DECODING THE EFFECTS OF TRADE VOLUME AND TRADE POLICIES ON ECONOMIC GROWTH
A Cross-Country Investigation

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Acknowledgments: To Babi, who showed me the beauty of this field, Mami, a true psychologist, and Ina, my source of sweetness: your support is truly invaluable. Andora, Eris, Lindi and Roger: do not feel excluded. I am indebted to Dr. Charlotte Lott, for her unparalleled tutoring, Dr. Chris Michelmore and Dr. Marie Connolly for lending their support to this project, as well as my success at the institute. Special thanks are also owed to Ms. Gonca Ocur of the World Bank Group, and Dr. Robert Lawson, co-author of the *Economic Freedom of the World: 2002 Report*. The project is a dedication to my Grandfather.

Abstract: The study investigates the effects of trade volume and trade policies on economic growth. An extension of an earlier study, conducted by Halit Yanikkaya, the study investigates economic growth from cross-section data of 99 countries between 1998 and 2002. The study employs trade measure variables from the Economic Freedom Index, with data from 2000, published by the Fraser Institute as a part of the *Economic Freedom of the World: 2002 Report*. The study assesses the impact of trade openness, through utilization of the trade openness index, a category of the Economic Freedom Index, which consolidates measures of trade policy and trade volume along with other measures of trade. The study hypothesizes a positive relationship between trade openness and economic growth. Examination is also performed on the isolated effects of trade volume on economic growth, by using the trade sector size index, one component of the trade openness index, and effects of trade policy, by using the international trade taxation index, another component of the trade openness index. A positive relationship between trade openness and economic growth, as well as trade volume and economic growth is hypothesized, while a negative effect of more restrictive trade policies on economic growth is anticipated.

Results are derived controlling for input factors relating to economic growth as well as institutional policies. The dependent variable, economic growth, is measured in two ways: (i) through GDP per capita growth rates of 2002; and (ii) average annual GDP growth rates between 1998 and 2002. In the case of single year GDP per capita growth rates for 2002 the results of the trade variables, both aggregated and separate are found to be statistically insignificant. However, the dependent variable of GDP growth rates spanning over the period 1998-2002 yields results consistent with those found by Yanikkaya: greater volumes of trade are positively associated with economic growth, but fewer trade restrictions measured as lower trade taxation rates are negatively associated with economic growth.

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I. Introduction

Defined by their "developing" status, developing economies strive for greater levels of development through economic growth. Changes in the strategies for growth have been observed particularly in the external sector, where exchange with foreign countries has been both criticized and praised as a method for industrialization. Emerging from isolated economies, whether a product of communism or colonial rule, many less developed countries (LDCs) have found themselves entrenched in vicious cycles of poverty. The product of economic isolation with respect to international trade has given rise to growth literature that continues to investigate the effects of trade on economic growth. Advocacy for open trade policies and subsequently greater international interaction via trade outline the arguments presented by most of this literature.

Open trade policies have been perceived as a vital mechanism for growth through a country's expansion of exports and imports. While exports provide for an improvement of the current account balance, imports usher in new technologies, physical capital, and higher levels of human capital – factors essential to economic growth and development– in addition to lower prices that raise consumer purchasing power. Opposing views, however, draw on the concentrated adverse effects of such openness in a given economy, particularly the effects of trade on domestic producers, who face competition from foreign companies. Lending support to their argument for restrictive trade policies are also decreasing world prices of raw products as a result of international trade, usually a specialization of LDCs.

While arguments set forth by trade antagonists possess credibility, counterarguments are also of interest, especially if the intent is a more conclusive understanding of the issue in question. Addressing the initial argument of trade-imposed detriments on domestic producers,

trade protagonists claim that such detriments are outweighed by consumer benefits; evidence of trade-generated benefits are rather dispersed and thus less conspicuous than trade-generated costs that are experienced by the domestic producer. Disputing the notion of adverse effects of trade on developing economies through decreasing world prices for primary products, lies the argument of structural change: decreasing world prices of raw products indeed infers a demand for structural change, from an agricultural economy, to a manufacturing economy, or perhaps to a service economy.

International trade, as evidenced in the previous arguments, continues to be disputed in the circles of academia as well as in policy-making. Evidence on the effects of trade on growth is not unambiguous, however, substantial evidence attests to a positive relationship between international trade and economic growth. It is thus of interest to explore the impact of trade volume and trade restrictions, as two primary measures of trade, on economic growth. Exploitation of international trade through less restrictive trade policies is hypothesized to increase economic growth on several grounds:

(i) reduction in trade imparts lower levels of growth, as evidenced by the poverty of most world economies pursuing isolationist policies; (ii) exposure to new technologies, increases in physical capital, and higher levels of human capital from international trade; and (iii) the potential detriment on economies from inappropriate trade restrictions imposed in an attempt for protection from trade-induced hostility.

