

***Trade Openness, the Market for Governance, and Long-Run Economic Growth***

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## *Trade Openness, the Market for Governance, and Long-Run Economic Growth*

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Can the freedom to trade internationally, once introduced by a nation's government, lead to the necessity to liberalize more generally, and so result in enhanced growth and greater realized productive capacity? Many studies (Baldwin, 2002; Rodríguez and Rodrik, 2000; Edwards, 1998; Lee, 1993) have examined whether or not greater trade liberalization is likely to impact long-run economic growth with what could be described as either mixed results or, more accurately, *conditional consensus*.<sup>1</sup> Economic theory suggests that there are a number of ways that openness may influence long-term economic growth, such as specialization according to the law of comparative advantage, an enhanced capacity to combat imperfect competition, and technological spillovers. Few studies, notably Wacziarg (2001), have examined the impact of openness on growth through its impact on the role and behavior of government.

This study examines the role of relative trade liberality (and the change in this freedom to trade internationally) on long-run economic growth *through* its indirect impact on the *quality of institutions* (as measured by the Economic Freedom of the World index – Gwartney and Lawson, 2006). As states remove barriers to and institutional biases from international trade, governments *must* also adjust their portfolio of services (and the taxes used to fund them) or risk capital flight, commerce flight, a loss of competitiveness for its domestic suppliers, and, ultimately, shrinkage in their tax base.<sup>2</sup> Trade openness begets greater importance for competitive institutions of governance, and so greater *economic freedoms* generally. Together, trade liberality and institutions that emphasize ideas such as individual responsibility and limited government lead to greater long-run economic growth.

Section I clearly defines the concepts of *trade openness* and *economic freedom* and then summarizes the (1) openness and growth, (2) openness and institutions, and (3) institutions and growth arguments. Section II outlines the Trade Openness Index (TOI) and Economic Freedom of the World Index (EFW) measures. Section III examines the impact of openness on institutional quality, the impact of institutional quality on growth, and both the direct and indirect impact of openness on long-run economic growth. Section IV summarizes the interpretations of the empirical analysis, and outlines the findings of this study.

### I. Trade Openness, Economic Freedom, Institutions, and Growth

#### Trade openness and long-run economic growth:

The term *trade openness* has been applied to a range of meanings in the literature from *trade intensity* and *exposure to external markets* (terms used to indicate the sum of imports and exports as a share of GDP – hereafter *simple trade share*) to the particular idea adopted in this study, that of *trade policy liberality*. Pritchett (1996) defines trade policy liberality as “that set of policies such that the level and pattern of trade (and prices) are near what they would be under

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<sup>1</sup> The empirical results from studies examining the relationship between openness and economic growth result are, generally, in agreement that greater liberalization leads to greater economic growth; but, this result is conditional as there is debate regarding the limits of some of the particular approaches to the question. Rodríguez and Rodrik (2000) is a key paper that addresses the range of questions regarding many existing empirical approaches. It is not the end of this paper to show the openness and growth relationship specifically, but rather to look for an additional conduit through which openness may impact growth and so suggest the measured impact of greater trade liberality is under-estimated in the literature – regardless of approach to measurement.

<sup>2</sup> Motivation for this particular question is derived from Wacziarg (2001) in which the quality of macroeconomic policy is tested as one channel through which trade openness may impact growth. See Section I of this paper.

free trade.”<sup>3</sup> And so, *Trade openness*, in this paper, represents the degree to which unfettered markets are used to coordinate trade across national boundaries and, hence, indicates the extent to which such markets can efficiently allocate scarce resources where they are valued the most.

In a dynamic world, *free-* and *open-markets* may influence long-run economic growth in many different specific ways. One path comes from the expanding the opportunities of firms to realize more fully scale economies and greater efficiency in investment (Krueger, 1978). Increased competition, resulting from reduced barriers for foreign competitors, serves to limit the market power of domestic imperfectly competitive markets, mandates efficiency, and delivers a greater variety of both finished products and intermediate inputs to consumers and industry, respectively (Harris and Cox, 1985; Bhagwati, 1988). A different path for growth through trade liberalization stems from the transfer of ideas and the ability of domestic industries to utilize imported intermediate inputs that benefit from new technologies in the world economy. Repeated and sustained interaction through international trade facilitates the ability of domestic producers to adopt foreign knowledge in their own production (Edwards, 1992). Yet another path for greater economic growth is through international competition in governance, the focus of this study. There are many different ways that trade openness may impact economic growth.

The degree to which trade impacts long-run economic performance remains a contentious topic, but economic theory indicates that there is reason to believe that relatively open economies will achieve higher income levels and grow more rapidly than those with substantial barriers that retard trade. Policies that limit potential gains from trade simultaneously limit the gains from division of labor, specialization, and the realization of gains from comparative advantage.

#### Institutional quality and long-run economic growth:

The concept of *economic freedom* centers around the capacity for the individual to determine the ultimate use of their private property and for free markets, dominated by voluntary exchange, to direct scarce resources in a society. The institutions of an economy can be supportive of this end in a myriad of ways. The particular conceptualization of economic freedom employed in this study, developed by Gwartney and Lawson (2006), divides the various ways an economy’s institutions can be representative of *economic freedom* into five general groups: the size of government, the protection of private property rights, access to sound money, the freedom to trade internationally, and the control of private enterprise.

The literature examining the relationship between *economic freedom* and long-run economic growth is quite rich and varied. Examining the literature for studies which include *economic freedom* as defined by the Gwartney and Lawson (2006) methodology returns a range of studies which find either the level, or the level and change of economic freedom as significant factors in explaining long-run differences in economic growth (Dawson, 1998; Pitlik, 2002; Scully, 2002). Gwartney, Holcombe, and Lawson (2006) employ *economic freedom* as a measure of institutional quality to examine both the direct and indirect impact of *economic freedom* on long-run economic growth through private investment. They find that the impact of economic freedom on long-run economic growth is underestimated in the literature due to omission of the indirect impact that it has on private investment decisions.

