulate export activity and may actually divert economic activity to foreign to local markets. Sixth, rural income transfer coefficients are insignificant on imports but economically and statistically significant for exports. As noted previously, household income transfers may be consumed on primary goods consequently having no impact on imports. Rural income transfers may have a positive impact on rural communities because households own many of

[41] Between 2004 and 2005 the National Bureau of Statistics of China divided government income transfers in two line items consisting of urban and rural income transfers. Consequently, in 2004 I regress using government income transfers but in 2005 use rural income transfers.

the productive assets in rural and agricultural oriented communities. Whereas household transfers to urban areas may simply spur consumption and saving when citizens work for companies, household transfers to rural areas may stimulate increased economic activity.

On Geography and Robustness

I turn now to focusing on geographical relationships with major Chinese trading partners and robustness tests. Regressions are run testing Chinese provincial trade with major east Asian economies of Hong Kong, Taiwan, South Korea, and Japan. Coastal provinces have either short sea lanes or border these economies so this will better isolate the impact of Chinese geography provinces. The results of focusing on rich east Asian economies can be found in Table 4. A number of results stand out. First, state budget investment has an economically and statistically significant negative impact on trade. The results are similar to the state budget coefficients from the baseline panel results. Second, neither capital construction nor underdevelopment funds are economically or statistically significant in impacting trade with developed Asian economies. Capital construction funding has a mixed record in this study only having consistent significance in the cross sectional regressions while under development fund has been both economically small and statistically insignificant. Third, expressways have a statistically insignificant impact on

trade with developed Asian economies but distance and land locked provinces are negative, economically large, and statistically significant. In other words, despite the best attempts of policy makers, geography significantly impacts international trade levels. Fourth, government income transfers again exert a negative impact in economically large and statistically significant manner on international trade. Fifth, rural income transfers positively impact both imports and exports. The lower incomes in rural areas may cause a higher percentage of income transfers to be invested into productive assets rather than be consumed. These results with a more narrow geographic trading range support the baseline and cross sectional results.

In Table 5, I present the results from a standard battery of robustness tests. A few patterns of the results are notable. First, in fixed effect, random effect, and weighted least square regressions, no import coefficients are statistically significant at conventional levels. Throughout the regressions presented here, most import coefficients are statistically insignificant and the robustness tests continue to confirm this pattern. Second, capital construction, under development funding, and expressways have a statistically significant impact but under development funding has a negative impact on trade. This supports results from the baseline results in Table 2. Third, the robustness tests continue to confirm that many Chinese government policies aimed at development do not appear to have the impact believed.

Conclusion

The Chinese government has focused on driving GDP growth through rapidly increasing exports via coastal areas and working to insure improved economic development in western and inland provinces. However, governmental transfers and investment in western and inland provinces may be trying to enact development policies that do not increase trade. If the bilateral gravity trade model is empirically accurate in describing flows of goods, are government policies that do not address the exogenous factors of trade and market integration for inland and western Chinese provinces designed to fail?

The results presented here imply that Chinese government investment and income transfers may have a smaller impact on increasing international trade than previously believed. If overcoming geography is the primary obstacle to increasing international trade levels, basic infrastructure and reforms that improve market access to producers further away from major markets would increase trade levels most. Government programs and transfers for nebulous goals or increase consumption may serve political objectives but do little to increase access to major trading partners or even economically wealthy provinces. Distance and coastal access remain the primary barriers to increasing international trade not government policy.

Table 4.1-Chinese Provincial Geography and Income

	Geography			Income	
Province	**Coastal**	**Secondary**	**Inland**	**High**	**Low**
Anhui		X			X
Beijing		X		X	
Chongqing			X		X
Fujian	X			X	
Gansu			X		X
Guangdong	X			X	
Guangxi	X				X
Guizhou		X			X
Hainan	X				X
Hebei	X				X
Heilongjiang			X		X
Henan		X			X
Hubei			X		X

Hunan		X			X
Inner Mongolia		X		X	
Jiangsu	X			X	
Jiangxi		X			X
Jilin		X			X
Liaoning	X			X	
Ningxia			X		X
Qinghai			X		X
Shaanxi			X		X
Shandong	X			X	

Table 1 cont.