II. Literature Review

> The discovery of America, and that of a passage of the East Indies by the Cape of Good Hope, are two of the greatest of the most important events recorded in the history of mankind. ...one of the principal effects of those discoveries has been to raise the mercantile system to a degree of splendour and glory which it could never otherwise have attained to. It is the object of that system to enrich a great nation rather by trade and manufactures... [as] the commercial towns of Europe, instead of being the manufacturers of and carriers for but a very small part of the world... have now become the manufacturers for the numerous and thriving cultivators of America, and the carriers, and in some respects the manufacturers too, for almost all the different nations of Asia, Africa, and America. (Smith, ch.7, part.3, par. 81)

The gains from trade, as noted by economist Adam Smith in his *Wealth of Nations*, increased with Europe's discovery of the new continents of the Americas and their islands such as those of the Caribbean. Published in 1776 during a time of revolutionary change, the *Wealth of Nations* introduced new theories of development to the world of economic thought. With an introduction to development theories such as the theory of the invisible hand, absolute advantage, specialization and exchange, Smith unveiled the benefits of trade buried underneath the taboos of conventional wisdom. Smith's notion of the *invisible hand* held that market mechanisms would ensure an optimum outcome between buyers and sellers through the pursuit of self interest; while his theory of *absolute advantage* suggested that a country should specialize in the production of goods or services in which it acquires an output greater than another country relative to the inputs of that product. In the process, his ideas induced reevaluation of trade policies, monopolies, oligopolies, and policies repellant to technological innovation. The evaluation of the benefits associated with trade, and trade policies of world economies, has once again gained center stage, as development economists strive to deliver the recipe for industrialization to less developed countries. This study reviews literature corresponding to more contemporary trade

policy evaluations, in an attempt to disclose trade-generated benefits and costs on economic performance.

The literature review begins with Sebastian Edwards's 1993 work on *Openness, Trade Liberalization, and Growth in Developing Countries*. Edwards reviews previous empirical studies on developing economies in an attempt to draw a relationship between such literature and the increasingly popular views on trade policies that advocate for liberalization. *Liberalization* is defined as the relaxation of protective barriers to international trade, including exports as well as imports, and is expected to introduce foreign investments and competition to a given economy. In the process Edwards addresses faults apparent in the theoretical models, methodologies, and the data employed in the studies. The literature addressed in the study is classified as "(i) large scale multi-country studies that have investigated in detail the experiences of a group of countries with trade policy reform," and "(ii) econometric studies that have investigated on broad cross-country data the pace of export expansion and aggregate economic growth." (Edwards, p. 1361) Throughout his assessment of the two individual groups, Edwards strives to satisfy his objective of attributing the growing stigma of protectionist policies to this growing body of growth literature.

Multi-Country Studies of Trade Policy

Edwards's multi-country studies of trade policy in less developed countries (LDCs), are argued to be primarily the work of multilateral institutions, consisting of book-length investigations of the progress of individual economies comprising the sample. Included in this section are Ian Little, Tibor Scitovsky, and Maurice Scott's 1970 work on *Industry and Trade in Some Developing Countries*, and Bela Balassa's 1971 *Tariff Protection in Industrial Countries:*

An Evaluation. Assessing the economies of Norway[1], Pakistan, India, Taiwan and the Philippines, the Little et al. study defines the relationship between protectionist policies post World War II and industrialization, using the Corden effective rate of protection indicator, *ERP*. The effective rate of protection, which captures the "rate of protection granted to [the] value added in a given industry" is denoted by the ratio of the difference between the domestic value added, *VA*, and the world value added, *VA**, to the world value added, *VA**, thus: $ERP = (VA - VA^*)/VA^*$[2]. (Edwards, p. 1362) In a similar investigation, where the *ERP* indicator is again employed, Balassa assesses the relationship between tariff protection and the rate of industrialization in Norway, Pakistan, the Philippines, Chile, Brazil, and Mexico. Concluding results of the two multi-country studies indicate a negative impact of inward-oriented strategies on industrialization, specifically through a reduction of incentives for agriculture and exports.[3] Further findings suggest a "worsening of income distribution, a reduction in savings, [and] an increase in the rate of unemployment..." (Edwards, p. 1362)

Emerging views on trade policy, following such studies, advocate for relaxation of trade restrictions. Proponents of trade openness argue on the basis of greater levels of competition feasible through international trade. Edwards's review of the Little et al. project, and the Balassa study, however, criticizes these studies on the basis of measurement difficulties as well as methodologies used by the works. Edwards notes discrepancies in the *ERP* calculations between the Little et al. study and the Balassa study of overlapping countries, such as the Phillippines,

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[1] The data on Norway is drawn from 1954, during which time the country was classified as a developing economy.

[2] VA*, or the world value added is treated as a proxy for the most efficient mean of production in a given industry.

[3] The process of economic development, as widely noted throughout growth literature, requires the natural shift in production from agriculture, to the manufacturing of goods, to services. Artificially induced shifts in economic structure have proven detrimental to the process.

where Little, Scitovsky, and Scott discover an *ERP* of 49 percent while Balassa notes one of 61 percent. Edwards further criticizes the disregard for the evolution of *ERPs* through time, asserting that the authors were "satisfied with providing one, or at most two snapshots of protection in their specific countries." (Edwards, p. 1363) The author also recognizes the studies' concurrent disregard for alternative policies to inward-oriented strategies that have been employed by such countries, and their negative effect on economic growth.

Additional studies of his "multi-country investigations" include Anne Krueger and Jagdish Bhagwati's 1978 National Bureau for Economic Research, (NBER), paper. In their attempts for classification of trade regimes, Krueger and Bhagwati employ an anti-export bias index, against which individual economies are assessed. The index, B, is defined by the ratio of the effective exchange rate paid by importers, EER_M, to the effective exchange rate paid by exporters, EER_X, thus: $B = EER_M/EER_X$, where the value of B determines the type of trade regime in a given economy. A value of one is noted to define a "neutral" trade regime while values deviating from this unitary value indicate export promotion or import substitution policies; specifically a value less than one suggests an export promotion trade regime, and a value greater than one indicates one of import substitution. Selected countries include: Ghana, Egypt, Israel, Turkey, India, the Philippines, Korea, Colombia, and Chile. Krueger and Bhagwati find half of the countries under investigation to be shifting away from highly protectionist trade policies to more liberal/export promotion economies, concretely by mid 1960, countries also performing well. Two of the countries are found to pursue more volatile trade policies, moving between import substitution regimes and more liberalized systems, while three others are found entrenched in trade regimes of import substitution policies.