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<sup>3</sup> Pritchett (1996) also defines *trade openness* as synonymous with *trade intensity*, which varies for reasons unrelated to trade policy (like geographic size and population). *Trade intensity*, described as *trade share* in this paper, is an especially imprecise outcome based measure of both the non-policy characteristics of a state (such as its proximity to demand, size, population, etc) and its explicit counter-openness policies (such as tariffs, quotas, & exchange rate controls).

### Trade openness and an economy's institutions:

The literature for the impact of trade openness on the *behavior of government*, and so the institutions shaped by such government, includes studies examining trade openness and the size of nations, the size of government, and (in one study) economic growth through the behavior of government. Many studies have shown that smaller nation-state sizes are facilitated by the freedom to trade internationally as the relative efficiencies of organizing as a large state melt away with trade liberalization (Alesina, Spolaore, and Wacziarg, 2000; Alesina and Wacziarg, 1998). Rodrik (1998) tested the hypothesis that with increased openness comes increased *size of government* as government engages the perceived need to insulate (and “insure”) its constituency from external macroeconomic shocks that have (as a result of greater openness) ever larger impacts on the domestic population. Wacziarg (2001) measures the impact of trade openness on long-run economic growth through a range of distinct channels, which include government size (addressing the impact of the consumption smoothing services, similar to Rodrik) and enhanced government policy (institutional quality). Openness, he argues, may impact long-run economic growth and, so, create “incentives for policymakers to pursue virtuous macroeconomic policies.” Though Wacziarg did not find that government size impacted economic growth in a statistically significant fashion, he found the quality of macroeconomic policy did.

If trade openness impacts an economy's *quality of institutions* then it may impact long-run economic growth indirectly. Thus, the full impact of trade openness on long-run economic growth may be consistently underestimated in the existing literature.

## II. Tools for Analysis

### The freedom to trade internationally as measured by the *Trade Openness Index (TOI)*:

When measuring the extent of counter-openness policy present, there are two basic approaches: the measurement of incidence and measurement of outcome (Baldwin, 1989). Methods that concentrate on incidence examine explicit measures of counter-openness policy or proxies for them; measures that concentrate on outcome infer the extent of counter-openness policy present by looking at macro outcomes hypothesized to be affected by such policy. Methods that concentrate on incidence must select meaningful measures that are indicative of the entire trade policy regime. Methods that concentrate on outcome must select measures functionally related to the incidence of counter-openness policy, carefully model the relationship between the observed variables and the implied counter-openness policies, and control for the multitude of contributing factors in an economy that may create the specific effect.

The *TOI* (Skipton, Gwartney, and Lawson, 2001; Skipton 2004) is a composite index of relative trade openness constructed from a set of incidence and outcome measures of trade restrictiveness. Three elements make up the *TOI*: a 3-part tariff measure, an exchange rate control measure, and *actual-versus-expected* trade share differences from an empirical model. The tariff and exchange rate control measures are each incidence-based indicators. The *actual-versus-expected* trade share differences (estimated by a *trade-share-estimation model*) are an outcome-based measure. A fixed effects model is used to estimate *natural* trade share levels (by nation) that would exist in a world economy without policy distortion. By including established determinants of simple trade share (imports and exports as a share of GDP) such as population, geographic size, proximity to demand, and access to coastline, the fixed effect model accounts for the time-invariant, *state dependent* factors<sup>4</sup>. These state dependent factors are, by definition,

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<sup>4</sup> The fixed effect, trade share estimation model includes a unique measure of proximity to world concentrations of demand called the *distance adjusted demand scalar (DADS)*. The *DADS* measure is an aggregated approach to the proximity idea developed by

**Table 1: Trade Openness Index, 2000-02**

<b>10 Most Open Economies</b>	<b>2000-02 TOI</b>	<b>10 Least Open Economies*</b>	<b>2000-02 TOI</b>
Singapore	9.96	Tanzania	6.11
Indonesia	9.20	Albania	6.07
Ireland	9.03	Egypt	5.93
Slovakia	8.93	Central African Republic	5.61
Thailand	8.90	Rwanda	4.87
Luxembourg	8.85	Iran	4.61
Estonia	8.82	Pakistan	4.38
Belgium	8.79	Burundi	4.29
Canada	8.78	Sierra Leone	4.09
Ghana	8.76	Congo, Democratic Republic	3.94

**Note\*:** Myanmar excluded due to inconsistent data.

policy invariant and so the difference between the *natural* trade share level and actual trade share figures represents a rough proxy for the total extent of counter-openness policy present.

Data from the three elements in the TOI are normalized to fit between 0 and 10 using a range of different techniques designed to maintain the integrity of the relative distribution in the actual data. The elements are combined using weights established using principal components analysis to form a continuous, annual measure of relative trade openness for the 123 countries in the sample from 1980-2002. By construction the TOI is an index bounded between 0 and 10 where an index of 0 is representative of a relatively *less open* economy and an index of 10 is representative of a *relatively more open* economy. Table 1 shows the 10 *most open* and 10 *least open* economies in 2003 (the latest year for which the index is available). Appendix 1 presents more complete TOI data for the entire 123-country sample sorted alphabetically.<sup>5</sup>

#### Institutional quality as measured by the *Economic Freedom of the World Index (EFW)*:

The Economic Freedom of the World Index (EFW), developed by Gwartney and Lawson (2006), is the measure of institutional quality employed in this study. The EFW index includes observations for 123 countries over the 1970-2004 period. It is constructed using data from 38 distinct sources making up 21 component areas divided into the 5 principle areas described earlier. Apart from determining which of the components goes into which principle area, equal weighting is applied to each of the elements within each component, each component within each principle area, and each principle area within the broader index of economic freedom. The data in the index itself is normalized (using a range of methodologies) to fit within a 0 to 10 scale; the result is an index bounded between 0 and 10 where an index of 0 is representative of a relatively *less free* economy and an index of 10 is representative of a *relatively more free* economy. Generally speaking, economies with relatively high EFW index ratings may be described as more *free market* oriented than those with relatively low index ratings.