	Geography			Income	
Province	**Coastal**	**Secondary**	**Inland**	**High**	**Low**
Shanghai	X			X	
Shanxi		X			X
Sichuan			X		X
Tianjin	X			X	
Tibet			X		X
Xinjiang			X		X
Yunnan		X			X
Zhejiang	X			X	

Table 4.2-Baseline Results

	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8
Distance	-1.48* (.49)	-1.12* (.30)	-1.48* (.49)	-1.12* (.30)	-1.48* (.49)	-1.12* (.30)	-1.48* (.49)	-1.12* (.30)
GDP	1.83* (.90)	.35 (.85)	1.84* (.81)	.56 (.79)	1.84* (.90)	.49 (.79)	1.84* (.90)	.26 (.81)
Landlocked	-3.05* (.65)	-2.96* (.73)	-2.89* (.56)	-2.46* (.63)	-2.91* (.55)	-1.85* (.66)	-5.60 (1.79)	-1.73 (.66)
State Budget Investment Import	-.18 (.40)							
State Budget Investment Export		-.34** (.19)						
Capital Construction Import			-.02 (.11)					
Capital Construction Export				.28* (.08)				
Under Development Import					.004 (.04)			
Under Development Export						-.12* (.03)		

Total Expressway Import							-.97 (1.71)	
Total Expressway Export								4.62* (1.17)
Fixed Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Importer & Exporter Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clusters	914	901	914	901	914	901	914	901
R-square	.82	.73	.82	.73	.82	.74	.82	.73
Observations	1,840	1,822	1,840	1,822	1,840	1,822	1,840	1,822

Standard errors are in parentheses. *Significant at the 5% level **Significant at the 10% level

Table 4.3-Cross Sectional Results

	2004		2005	
	Import	**Export**	**Import**	**Export**
State Budget Investment	.77 (.65)	-.47 (.30)	.18 (.83)	3.55* (.23)
Capital Construction	-3.89* (1.56)	-4.21* (.19)	-1.92* (.82)	-1.64* (.11)
Underdevelopment Funding	1.24* (.13)	1.13* (.09)	-.02 (.08)	.03 (.02)
Total Expressway	1.87* (.69)	1.08 (1.00)	1.84* (.75)	1.39 (.93)
Government Income Transfers	-2.94* (1.08)	-4.60* (.39)		
Rural Income Transfers			.26 (.51)	1.29* (.16)

Standard errors are in parentheses. *Significant at the 5% level **Significant at the 10% level

Table 4.4-Trade with Developed Asia

	Import	Export
State Budget Investment	-.35**	-.33*
	(.21)	(.13)
Capital Construction	.10	.05
	(.08)	(.03)
Underdevelopment Funding	-.03	-.02
	(.03)	(.02)
Total Expressway	-1.07	-.51
	(1.29)	(.75)
Government Income Transfers	-2.47*	-5.90*
	(.34)	(.32)
Rural Income Transfers	1.19*	.86*
	(.09)	(.26)

Standard errors are in parentheses. *Significant at the 5% level **Significant at the 10% level

Table 4.5-Robustness Tests

	Fixed Effects		Random Effects		Weighted Least Squares GDP Weighting	
	Import	Export	Import	Export	Import	Export
State Budget Investment	-.22 (.89)	-.34 (.62)	-.25 (.89)	-.34 (.60)	-.13 (.39)	-.31** (.16)
Capital Construction	-.02 (.15)	.28* (.10)	-.02 (.15)	.28* (.10)	-.03 (.11)	.27* (.08)
Underdevelopment Funding	-.004 (.05)	-.12* (.04)	-.004 (.05)	-.12* (.04)	.01 (.04)	-.11* (.03)
Total Expressway	1.01 (2.48)	4.62* (1.68)	1.02 (2.48)	4.62* (1.67)	.80 (1.68)	4.39* (1.11)

Standard errors are in parentheses. *Significant at the 5% level **Significant at the 10% level

Bibliography

Amiti, Mary and Beata Smarzynska Javorcik, 2006, "Trade Costs and Location of Foreign Firms in China", *Journal of Development Economics*, V. 85 n. 1, pp. 129-149

Anderson, J.E. and van Wincoop, Eric, 2004, "Trade Costs", NBER Working Paper No. 10480

Anderson, James and Marcouiller, Douglas, 1999, "Trade, Insecurity, and Home Bias: An Empirical Investigation", NBER Working Paper 7000

Arora, Vivek and Vamvakidis, Athanasios, 2004, "How Much Do Trading Partners Matter for Economic Growth?", *IMF Working Paper*