Edwards later introduces a similar investigation of country-specific studies conducted by Michael Michaely. Michaely's *The Design of Trade Liberalization*, assesses trade regimes in Portugal, Spain, Yugoslavia, Greece, Turkey, Israel, Pakistan, Sri Lanka, Singapore, Indonesia, Australia, New Zealand, the Philippines, Korea, Columbia, Peru, Chile, Argentina, Uruguay, and Brazil. In a similar method, the study investigates the devaluation of each individual currency as it relates to changes in trade policy and economic performance of that country. In the findings, Michaely notes that the "long-term performance of the real exchange rate clearly differentiates 'liberalizers' from 'non-liberalizers.'" (Edwards, p. 1369) His results, consistent with earlier findings, depict volatile exchange rates to be a restrictive trade policy, hindering overall international interaction, while economies of greater exchange rate stability enjoyed greater levels of economic growth via trade. The devaluation of a given currency, the inevitable outcome of the initial floating of an exchange rate, is inferred to be a necessary step towards the establishment of long-term exchange rate stability as well a propeller of growth.[4] The devaluation of currencies through a floating exchange rate, for improvement in the external sector, as Edwards notes, appears to be the consensus among works such as Michaely's as well as World Bank reports.[5]

Edwards's interpretation of Michaely's work and World Bank reports, which called for the devaluation of currencies throughout the African continent, however, is rather skeptical in nature. Edwards cites the works of pervious critics of the World Bank reports, who condemn the

[4] The devaluation of a given currency is known to induce greater levels of growth through improvements in the current account - a category in the balance of payments, driven primarily by trade transactions. The devaluation of a currency reduces the world price of a country's exports, thus increasing the demand for such exports. An increase in exports triggers growth in the current account, and thus a country's balance of payments.

[5] The true value of a given currency is believed to be corrected through time by market mechanisms; and thus the market should correct for an initial devaluation following the floating of the exchange rate.

works for the implementation of policies that followed. Specifically noted are World Bank critics who recognize domestic inflation to be the outcome of such policies. Furthermore, the high degree of responsiveness to the domestic inflation appeared to inhibit agricultural production, a vital industry to the external sector of exports in the economies under investigation. The criticism of World Bank reports cited in Edwards, is also applied to the work of Michaely, which as evidenced advocates for the same strategies towards economic growth.

Cross-Country Regression Analyses: the Effects of Export Growth on Economic Growth

Edwards then goes on to investigate studies pertaining to his second group of growth literature: cross-country regression analyses of the relationship between export growth and economic performance. Returning to the works of Anne Krueger, Edwards reviews results of her *Foreign Trade Regimes and Economic Development,* which employs data from her NBER multi-country study. This cross-country regression analysis hypothesizes that "(i) more liberalized regimes result in higher rates of growth of exports; and (ii) [that] a more liberalized trade sector has a positive effect on aggregate growth." (Edwards, p. 1371) Krueger finds that more liberalized regimes indeed lead to a growth in exports, however, such liberalization is found to have no direct effect on economic performance. However, Krueger notes growth in GNP to be the result of growth in exports, which is triggered by liberalization of trade; thus liberalization is found to have an indirect and positive effect on aggregate growth. Explaining this "mere" indirect effect on aggregate growth is Balassa's 1982 *Development Strategies in Semi-Industrial Economies*, cited in Edwards. Balassa indicates that Krueger's results are primarily determined by "an inadequate classification of trade regimes." Balsassa notes this to be the result of Krueger's initial NBER report that solely concentrates on quantitative restrictions of trade, while

disregarding the effect of tariffs, which Balassa argues to be a more rigorous method of protection.

Among other studies exploring the relationship between growth in exports and economic performance cited in Edwards's work, is the Michaely et al. project addressed earlier in his review. The effects of trade policy on growth are assessed through a classification of trade regimes between *liberalizers* and *nonliberalizers*, determined by dummy variables Michaely establishes in the process. Findings of his study, consistent with popular belief, indicate that economies of "intense [and] sustained liberalizations have outperformed those with failed liberalization attempts." (Edwards, p. 1373) Edwards, however, draws criticism to the study on the ground of substantial arbitrary classification of trade regimes.

After further assessment of studies exploring the relationship between growth in exports and economic growth, the author concludes with the following: Edwards criticizes the findings of studies that attempt to shed light on the true impact of trade liberalization on economic growth, while recognizing the effect of this literature on growing views of trade policy. His investigation of growth literature, performed on two groups of studies, recognizes that support is indeed drawn to trade liberalization. Illustrated by case studies, such as Chile and Korea, growth literature has proven rather influential in emerging views on trade policy, including those of policy makers. Despite the growing evidence that links policy reform, notably trade liberalization to growth in the external sector, and finally to improved economic performance, Edwards remains skeptical of the simple and positive relationship portrayed by the studies. Supplementing his criticism on the methodologies and the findings, with the works of previous critics of such studies, Edwards suggests greater levels of caution with which such literature should be approached.

More contemporary studies that attempt to produce more reliable results on the relationship between trade and economic growth, through new methodologies, are works such as the 1999 study of Jeffrey Frankel and David Romer. "It is difficult to think of reasons that a country's geographic characteristics could have important effects on its income except through their impact on trade." (Frankel et al., p. 380) In Frankel and Romer's *Does Trade Cause Growth*, the use of geographic variables as proxies for trade variables outlines a new approach for the assessment of the relationship between trade and economic growth. Acknowledging the existence of a correlation between trade and income, as well as the inability to determine the direction of causation between the two, the authors select geographic characteristics in determining the effects of trade on income. It is recognized that a country's geographic features outline the avenues of that country's trade, while remaining uncorrelated with other determinants of income. Therefore, the study employs geographic characteristics, affecting trade, in the constructed instrument that is later used for the assessment of the impact of trade on income.