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Chuck Skipton and James Gwartney (2000) that includes, within its construction, more than 99% of the world's measured GDP. In the standard gravity model of international trade, bilateral trade shares are estimated pair-wise (bi-laterally) with the distance between them and their respective GDP measures introducing a measure of proximity to demand. The **DADS** measure represents a conceptual aggregation of this bilateral approach. For more detailed information on the **DADS** measure, see Skipton (2003).

<sup>5</sup> The complete time-series of the TOI data is available by request from the author.

### III. The Empirical Study

The empirical question that is the focus of this study is whether trade openness impacts long-run economic growth both directly (as theory suggests) and indirectly (through necessary competitive behavior in the market for governance resulting from openness). Toward this end a two-stage process is pursued in order to identify, qualify, and quantify such measurable effects in much the same way that Gwartney, Holcombe, and Lawson (2006) isolated the impact of economic freedom on long-run economic growth through enhanced private investment.

In the first stage, the TOI is regressed on both the principle areas of the EFW index (with the exception of area-4 – the freedom to trade internationally) and a composite EFW measure. This analysis both quantifies the degree to which the various elements of the index are impacted by greater freedom to trade internationally and creates a *residual series* which, when introduced into the growth equations of the second stage, represents the cross-country variations in institutional quality not correlated with trade openness.

In the second stage, both trade openness and the residual series from stage one are introduced to a Barro (1991) style long-run economic growth equation. By employing this approach, two related (yet individually relevant) factors are included in the long-run analysis and the direct and indirect impact of openness on growth may be examined.

#### The Data:

The TOI data are from Skipton (2004) updated in 2006 to include TOI figures for 2002 and 2003. The data for institutional quality (the EFW index) come from the 2006 *Economic Freedom of the World Annual Report* (Gwartney and Lawson, 2006). The composite EFW measure *EFW-4* is the un-weighted average of the 5 major components of the EFW index without area-4 – which is explicitly related to the TOI.<sup>6</sup> The other 4 principle areas of the EFW index are EFW1 (*the size of government*), EFW2 (*protection of private property rights*), EFW3 (*access to sound money*), and EFW5 (*control of private enterprise*). The private and government investment as a share of GDP series are from Gwartney, Holcombe, and Lawson (2006). Data for the standard elements of the Barro growth regressions came from World Bank, Penn World Tables, OECD, and IMF.<sup>7</sup>

The full sample for the growth analysis is made up of 93 economies. The difference between these 93 and the 123 in the full EFW country sample is comprised mostly of states not present in the data for the entire 23-year span. There are a few states that were in existence for the entire period but for which **TOI** data are not available for long-periods in the sample due to data availability issues. There are two states, Belize and Tanzania, with **TOI** data spanning the entire growth regression period that were eliminated from the full-sample run due to inconsistency in other data necessary for the growth analysis.

#### Trade Openness and Institutional Quality:

Figure 1 shows the impact of trade openness on the institutional quality of an economy as measured by the four principle areas of the EFW index that are not explicitly related to trade

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<sup>6</sup> One of the sub-components of area-4 (of the EFW index) is an element of the TOI provided to the authors of the EFW report and used in the construction of the EFW index.

<sup>7</sup> GDP and gross capital formation figures were collected from the World Bank, *World Development Index CD-ROM (various editions) and WDI-Online (2006)*; Penn World Table (v. 5.6a); International Monetary Fund, *International Financial Statistics Yearbook* (various editions); OECD, *Economic Outlook* (various issues); Central Intelligence Agency, *World Fact Book* (online – various years), and Central Intelligence Agency, *Handbook of International Economic Statistics* (1998). Enrollment figures are from William Easterly and Mirvat Sewadeh's online *Global Development Network Database* (#4 – Social Indicators and fixed factor time series). Enrollment figures were updated using the World Bank's *World Development Index CD-ROM (various editions) and WDI-Online (2006)*. Relative price of investment goods data were gathered from Barro, R. and J-W. Lee (1994).

**Figure 1: Trade Openness and Institutional Quality (EFW Subs)**

— Dependent Variables are Sample Means for Full Period (1980-2000) —

	<i>Dependent Var.</i> EFW Sub-1 <i>Size of Government</i> EQ-1	<i>Dependent Var.</i> EFW Sub-2 <i>Property Rights</i> EQ-2	<i>Dependent Var.</i> EFW Sub-3 <i>Access to Sound Money</i> EQ-3	<i>Dependent Var.</i> EFW Sub-5 <i>Regulation of Business</i> EQ-4	<i>Dependent Var.</i> EFW w/o Sub-4 <i>Freedom to Trade Int'l</i> EQ-5
Constant	5.21 (6.42)***	1.37 (1.70)*	2.80 (3.68)***	3.87 (9.62)***	2.88 (5.80)***
TOI 80-83	0.01 (1.06)	0.69 (6.11)***	0.66 (6.07)***	0.29 (5.11)***	0.47 (6.75)***
Δ in TOI 80s	0.29 (1.65)*	0.37 (2.05)**	0.08 (0.47)	0.24 (2.47)***	0.33 (3.05)***
Δ in TOI 90s	- 0.01 (0.08)	- 0.002 (0.11)	0.09 (0.50)	- 0.07 (0.72)	0.08 (0.74)
Adj. R <sup>2</sup>	.02	.39	.39	.30	.41
Sample size	94	94	94	94	94