Balding, Christopher, 2008, "Joining the WTO: What is the Impact?", *Review of International Economics*, Forthcoming

Brun, J.F., J.L. Combes, and M.F. Renard, 2002, "Are there spillover effects between coastal and noncoastal regions in China?", *China Economic Review*, V. 13 n. 2, pp. 161-169

Du, Yang, Albert Park, and Sangui Wang, 2005, "Migration and Rural Poverty in China", *Journal of Comparative Economics*, V. 33 n. 4, pp. 688-709

Fan, Shenggen, Linxiu Zhang, and Xiaobo Zhang, 2004, "Reforms, Investment, and Poverty in Rural China", *Economic Development and Cultural Change*, V. 52 n. 2, pp. 395-421

Fang, Cheng, Xiaobo Zhang, and Shenggen Fan, 2002, "Emergence of Urban Poverty and Inequality in China: Evidence from Household Survey", *China Economic Review*, V. 13 n. 4, pp. 430-443

Huang, Jikun, Ninghui Li, and Scott Rozelle, 2003, "Trade Reform, Household Effects, and Poverty in Rural China", *American Journal of Agricultural Economics*, V. 85 n. 5, pp. 1292-1298

Kuijs, Louis and Tao Wang, 2005, "China's Patter of Growth: Moving to Sustainability and Reducing Inequality", *World Bank China Office Research Working Paper No. 2*

McCallum, John, 1995, "National Borders Matter: Canada-U.S. Regional Trade Patterns", *The American Economic Review*, June 1995, Vol. 85 No. 3

Poncet, Sandra, 2003, "Measuring Chinese domestic and international integration", *China Economic Review*, V. 14 n 1, pp. 1-21

Ravallion, Martin and Jyotsna Jalan, 1999, "China's Lagging Poor Areas", *AEA Papers and Proceedings*, May 1999, pp. 301-305

Riskin, Carl, 1994, "Chinese Rural Poverty: Marginalized or Dispersed?", *American Economic Review*, V. 84 n. 2, pp. 281-284

Rose, Andrew, 2004a, "Do We Really Know the WTO Increases Trade?", *The American Economic Review*, Vol. 94 No.1, March 2004

Rose, Andrew, 2004b, "Does the WTO Make Trade More Stable?", *Open Economies Review*, Volume 16, Number 1, January 2005

Rozell, Scott, Albert Park, Vincent Benziger, and Chanqing Ren, 1998, "Targeted Poverty Investments and Economic Growth", *World Development*, V. 26, n. 12, pp. 2137-2151

Wei, Shang-jin and Yi Wu, 2001, "Globalization and Inequality: Evidence from Within China", *NBER Working Paper*

World Bank, 2006, *China Governance, Investment Climate, and Harmonious Society: Competitiveness Enhancements for 120 Cities in China*

Xu, Xinpeng, 2002, "Have the Chinese Provinces become integrated under reform?", *China Economic Review*, V. 12 n. 2, pp. 116-133

Yang, Dennis Tao, 2002, "What has caused regional inequality in China?", *China Economic Review*, V. 13 n. 4, pp. 331-334

Yang, Dennis Tao, 1998, "Urban-Biased Politics and Rising Income Inequality in China", *American Economic Review*, Vol. 89, Issue 2, May 1998, pp. 306-310

Yao, Shujie, Zongyi Zhang, and Lucia Hanmer, 2004, "Growing Inequality and Poverty in China", *China Economic Review*, V. 15 n. 2, pp. 145-163

Yao, Shujie, 2000, "Economic Development and Poverty Reduction in China over 20 Years of Reforms", *Economic Development and Cultural Change*, V. 48 n. 3, pp. 447-474

Zhang, Kevin and Shunfeng Song, 2000, "Promoting exports the role of inward FDI in China", *China Economic Review*, V. 11 n. 4, pp. 385-396

Zhang, Qing and Bruce Felmingham, 2001, "The relationship between inward direct foreign investment and China's provincial export trade", *China Economic Review*, V. 12 n. 1, pp. 82-99

Zhang, Tao and Heng-fu Zou, 1998, "Fiscal Decentralization, public spending, and economic growth in China", *Journal of Public Economics*, V. 67 n. 2, pp. 221-240

Zhang, Xiaobo and Kevin Zhang, 2003, "How Does Globalization Affect Regional Inequality With a Developing Country? Evidence from China", *The Journal of Development Studies*, V. 39 n. 4, April 2003, pp. 47-64