Frankel and Romer define the role of geography on trade, in terms of within-country trade as well as international trade. The study hypothesizes a negative correlation between the country size and proximity to other countries, with respect to international trade. Thus a smaller country enjoys less within-country trade and more international trade due its proximity to other countries, while a larger country is prone to more within-country trade and less international trade. Since within-country trade as well as international trade raise the levels of income in a given economy, the study controls for country size when examining the effect of international trade on income using proximity, and reciprocally controls for proximity when analyzing the impact of within-country trade on income using country size.

A bilateral trade equation, defined by the following geographic characteristics outlines the estimates of trade's impact on income: (i) a measure of the distance that separates the two countries; (ii) the countries' sizes; (iii) dummy variables for a shared border; and (iv) dummy variables for landlocked geography. The data utilized in the following bilateral trade equation, dated 1985, is drawn from trade among 63 countries;

$$ln(\tau_{ij}/GDP) = \alpha + \alpha_1 ln\, D_{ij} + \alpha_2 ln\, N_i + \alpha_3 ln\, A_i + \alpha_4 ln\, N_j + \alpha_5 ln\, A_j + \alpha_6(L_i + L_j) + \alpha_7 B_{ij} + \alpha_8 B_{ij} ln\, D_{ij} + \alpha_9 B_{ij} ln\, N_i + \alpha_{10} B_{ij} ln\, A_i + \alpha_{11} B_{ij} ln\, N_j + \alpha_{12} B_{ij} ln\, A_j + \alpha_{13} B_{ij}(L_i + L_j) + e_{ij},$$

where:

τ_{ij} = Bilateral trade between countries *i* and *j*; exports plus imports- serving for international trade, from the International Financial Statistics (IFS) Direction of Trade

GDP_i = Real income per person in country *i,* from the IFS Direction of Trade

D = Great-circle distance between principal cities of countries *i* and *j*, from the IFS Direction Table

N = Population – serving as a measure of size from the Penn World Table Mark 5.6

A = Area - supplements the measure of country size from Rand McNally 1993

L = Dummy variable for a landlocked country from Rand McNally 1993

B = Dummy variable for a common border between countries *i* and *j* from Rand McNally 1993

The remainder of the study employs the instrumental variable estimates on cross-country regressions of income per person - results of which are then compared to the ordinary least-

squares (OLS) estimates of the same equations. After analyzing the regressions of income components on each constant, the trade share and the size measures, the authors conclude that trade increases income through each income component; "estimated impacts of trade on physical capital depth and schooling are moderate, and its estimated impact on productivity is large... [in addition to large estimated effects] on both initial income and subsequent growth." (Frankel et al., p.390) Furthermore, Frankel and Romer conclude that larger coefficient estimates using instrumental variables, relative to OLS estimates, are robust and not susceptible to omitted country characteristics. Trade, however, is concluded to be "an imperfect measure of income-enhancing interactions among countries." (Frankel et al., p.393) Accounting for this "imperfect" status are Frankel and Romers's theories of upward-biased and downward-biased OLS estimates. The theory of upward-biased OLS estimates pertains to the possibility of a sampling error, while the second theory of downward-biased OLS estimates relates to the possibility of trade serving merely as a proxy for the different measures of international interaction.

The study indicates a lack of evidence that would suggest an increase in international trade to be the result of high income - rather it supports the hypothesis of an ample impact of international trade on income. Specifically the study estimates a rise of one-half to two percent in income per person for every one percent increase in trade relative to GDP. In addition to the conclusion about international trade, the study also finds higher levels of income in countries greater in size; thus confirming the initial hypothesis of an increase in income as a result of increased within-country trade. In conclusion, Frankel and Romer assert the support engendered by the study to their initial theorem, relative to a country size and international trade; "the large estimated positive effects of trade and size are robust to changes in specification, sample, and construction of the instrument." (Frankel et al., p.381) However, their conclusion proceeds to

explain that "the impacts of trade and size are not estimated very precisely," and thus generated results provide for considerable uncertainty of the nature of the effect of trade on growth. (Frankel et al., p.381)

Rodriguez and Rodrik introduce a study on trade policy and economic growth through criticism of previous literature, which argues in favor of open trade policies. Their *Skeptic's Guide to the Cross-National Evidence* specifically critiques studies published by multinational institutions such as the International Monetary Fund (IMF), the World Bank (WB), and the Organization for Economic Cooperation and Development (OECD). Such studies are argued to ignore the possibility of "an inverse relationship between trade barriers and economic growth." (Rodriguez et al., p. 2) Further criticism introduced in the study pertains to the poor quality of variables used to examine openness in such traditional literature, recognizing them as "problematic or highly correlated with other sources of poor economic performance." (Rodriguez et al., p. 4) Additional criticism of these previous studies is found in the flawed data from which results are drawn. However, recognizing that new methods of observation have emerged due to the flawed nature of such studies, Rodriguez and Rodrik refrain from further assessment of traditional growth literature. The primary focus of the study, thus shifts to the assessment of "new generation" research that attempts to correct for faults associated with previous literature. Parallel to the evaluation of this type of research, the authors attempt to deliver an answer to the more critical question: "Do countries with lower policy-induced barriers to international trade grow faster, once other relevant country characteristics are controlled for?" (Rodriguez et al., p. 3)