\*\*\* significant at the 1% level      \*\* significant at the 5% level      \* significant at the 10% level  
(t-statistic is in parenthesis)

openness policy. If it takes time for the impact of trade liberalization to then influence the behavior of government through the competitive pressures of the international market for governance (and so liberalize other economic institutions within an economy), then there is reason to believe there would be a lag between trade liberalization and more general institutional reform. To address this, the data on changes in the level of trade openness is divided into two parts (1980's and 1990's). This allows for different sized coefficients during each time period to demonstrate such a lagged impact. Table 2 (on the next page) presents the economies with the largest change in trade openness during both the 1980s, 1990s, and entire 1980 – 2002 period.

Both the beginning of period *level* and 1980-90 period *change* variables enter EQ 1, 2, 4, and 5 with positive and significant coefficients. This suggests that the initial level of trade openness and changes in relative trade liberality (at least during the first half of the period) are *each* associated with economic institutions more consistent with the concept of *economic freedom* and the hypothetical *free-market* (with the measured exception of area-3).

With regard to the relationship between trade openness and the measured quality of institutions in area-3 (*access to sound money*), the lack of a measured statistically significant relationship between it and both the level of and change in trade openness serves to eliminate it from further analysis in this study. Despite the fact that the results suggest that countries which possessed more liberal trade regimes in 1980-83 also possessed more *economically free* economic institutions related to *access to sound money* during the sample period, it does not suggest that changes in openness can lead to, generally, more liberal economic institutions.

Residuals from EQ(s) 1, 2, 4, and 5 (of Figure 1) are used in the second stage long-run economic growth analysis (described below) as a proxy for the cross-country variations in institutional quality not correlated with trade openness

**Table 2: States with Largest Change in Trade Openness**

1980-02 to 1988-90	Change in TOI	1990-92 to 2000-02	Change in TOI	1980-2 to 2000-02	Change in TOI
Ghana	4.5	Bangladesh	4.6	Ghana	8.4
Mexico	4.4	Syria	3.4	Nicaragua	5.6
Nicaragua	3.3	China	3.3	Mexico	5.4
Congo, Dem. R.	2.9	Uganda	3.2	Bangladesh	4.6
Costa Rica	2.5	Ghana	3.0	El Salvador	4.2
Burundi	2.3	Bulgaria	2.6	China	4.0
Mauritius	2.0	Hungary	2.5	Costa Rica	3.8
Madagascar	1.8	Estonia	2.4	Hungary	3.6
Nigeria	1.7	Rwanda	2.3	Syria	3.6
Malawi	1.7	Algeria	2.3	Turkey	3.3
Turkey	1.5	India	2.2	Tanzania	3.1
El Salvador	1.4	Romania	2.2	Nigeria	3.1

### Trade Openness and Long-Run Economic Growth:

The greatest impact of trade liberalization on economic growth is in the long run. Though the reduction of counter-openness policy may lead to fairly immediate changes in trade flows (as they are often anticipated) the full impact of liberalization on income is likely to take more time. It takes time for institutional changes to lead to capital inflows and resource decisions to be made to reflect now profitable transactions. It takes time for financial institutions to become convinced of the likelihood of trade policy persistence – facilitating the reorganization of resources necessary for the full-impact of a liberal trade regime to be realized. It takes time for economies, once impeded by the strong arm of exchange regulation, to operate in industries where their true comparative advantage lay and where wealth may be created without inhibition. Finally, it takes time for all resources, whether human or physical, to be reallocated to where they are valued the most, making the largest measurable impact on the growth rate of the economy, the long-run growth rate, possible.

The long-run economic growth analysis in this study employs an applied Barro (1991) methodology – modeled after the approach used by Sachs and Warner (1995) their landmark trade openness paper. The dependent variable is the average annual compounding growth of PPP GDP per capita for the period (1980-2000). Two measures of human capital formation are used: primary and secondary enrollment rates. Three measures related to physical capital formation are utilized: private investment as a share of GDP, government investment as a share of GDP, and a measure for the relative price of investment capital at the start of the sample.<sup>8,9,10</sup> Both a convergence indicator (the log of GDP per capita at the start of the period) and a measure

<sup>8</sup> PPI80DEV is the deviation of the log of the price level of investment goods for a nation relative to the sample mean as calculated by Barro and Lee (1994). In a few cases, where data is not available for 1980, observations for 1985 were used.

<sup>9</sup> Gross capital formation (the conventional metric for physical capital formation) is used for control runs at the beginning of the analysis. It has been shown (Skipton, 2004) that private and public (government) investment as a share of GDP serves much the same purpose as gross capital formation and allows for a more descriptive analysis of the growth relationship. By dividing up investment into its two parts, statistical issues related to multi-collinearity between *the size of government* and *government investment as a share of GDP* descriptive variables can be controlled.

<sup>10</sup> Government spending as a share of GDP (in this analysis) also serves to replace (albeit *imperfectly*) real government consumption spending as a share of GDP (a fairly cumbersome data series from the Barro growth analysis which measures government spending outside of the military and education).

of sound monetary policy (period inflation variability) are each included. Finally, to represent the general level of relative trade openness during the period, the TOI (1980-2002) is included.