Recent growth literature, examined within the study, includes the following: David Dollars's 1992 publication on the growth of *Outward-Oriented Developing Economies*, Sachs

and Warner's 1995 work on *Economic Reform and the Process of Global Integration*, Sebastian Edward's analysis on *Openness, Productivity and Growth* of 1998, Dan Ben-David's *Equalizing Exchange*, dated 1993, Frankel and Romer's *Does Trade Cause Growth* of 1999, Jong-Wha Lee's *International Trade, Distortions, and Long-Run Economic Growth* of 1993, Ann Harrison's *Time-Series, Cross-Country Analysis*, published in 1996, and Romain Wacziarg's *Measuring the Dynamic Gains from Trade*, conducted in1998. Prior to in-depth analyses of the mentioned studies, the authors introduce three primary models generally employed in growth literature: the static model, the standard model incorporating exogenous factors, and the standard model with an absolute focus on endogenous growth. Static models with market imperfections such as externalities typically provide for increases in real GDP as a result of trade restrictions. Standard models incorporating exogenous factors, such as external technological change and diminishing returns to reproducible factors of production, largely provide for no effect of trade restrictions on long-run growth. And the standard models exclusively assessing endogenous growth are primarily found among studies that find trade restrictions to be an impediment on economic growth. Following their introduction to growth models, Rodriguez and Rodrik shift towards more detailed observations of the studies.

Rodriguez and Rodrik begin their analyses with the assessment of a heavily cited work in growth literature: David Dollar's study on outward-oriented developing economies which argues in favor of trade liberalization. In his study, *Outward-Oriented Economies Really Do Grow More Rapidly*, Dollar examines the impact of openness on growth through the construction of two separate indices and their effects on growth: the index of real exchange rate distortion, *DISTORTION*, and the index of real exchange rate variability, *VARIABILITY*. Dollar's evaluation pertains to the effect of each index on a sample of 95 countries, over a period of ten

years, 1976-85. His findings, suggestive of a negative correlation between each index and growth are explained by his conclusive theory on outward orientation. Dollar's theory defines outward orientation as the combined product of relatively low levels of protection against imported goods, particularly intermediate goods, and relatively low levels of variability in the real exchange rate. The results of the former suggest a "sustainable level of the real exchange rate that is favorable to exporters," and those of the latter providing for consistent incentives over time. (Rodriguez et al., p. 14) Therefore, *DISTORTION*, serving as a measure of protection, has a negative relationship with growth, a result consistent with Dollar's claim. Concurrently, *VARIABILITY*, defining fluctuating real exchange rates, also has a negative relationship with growth, again supported by his claim.

Following a replication of the study with heteroskedasticity-corrected standard errors, Rodriguez and Rodrik derive "virtually identical results" to those found in Dollar's study. Their criticism, however, lies in the choice of variables. The *DISTORTION* index is argued to be a theoretically sound measure of trade barriers only in the absence of export taxes or subsidies, one universal price, and in the absence of "systematic differences in national price levels due to transport costs and other geographic factors" simultaneously. (Rodriguez, et al., p. 19) Seeing that such conditions are not met, Rodriguez and Rodrik dispute the credibility of the index as a measure of trade barriers. Furthermore, the authors recognize other implications of the index. Economies utilizing both import barriers as well as export taxes as means of protection, are treated as "less protected than those that rely on import restrictions alone." (Rodriguez et al., p. 17) Their critical views are further advanced in the assessment of the second index, *VARIABILITY*, in which case the authors are perplexed by the employment of the variable

altogether. Rodriguez and Rodrik conclude with their argument that such a measure serves to assess economic instability at large and not merely fluctuations in real exchange rates.

Rodriguez and Rodrik review Sachs and Warner's 1995 work on *Economic Reform and the Process of Global Integration* for an analysis of a more "ambitious" attempt that tries to correct for the eternal problem of measurement errors. Their self-constructed index of openness, *OPEN*, provides for a variety of methods for confinement of an economy from international trade. This dummy variable assumes the value of 0 if the economy is found to be closed, or fulfills any of the subsequent criteria, and the value of 1 if found to be an open economy or does not satisfy the criteria: (i) possesses an average tariff rate higher than 40% (TAR); (ii) possesses non-tariff barriers that cover on average more than 40% of imports (NTB); (iii) possesses a socialist economic system (SOC); (iv) possesses a state monopoly of major exports (MON); and (v) possesses a black market premium that exceeds 20% during the decade of the 1970s or that of the 1980s (BMP)[6]. This index, otherwise known as the Sachs-Warner dummy, has consistently had a high and robust coefficient in the case of its application to growth regressions. Such results suggest large disparities between economies fulfilling the mentioned criteria and those not satisfying such; thus between closed and open economies. Countries have been found to have "converge[d] to a level of per capita GDP 2.97 times as high as if it had remained closed." (Rodriguez et al., p. 24)

Rodriguez and Rodrik in part approve of and in part dispute the findings. Support is initially drawn to their construction of a dichotomous variable, recognizing the potential collinearity that may exist between individual variables comprising the *OPEN* index; "if these

[6] Black market premium (BMP) is defined here as the percentage differential between the black market and the official exchange rate.

openness indicators are correlated among themselves, introducing them separately in a regression may not yield reliable estimates." (Rodriguez et al., p. 24) The authors also recognize the vitality of the black market premium (BMP) and the state monopoly of exports variable (MON) in the index, thus focusing their examination on such variables. Specifically, Rodriguez and Rodrik address their credibility as trade openness measures. After thorough analyses of both variables as well as other variables affecting trade policies that are included in the index, Rodriguez and Rodrik identify *OPEN* as an upward-biased estimate of the effects of trade restrictions on growth. The authors perceive the black market premium variable to be a proxy for macroeconomic problems, and the state monopoly of exports variable as a faulty variable on two accounts: data for the variable is drawn from a relatively small and skewed sample, concretely 29 African countries undergoing structural adjustment, and on the second account, overlooks more strenuous restrictive policies. Rodriguez and Rodrik, therefore, warn that the employment of the Sachs-Warner index in growth regressions may not yield results explaining for trade barriers.