EQ-1 of Figure 2 shows the applied Barro long-run growth equation. The convergence measure enters the equation as significant and with the expected negative sign.<sup>11</sup> While the sign on the coefficient for the primary enrollment rate is not as expected, it is also insignificant.<sup>12</sup> The coefficient on the secondary enrollment rate is both significant at the 99<sup>th</sup> percentile and possesses the expected sign. Each of the two human capital measures delivers a proxy for the extent of human capital formation occurring at the beginning of the 22 year period of the sample. The coefficient on inflation variability, which captures the *soundness* of monetary policy (to be stable and predictable), is significant at the 99<sup>th</sup> percentile and possesses the expected negative sign. Where the annual rate of change in the general level of prices in the economy is volatile (as measured with larger standard deviations) there is slower rate of economic growth. The “relative price of investment goods” measure (PPI80DEV) is both significant at the 99<sup>th</sup> percentile and possesses the expected positive sign. In economies where the general price level for investment goods at the beginning of the period was higher, slower long-term economic growth followed. The coefficients on both private investment as a share of GDP and government investment as a share of GDP are each significant (private at the 99<sup>th</sup> and public at the 95<sup>th</sup> percentile) and possess the expected (positive) signs. It is interesting to note that the coefficient (and the t-stat) on private investment is twice that of the one on public investment. Relatively small levels of private capital formation (and net flows) – all else equal – are indicative of an economy limited in its own capacity to grow.<sup>13</sup> Last, the *TOI* enters the growth equation significant at the 95<sup>th</sup> percentile and with the expected positive sign. This suggests that, even from within an established long-run economic growth equation, trade openness matters for long-run economic growth. The adjusted r-squared for the basic model (EQ-1) is 0.62.

#### Trade Openness, Its Impact on Institutional Quality, and Long-Run Economic Growth:

The remaining equations of Figure 2 show the impact on the descriptive capacity of the growth equation resulting from the inclusion of the residuals from the *trade openness and institutional quality* regressions in the first stage (in Figure 1). The variation in the quality of economic institutions across countries not related to differences in either the *level of* or *change in* trade openness is imbedded within the residuals of the first stage analysis.

EQ-2 introduces the first-stage residuals from the analysis of the impact of trade openness on the quality of a nation’s economic institutions related to the *size of government* (the first component of the economic freedom of the world index). Comparing EQ-1 and EQ-2 shows that while introducing this imbedded information does not change the estimated coefficient for trade openness measurably it does increase both the t-stat on the TOI coefficient and the overall descriptive power of the equation (from 0.62 to 0.63). Introducing differences in institutional quality *the result of* differences in the freedom to trade internationally serves to increase the descriptive power of the model in both a meaningful and predictable fashion.

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<sup>11</sup> The *convergence* of income levels through faster growth rates exhibited by less developed economies (after controlling for the other macro aspects of the economy) is controlled for using the beginning of period log of per capita income measure. Using this technique, a negative and significant coefficient on the measure allows for (and suggests) economies with smaller beginning of period per capita incomes (all else equal) to grow faster than their higher per capital income equivalents (see Edwards, 1992).

<sup>12</sup> The performance of this particular human capital measure (the primary enrollment rate) may be due to multi-colinearity between it and the secondary enrollment rate figure.

<sup>13</sup> When EQ-1 is run using gross capital formation in place of private and public investment as a share of GDP, it also enters the equation with the expected positive sign and significant at the 99<sup>th</sup> percentile. Even so, the resulting adjusted r-square is smaller. Further, the use of gross capital formation does not allow for the model to test area 1 of the EFW as government investment as a share of GDP (a part of gross capital formation) is most certainly correlated with the size of government.

**Figure 2: Trade Openness, the Quality of Institutions, and Long-Run Economic Growth (Direct and Indirect Effects)**

**Dependent Variable: Average Annual Compounding Growth of PPP GDP Per Capita 1980-2000**  
(*t*-statistic is in parenthesis)

	Eq-1	Eq-2	Eq-3	Eq-4	Eq-5
Constant	- 0.001 (0.10)	0.001 (0.67)	0.001 (0.13)	0.005 (0.34)	- 0.007 (0.54)
LN GDP Per Cap 1980	- 0.005 (2.86)***	- 0.007 (3.77)***	- 0.006 (3.10)***	- 0.005 (2.44)***	- 0.006 (3.03)***
Enroll P <sup>a</sup>	- 1.1E-04 (1.35)	- 6.5E-05 (0.85)	- 1.2E-04 (1.72)*	- 9.3E-05 (1.15)	- 8.3E-05 (1.06)
Enroll S <sup>b</sup>	2.7E-04 (2.99)***	2.4E-04 (2.53)***	1.7E-04 (2.05)**	2.4E-04 (2.54)***	2.5E-04 (2.72)***
Std Dev Infla Rate <sup>c</sup>	- 8.8E-06 (4.58)***	- 9.4E-06 (5.03)***	- 7.4E-06 (4.38)***	- 8.2E-06 (3.39)***	- 7.4E-06 (3.59)***
PPI80DEV <sup>d</sup>	- 0.013 (4.22)***	- 0.015 (4.75)***	- 0.015 (4.53)***	- 0.012 (3.63)***	- 0.012 (3.86)***
Priv Invest % GDP <sup>e</sup>	0.002 (4.79)***	0.002 (4.75)***	0.002 (4.38)***	0.002 (4.98)***	0.002 (4.15)***
Govt Invest % GDP <sup>f</sup>	0.001 (2.05)**	†	5.5E-04 (1.12)	0.001 (2.19)**	0.001 (2.62)***
TOI <sup>g</sup>	0.003 (2.00)**	0.003 (2.16)**	0.005 (3.55)***	0.002 (1.22)	0.004 (2.52)***
Resid. EFW-1 <sup>h</sup>		- 0.004 (2.43)***			
Resid. EFW-2 <sup>i</sup>			0.004 (2.86)***		
Resid. EFW-5 <sup>j</sup>				2.2E-04 (0.09)	
Resid. w/o EFW-4 <sup>k</sup>					0.004 (1.70)*
Adjusted R-squared	.62	.63	.67	.60	.63
Sample size	92	92	92	92	92