> The Sachs-Warner measure is so correlated with plausible groupings of alternative explanatory variables -- macroeconomic instability, poor institutions, location in Africa – that it is risky to draw strong inferences about the effect of openness on growth based on its coefficient in a growth regression. (Rodriguez et al., p. 36)

Openness, Productivity and Growth: What Do We Really Know, Sebastian Edwards's attempt to find robust results of openness relative to growth, uses different readily available measures. Regressions are primarily conducted on total factor productivity growth, *TFP*[7]*,* the dependent variable, utilizing nine alternative indicators of openness, as follows: (i) the Sachs-Warner openness index; (ii) the World Bank's *World Development Report*; (iii) Edward Leamer's (1998) openness index; (iv) the average black market premium; (v) UNCTAD of Barro

[7] Total factor productivity (TFR) is defined here as the ratio of output quantity to the quantity of all inputs used in the production.

and Lee - average import tariffs (1994); (vi) UNCTAD of Barro and Lee - average coverage of non-tariff barriers; (vii) the Heritage Foundation index of *Distortions in International Trade*; (viii) the ratio of total revenues on trade taxes to trade; and (ix) Holger Wolf's regression-based index of import distortions for 1985. Edwards later includes a tenth, self-constructed, index, which aggregates the first "principal components" of indices (i), (iv), (v), (vi) and (ix). After conducting weighted least squares (WLS) regressions on *TFP* growth, using GDP per capita as the weighing variable, Edwards concludes "a significantly positive relationship between openness and productivity growth." (Rodriguez et al., p. 37)

Rodriguez and Rodrik's response to the study, although critical, is defined by a much more moderate attack than those provided in the assessments of previous studies. While applauding the usage of WLS as a method of correcting for possible heteroskedasticity in the residuals, the authors dispute the findings on the grounds of unreliable data, particularly the Collected Taxes Ratio report of the IMF. "We are puzzled by this data because many of the numbers for developing countries are implausible." (Rodriguez et al., p. 41) Furthermore, the authors conduct their own regressions similar to those run by Edwards on *TFP*, while substituting segments of the data, with more appropriate and recent data. Results of their study confirm their initial stance, that the relationship between openness and productivity or openness and GDP growth is not unambiguous. Concluding, Rodriguez and Rodrik speculate that results of Edwards's study may be skewed by judgment-biases inherent in the indices employed, or may prove robust merely due to faulty data.

Shifting to a study of a rather different methodology, Rodriguez and Rodrik assess Dan Ben-David's work on trade liberalization and income convergence. Ben-David' *Equalizing Exchange: Trade Liberalization and Income Convergence,* a non-parametric, non-regression

based analysis examines the impact of openness on economic growth. His study concentrates on the effect of trade policies on income, specifically addressing "whether trade liberalization leads to a reduction in the dispersion of income levels among liberalizing countries [otherwise known as the σ-convergence]." (Rodriguez et al., p. 44) The study originally draws on ideas imparted by the factor price equalization, *FPE*, theorem, which argues that income convergence will prevail in the case of trade liberalization if trading partners "share an equal number of goods and factors, identical technologies, and... [no] transport costs."(Rodriguez et al., p. 44) His study advocates for trade liberalization after finding evidence of convergence within the European Economic Community (EEC), established through an increase in the average income of less developed members rather than a reduction in that of richer members. Further findings from his study indicate that European economies not participating in the EEC did not enjoy the same levels of convergence; a trend also found among worldwide economies not economically integrated, relative to those integrated.

Examining the data employed in the study on convergence, spanning from 1870 to 1978, thus evaluating convergence trends prior to and after the founding of the EEC in 1957, Rodriguez and Rodrik find a deliberate exclusion of Germany. The purpose of such exclusion from the series, is argued "not only to establish the existence of convergence following postwar [WWII] liberalization, but also to establish the absence of a long-term trend in convergence predating it." (Rodriguez et al., p. 46) Drawing on results of more recent, but similar studies, that employ more conclusive data, Rodriguez and Rodrik find a negative relationship between economic integration and the σ-convergence, or income convergence. Smaller-scale integration among European economies prior to World War I, such as the German *Zollverein*, the Italian unification, and bilateral free trade agreements among European countries helped trigger a

dispersion that "more than doubled from 1820 to 1880 (from 0.14 to 0.29)" leading to an era of protectionism. (Rodriguez et al., p. 48)

With regard to the second argument defended by Ben-David relating to lower levels of income convergence experienced by European countries not participating in the EEC than those engaged in the integration, Rodriguez and Rodrik again criticize his choice of countries, thus asserting skepticism on the findings. Rodriguez and Rodrik conduct their own analysis on three subsets of European countries: EEC members, European Free Trade Association (EFTA) members, and European economies not participating in economic integration. Their findings suggest substantial convergence among all three groups, thus withdrawing credibility from the argument that trade liberalization induces income convergence.