\*\*\* significant at the 1% level

\*\* significant at the 5% level

\* significant at the 10% level

a. Enroll P 80: Primary school enrollment rate in 1980

b. Enroll S 80: Secondary school enrollment rate in 1980

c. Std deviation of  $\Delta$  in GDP deflator (inflation), 1980-99

d. PPI80DEV: Relative price of investment goods in 1980

e. Priv Invest % of GDP, 1980-2000

f. Govt Invest % of GDP, 1980-2000

g. Trade Openness Index, 1980-2002

h. Residuals from EQ-1 of Fig-1; (Size of Govt), 1980-02

i. Residuals from EQ-2 of Fig-1; (Prop. Rights), 1980-02

j. Residuals from EQ-4 of Fig-1; (Regulation), 1980-02

k. Residuals from EQ-5 of Fig-1; (w/o EFW-4), 1980-02

†. As EFW-1 and government investment as a share are highly correlated, Gov't Investment is eliminated from EQ-2.

The coefficient on the EFW-1 residuals measure is both *negative* and significant. Rodrik (1998) and Wacziarg (2001) each suggest (and Rodrik tests) the proposition that greater trade openness leads to a greater propensity for government to provide income smoothing services for their constituency in order to isolate them from macroeconomic shocks that may exist outside of

their national borders; the idea being that increased trade openness may introduce increased opportunities for growth but it brings with it greater exposure to risk (risk independent of that which would exist for intra-national trade). As government spending as a share of GDP is included as a part of the *size of government* EFW measure the result from the analysis may not be as counter-intuitive as it may at first seem.

EQ-3 of Figure 4 introduces the first-stage residuals from the analysis of the impact of trade openness on the quality of a nation's economic institutions related to the *protection of private property rights* (EFW component 2). Comparing EQ-1 and EQ-3 shows that by introducing the imbedded information about the indirect impact of trade openness on this aspect of a nation's institutional quality substantively increases the estimated coefficient (and so, estimated impact) of trade openness on long-run economic growth. The descriptive power of the model is increased dramatically from an adjusted r-squared of 0.62 (in EQ-1) to 0.67.

EQ-4 of Figure 4 introduces the first-stage residuals from the first stage analysis examining the impact of trade openness on economic institutions present in the economy related to the *regulation of private enterprise* (EFW component 5). Comparing EQ-1 and EQ-4 shows that when the imbedded information about the indirect impact of openness on this particular group of institutional qualities is added to the growth equation, it enters insignificant. Further, as a result of some other statistical problem between it and the TOI, the estimated coefficient for trade openness becomes statistically insignificant and the descriptive power of the equation diminishes (from its benchmark of 0.62 to 0.60).

Finally, EQ-5 of Figure 4 introduces the residuals from the first stage analysis examining the impact of trade openness on the institutional quality of economic institutions present in the economy not related to the freedom to trade internationally (without EFW component 4). Comparing EQ-1 and EQ-5 shows the coefficient on the TOI increases dramatically (in a fashion similar to the result with EFW component 2) and the t-stat increases above its level in EQ-1; the overall descriptive power of the growth equation increases only modestly to 0.63 (from 0.62).

#### IV. Conclusions

While trade openness has been shown to influence long-run economic growth *directly* through expanded opportunities for firms to realize – more fully – scale economies, a reduced capacity for less than competitive markets to avoid competitive pressures, the transfer of ideas and methodologies among countries, and greater specialization and exchange according to the precept of comparative advantage, it may also influence economic growth *indirectly* through institutional quality the result of increased competitive pressure in the international market for governance. This study examines the impact of relative trade liberality, as measured by the *trade openness index – TOI* (Skipton, 2004), on long-run economic growth both directly and indirectly through quality institutions, as measured by the *economic freedom of the world index – EFW* (Gwartney and Lawson, 2006).

The statistical study employed involves two stages. The first stage measures the impact of the level of and change in relative trade liberality on the quality of institutions in an economy (separating out those related to the freedom to trade internationally). The residuals from this first-round analysis are employed as a proxy for the cross-country variations in economic freedom not associated with both the level of and change in relative trade liberality in the second-round analysis that includes a Barro-style long-run economic growth equation. In short, the second round analysis captures both the direct and indirect impacts of openness on growth – more accurately estimating the importance of trade openness and more definitively outlining the mechanisms by which such impacts are transmitted.

The greatest impact of trade openness on the quality of economic institutions is shown to be on those institutions related to the protection of private property rights. The impact of trade

openness on the quality of institutions present in an economy related to the size of government, was found to be significant.

If relative trade liberality matters for economic growth, then understanding the complexity of its full impact on the economy may require a series of indirect questions. This analysis addresses one such question: does relative trade liberality require a state to consider the general competitiveness of its economic institutions, and, if so, do any of the changes attributable to the necessities of the international market for governance then bring about additional economic growth benefits which may be both isolated and attributed to trade openness? The results of this study are intended to contribute to the dialogue regarding this particular question.