Examining Ben-David's concluding argument, which suggests that more integrated economies, in a worldwide context, possess greater levels of convergence than those defined by more protective barriers, the authors define flaws in his selection of diverging and converging areas. Converging areas, such as the EEC and the United States are groups of countries that possess close proximity to one other, while diverging areas, have greater physical distance between each other. Such "asymmetry" in his selection, thus provides for biased results in favor of his argument. Should one assess the impact of liberalization in East Asian economies and those of Latin America, as Rodriguez and Rodrik do, results would dispute Ben-David's liberalization-convergence theory. The East Asian countries, of relatively open economies, have and continue to experience steady diversion, while Latin America experienced a "steady decrease in dispersion during the period of import substitution," and a sharp increase in dispersion following its 1980 liberalization of trade. (Rodriguez, et al., p. 52) Reinforcing their skepticism are findings from later studies such as Slaughter's *Trade Liberalization and Per*

Capita Income Convergence, which offers the claim that there is "no systematic link between trade liberalization and convergence." (Rodriguez et al., p. 53)

For the evaluation of more recent work, Rodriguez and Rodrik examine a study addressed earlier in the literature review: Jeffrey Frankel and David Romer's 1999 work on growth. Frankel and Romer's *Does Trade Cause Growth,* a cross-country analysis focusing on the relationship between trade volumes and per capita income growth, draws conclusions consistent with traditional findings. The instrument variables defined in a bilateral trade equation include (i) a measure of the distance that separates the two countries, thus proximity; (ii) country sizes - these being population and land area; (iii) a dummy variable for a shared border; and (iv) a dummy variable for landlocked geography. The fitted values of the instrument variables are later aggregated across partners, providing for conclusive results. As noted earlier, Frankel and Romer hypothesize a negative correlation between country size and proximity to other countries, whereby a larger country is likely to possess greater within-country trade, and a smaller country - possessing greater proximity between its cities and those of the trading partner - is susceptible to greater international trade. Furthermore, hypothesizing a positive impact of each type of trade on income, the authors draw results by controlling for each variable respectively; the results support their theories.

Rodriguez and Rodrik's assessment of the study uncovers striking evidence that undermines the validity of its findings. Frankel and Romer's geographically constructed trade share is criticized on the ground that geography is "likely to be a determinant of income through a multitude of channels, of which trade is (possibly) only one." (Rodriguez et al., p. 55) Rodriguez and Rodrik define their skepticism by recognizing the effects of geography on national institutions, human capital, and natural endowments, as well as a potential correlation

between the geographically-determined component of trade and such other geographic components. Rodriguez and Rodrik re-run modified regressions of Frankel and Romer through the inclusion of three summary indicators of geography, these being: (i) the distance of the country from the equator; (ii) the percentage of a country's tropical land area; and (iii) a set of regional dummies. Their results, consistent with their initial critique confirm that "non-trade effects of geography are the main driving force behind the findings of Frankel and Romer." (Rodriguez et al., p. 56)

Lee's *International Trade, Distortions, and Long-Run Economic Growth*, which hypothesizes greater distortions by trade restrictions in those economies that would otherwise be more exposed to trade relative to other economies, is scrutinized on two grounds. Lee's black market premium as an indicator of a trade policy, as in Sachs and Warner's study, is criticized on the ground that it serves as a proxy for macroeconomic issues engulfing any given economy. Rodriguez and Rodrik's second objection also draws on trade policy indicators, this being the second indicator employed in the study: an import-weighted tariff average. Problems associated with the indicator are outlined in the data, which spans over "various years in the 1980s," while the regressions entail data from the period 1960-85, thus suggesting "the possibility of reverse causation." (Rodriguez et al., p. 57)

In the selection, Rodriguez and Rodrik include Ann Harrison's 1996 *Openness and Growth: A Time-Series, Cross-Country Analysis for Developing Countries*. The authors appreciate a methodological contribution of Harrison's study to the examination of the effect of trade policy on economic growth: the ability to inspect for "evidence of the effects of trade liberalization within countries." (Rodriguez et al., p. 57) Harrison's examination of trade policy, which utilizes a panel setting, however, is criticized for the short length of its time series data. In

addition to the attack on her time series data, which may not disclose the true impact of trade policies on growth due to likely lags and carry-over effects of business-cycles, the authors assert their wariness of the interpretation of measures of trade policy indicators employed in her study.

Returning to studies employing self-constructed indices of trade openness, Rodriguez and Rodrik assess Romain Wacziarg's *Measuring the Dynamic Gains from Trade*. Wacziarg's index on trade policies, comprised of average import duty rates, non-tariff barrier coverage ratios, and the Sachs-Warner dummy, indicates extraordinary growth via investments that result from openness. Rodriguez and Rodrik criticize the study's five-year averages used in the panel of 57 countries during the 1970-89 period, asserting that such time horizons may not reveal the effects of such trade policies and long-run economic growth. Also disputing his findings is Rodriguez and Rodrik's skepticism of the Sachs-Warner dummy as a trade policy indicator.

Concluding their examination of "new generation" research on economic growth relative to trade openness, Rodriguez and Rodrik recognize results, often considered as credible evidence of trade-induced growth, to be merely the outcome of "obvious mis-specification[s]... or the use of measures of openness that are proxies for other policy or institutional variables." (Rodriguez et al., p. 59) With regard to their question, "do countries with lower policy-induced barriers to international trade grow faster, once other relevant country characteristics are controlled for," Rodriguez and Rodrik find inconclusive answers; the relationship between trade barriers and economic growth remains ambiguous. The authors note:

> Had the negative relationship between trade restrictions and economic growth been convincingly demonstrated, we doubt that this issue would continue to generate so much empirical research. We interpret the persistent interest in this area as reflecting the worry that the existing approaches haven't gotten it "quite right." (Rodriguez et al., p. 60)

After the criticism of studies such as those mentioned in Rodriguez and Rodrik, as well as in the earlier review of Edwards, one witnesses the emergence of new studies that attempt to articulate new methods of investigation. These new approaches, strive to deliver better analyses of the impact of trade on economic growth, through innovative methodologies that try to "get it right." Among such literature is David Dollar and Aart Kraay's 2001 World Bank report, *Trade, Growth and Poverty,* which addresses the impact of trade on economies participating in globalization. Globalization is defined to be the relaxation of protective policies with respect to international trade, while it is measured by decadal changes in trade volumes of a country relative to that country's GDP. The study initially recognizes trade as the engine of growth merely during transitional phases of development. Due to the prolonged process of transition, typically spanning decades, trade is misinterpreted to be the engine of sustainable growth. To assess the true impact of trade on development, Dollar and Kraay examine the effect of trade on growth, specifically the relationship between decadal changes in trade volumes relative to GDP and the growth rate of GDP per capita, as well as the relationship between decadal changes in trade volumes relative to GDP and poverty, or changes in income inequalities.