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## Appendix 1: The TOI from 1980-82 to 2000-02

Economy	1980-82 Rating	1985-87 Rating	1990-92 Rating	1995-97 Rating	2000-02 Rating	1980-2002 Rating (rank)	Full-period $\Delta$ in TOI
Albania	.	.	.	5.8	6.1	**	**
Algeria	4.9	3.6	4.0	4.4	6.3	4.41 (90)	1.4
Argentina	4.4	2.9	5.0	6.3	6.3	4.88 (83)	1.9
Australia	6.7	7.0	6.8	7.2	7.4	7.01 (35)	0.7
Austria	7.5	7.6	7.5	7.7	8.2	7.69 (13)	0.7
Bahamas	5.1	5.4	4.8	5.2	.	**	**
Bahrain	8.7	8.3	8.3	7.7	7.5	8.06 (10)	-1.3
Bangladesh	1.6	1.5	1.6	3.8	6.1	2.86 (95)	4.6
Barbados	6.5	6.1	5.8	6.4	6.2	6.22 (55)	-0.3
Belgium	8.2	8.5	8.4	8.4	8.8	8.47 (3)	0.6
Belize *	4.9	4.5	5.6	6.0	6.8	5.52 (74)	1.9
Benin	5.4	5.5	.	.	6.4	**	1.0
Bolivia	5.4	6.2	7.1	7.4	7.1	6.69 (42)	1.7
Botswana	7.6	7.7	7.6	7.3	7.5	7.55 (17)	-0.1
Brazil	3.9	2.9	5.4	6.3	6.8	5.01 (80)	2.9
Bulgaria	.	4.9	5.5	7.5	8.1	.	**
Burundi	1.7	3.2	3.9	2.4	4.3	3.10 (94)	2.6
Cameroon	6.1	6.4	5.9	5.8	6.5	6.15 (57)	0.4
Canada	7.7	7.9	7.7	8.2	8.8	8.05 (11)	1.1
Central African Rep.	6.0	5.8	5.3	6.2	5.6	5.82 (66)	-0.4
Chad	.	.	6.5	7.2	6.9	**	**
Chile	6.6	6.4	7.8	7.6	7.8	7.18 (30)	1.2
China	4.3	5.9	5.0	7.7	8.3	6.11 (59)	4.0
Colombia	4.7	5.2	5.6	6.6	6.9	5.72 (70)	2.3
Congo Dem. Rep.	3.4	6.7	6.0	7.4	3.9	5.74 (68)	0.5
Congo Rep. of	8.2	7.0	7.0	8.4	8.3	7.74 (12)	0.1
Costa Rica	3.7	4.6	6.7	7.2	7.5	5.99 (62)	3.8
Cote d'Ivoire	6.5	6.6	6.0	7.0	7.0	6.60 (44)	0.4
Croatia	.	.	.	6.6	7.3	**	**
Cyprus	6.9	6.8	6.5	6.8	6.9	6.77 (39)	0.1
Czech Rep.	.	.	.	8.5	8.7	**	**
Denmark	7.0	7.1	7.0	7.0	7.3	7.04 (33)	0.3
Dominican Rep.	3.5	5.3	4.4	6.4	6.6	5.22 (78)	3.1
Ecuador	4.9	3.9	6.3	6.6	7.3	5.67 (71)	2.4
Egypt	5.9	3.3	4.9	6.1	5.9	5.21 (77)	0.1
El Salvador	2.8	3.4	5.1	6.6	7.0	4.95 (82)	4.2
Estonia	.	.	6.4	8.5	8.8	**	**
Fiji	6.0	6.1	7.2	7.3	7.5	6.83 (39)	1.4
Finland	7.3	7.2	6.8	7.4	7.5	7.23 (28)	0.2
France	7.2	7.2	7.3	7.4	7.6	7.34 (25)	0.4
Gabon	6.7	7.2	6.9	7.1	6.8	6.96 (36)	0.1
Germany	7.3	7.4	7.5	7.6	8.1	7.57 (16)	0.8
Ghana	0.4	2.8	5.7	7.2	8.8	4.78 (86)	8.4
Greece	6.2	5.8	6.6	6.8	7.1	6.48 (48)	0.9
Guatemala	4.2	2.5	5.9	6.5	6.7	5.02 (79)	2.5

### Appendix 1: The TOI from 1980-82 to 2000-02 *continued*

Economy	1980-82 Rating	1985-87 Rating	1990-92 Rating	1995-97 Rating	2000-02 Rating	1980-2002 Rating (rank)	Full-period $\Delta$ in TOI
Guinea Bissau	.	4.3	.	.	7.2	**	**
Guyana	6.1	5.3	.	.	8.5	**	**
Haiti	4.1	2.9	2.6	.	6.5	**	**
Honduras	5.2	.	6.9	7.7	7.6	**	**
Hong Kong	7.7	8.1	8.5	8.5	8.4	8.28 (5)	0.7
Hungary	4.8	5.3	5.9	7.4	8.4	6.34 (51)	3.6
Iceland	5.9	6.2	6.8	7.0	6.9	6.57 (45)	0.9
India	4.1	3.7	4.5	5.6	6.7	4.80 (85)	2.6
Indonesia	7.9	7.5	8.0	8.2	9.2	8.10 (9)	1.3
Iran	2.5	1.6	4.1	4.2	4.6	3.40 (93)	2.2
Ireland	7.6	7.7	7.8	8.5	9.0	8.15 (6)	1.5
Israel	7.1	7.3	7.2	7.1	7.5	7.23 (27)	0.5
Italy	7.5	7.4	7.1	7.5	7.6	7.40 (22)	0.2
Jamaica	4.9	6.3	6.0	6.8	7.0	6.16 (56)	2.2
Japan	7.1	6.8	6.5	6.4	6.5	6.64 (43)	-0.6
Jordan	7.7	7.0	7.6	7.8	7.2	7.47 (20)	-0.5
Kenya	6.1	6.1	6.2	7.1	7.0	6.51 (46)	0.9
Korea, South	7.1	7.2	7.4	7.6	8.1	7.49 (19)	1.0
Kuwait	.	7.7	8.0	7.6	7.4	**	**
Latvia	.	.	.	7.8	7.5	**	**
Lithuania	.	.	.	8.0	7.7	**	**
Luxembourg	8.0	8.5	8.2	8.2	8.8	8.36 (4)	0.8
Madagascar	3.0	4.3	5.2	6.1	6.1	4.99 (81)	3.1
Malawi	4.1	5.0	6.2	6.5	6.6	5.73 (69)	2.5
Malaysia	8.7	8.8	8.9	8.9	8.6	8.82 (2)	-0.1
Mali	6.0	6.7	6.7	7.1	7.6	6.79 (40)	1.6
Malta	6.2	6.5	7.0	7.4	7.2	6.88 (38)	1.0
Mauritius	4.4	6.3	6.5	6.8	6.8	6.22 (54)	2.4
Mexico	2.6	5.4	7.3	8.3	8.0	6.46 (49)	5.4
Morocco	5.6	6.3	6.1	6.7	6.5	6.24 (53)	0.9
Myanmar †	1.4	0.4	0.0	0.0	.	**	**
Namibia	.	7.9	7.9	7.6	7.8	**	**
Nepal	5.6	5.2	5.0	6.1	6.4	5.60 (72)	0.8
Netherlands	8.1	8.2	8.0	8.1	8.3	8.14 (7)	0.3
New Zealand	7.1	6.8	6.8	7.0	7.5	7.01 (34)	0.4
Nicaragua	2.6	2.4	6.4	7.6	8.2	5.57 (73)	5.6
Niger	6.5	6.0	5.3	5.8	6.8	5.99 (63)	0.3
Nigeria	4.0	4.2	6.0	5.4	7.2	5.31 (75)	3.1
Norway	7.5	7.6	7.3	7.1	6.9	7.29 (26)	-0.5
Oman	.	7.8	7.8	7.6	7.7	**	**
Pakistan	3.9	4.9	4.8	5.2	4.4	4.68 (87)	0.5
Panama	7.5	6.8	6.6	7.1	6.8	6.93 (37)	-0.6
Papua New Guinea	.	7.9	7.6	7.5	.	**	**
Paraguay	4.4	4.1	6.2	7.3	7.1	5.77 (67)	2.7
Peru	3.9	2.8	4.8	6.5	6.7	4.85 (84)	2.8

### Appendix 1: The TOI from 1980-82 to 2000-02 *continued*

Economy	1980-82 Rating	1985-87 Rating	1990-92 Rating	1995-97 Rating	2000-02 Rating	1980-2002 Rating (rank)	Full-period $\Delta$ in TOI
Philippines	6.1	6.3	7.0	8.4	8.7	7.34 (24)	2.6
Poland	.	3.9	6.4	6.9	7.4	**	**
Portugal	7.2	7.4	7.2	7.4	7.5	7.36 (23)	0.4
Romania	.	.	5.1	7.1	7.3	**	**
Russia	.	.	.	7.9	8.6	**	**
Rwanda	1.7	.	2.6	4.3	4.9	**	**
Senegal	6.2	6.0	5.5	6.3	6.7	6.11 (60)	0.4
Sierra Leone	2.7	2.4	3.9	5.1	4.1	3.58 (92)	1.4
Singapore	9.9	9.9	9.9	9.9	10.0	9.92 (1)	0.0
Slovakia	.	.	.	8.3	8.9	**	**
Slovenia	.	.	.	7.3	7.3	**	**
South Africa	7.5	6.8	6.9	7.0	7.7	7.10 (32)	0.2
Spain	6.8	6.9	6.9	7.5	7.8	7.18 (29)	1.0
Sri Lanka	6.1	5.3	5.5	7.2	7.7	6.30 (52)	1.6
Sweden	7.2	7.7	7.3	7.7	7.9	7.60 (15)	0.7
Switzerland	7.3	7.5	7.4	7.1	7.8	7.41 (21)	0.5
Syria	3.6	3.0	3.8	5.0	7.2	4.32 (91)	3.6
Taiwan	8.2	8.2	8.1	8.1	8.0	8.12 (8)	-0.2
Tanzania *	3.0	3.0	4.5	6.7	6.1	4.61 (88)	3.1
Thailand	6.6	6.8	7.8	8.3	8.9	7.65 (14)	2.3
Togo	6.4	6.9	6.1	.	7.1	**	**
Trinidad and Tobago	4.1	4.0	4.6	6.7	6.5	5.12 (78)	2.4
Tunisia	5.8	5.6	6.7	7.0	7.2	6.50 (47)	1.4
Turkey	4.4	6.2	6.0	7.4	7.7	6.38 (50)	3.3
Uganda	3.8	3.5	3.5	6.0	6.7	4.51 (89)	2.8
Ukraine	.	.	.	.	8.5	**	**
United Arab Emirates	8.2	8.0	8.3	.	.	**	**
United Kingdom	7.5	7.7	7.3	7.6	7.6	7.53 (18)	0.1
United States	7.2	7.0	7.1	7.3	7.2	7.15 (31)	0.0
Uruguay	5.3	6.0	6.1	6.5	6.4	6.09 (61)	1.1
Venezuela	6.7	4.9	6.5	5.5	6.9	5.91 (65)	0.2
Zambia	5.5	5.5	5.8	7.4	7.1	6.13 (58)	1.6
Zimbabwe	4.3	4.7	6.3	7.8	6.2	5.95 (64)	2.0

\*\* There is insufficient *TOI* data for these economies to have a full 1980-2002 period rating.

\* Insufficient macro growth data exist for these two economies to be run in the growth equation in Figure 2.

† Inconsistent (and problematic) *other* macro data prevent Myanmar from use in the growth equations in Figures 1 & 2.