Dollar and Kraay utilize systematic case studies regarding trade liberalization of the 1970s, and due to lack of such literature on post-1980 globalizers, introduce potential candidates for such case studies during the 1980s and 1990s. For the latter group, a comparative analysis is conducted between "globalizing" countries of developing status and "nonglobalizers," countries also of developing status. Comparative analysis between the two groups is drawn through changes in trade volumes, trade tariffs, and GDP per capita growth rates. Trade volumes, indicated by the ratio of exports and imports relative to GDP, are considered to incorporate factors external to trade policies, such as geographic characteristics. Consequently extraction of

geographic determinants is performed through exclusive examination of proportional changes in trade volumes to GDP of individual countries over time, thus controlling for cross-country variation. Recognizing that changes in trade volumes may still account for exogenous factors, aside from geographic features, the study assesses reduction in average tariff rates, which solely provides for changes in trade policies. Returning to measures of trade volumes and the advantages associated with such, the study recognizes a partial reflection of non-tariff barriers to trade, such as explicit quotas, licensing schemes, local content requirements, and health and safety standards, excluded from average tariff barriers.

Globalizers, which comprise one-third of the developing world population, produced the following results during the time period 1970-1990: an increase in trade volume ratios, from 16% to 33% of the GDP, a reduction in tariffs from 57% to 35%, and an increase in GDP per capita growth rates from 2.9% to 5.0%. The rapid growth rate of such *globalizers* is notably attributed to increased trade as a result of comparative analysis relative to *nonglobalizers*. In contrast to *globalizers*, *nonglobalizing countries* experienced reduction in trade volumes, from 60% to 49% of the GDP, incremental decline in tariffs, from 31% to 20%, and a decline in GDP per capita growth rates from 3.3% to 1.4%. Following the examination of trade openness on growth, the study attempts to address the impact of trade on poverty. Application of the Gini coefficient to a sample of 285 observations of income distribution covering 92 developed and developing countries over non-overlapping periods of at least five years generates "declining inequality between countries, and declining poverty within countries." (Dollar et al., p.12) The study thus concludes positive effects of trade on growth as well as proportionate increases in incomes of the poor to increases in trade.

Although modern growth literature continues to expand on new methodologies, attempting to correct for faults associated with those of preceding studies, traditional methodologies do not appear to have perished from such literature. In fact, traditional methodologies continue to surface throughout studies of recent status, perhaps due to the greater levels of its acceptability among scholars. Employment of such traditional methodologies is evidenced in studies such as Halit Yanikkaya's 2002 work that followed that of Dollar and Kraay. Shedding light on a new perspective of trade liberalization relative to economic growth, Yanikkaya proposes a new analysis of cross-country empirical evidence. In *Trade Openness and Economic Growth* Yanikkaya challenges mainstream economic studies that provide support to the claim of open economies as the engine of economic growth. "Although there is a near consensus about the positive association between trade flows and growth... these effects are very complicated in the most general case and the results are mixed as to how trade policies play a special role in economic growth." (Yanikkaya, p. 58) Theoretical growth literature is more concerned with the impact of trade policies on growth rather than the impact of trade volumes on growth. However, empirical studies on trade barriers with respect to economic growth are much more limited in number, than empirical studies on trade volumes relative to such growth. When accounting for exogenous factors influencing a country's external sector, such as geographic features, high inflation, external debt issues, corruption, ineffective law enforcement, and too few reliable bureaucracies among others, trade volumes may be inherently small regardless of trade policies. Thus, in an attempt to provide for a more complete picture of the relationship between openness and growth than previous studies, Yanikkaya proposes new areas for employment of traditional growth econometrics utilizing two types of trade openness measures: trade volume and trade barriers.

Trade volumes and trade restrictions, two separate measures of trade openness, impart separate effects on long-term economic growth. A three-equation system is employed in the analysis of 108 developed as well as developing countries. The dependent variable, the average GDP per capita growth rate of each country, is derived for time period 1970-1979, 1980-1989, and 1990-1997;

GRWB = f (log(GDPSH), TELPW, log(LIFE), REGIME, WAR, TROPIC, WATER, Z)

where:

GRWB = GDP per capita growth rate from the World Development Indicators (WDI) 1999

GDPSH = Initial GDP per capita levels from the Penn World Table (PWT) 5.6

TELPW = Telephone mainlines from the Global Development Network Growth Database (GDNGD)

LIFE = Life expectancy figures from the WDI 1999

REGIME = Political regime type from GDNGD

WAR = Data on war deaths from the GDNGD

TROPIC = Data on tropical climate from the Center for International Development (CID)

WATER = Physical access to international waters from the CID

Z = Trade openness

Trade openness is categorized into trade volumes and trade restrictions. Separate regressions are run later in the study using one type of trade variable. Trade volumes are defined by the following:

OPEN = Exports and imports relative to GDP from the WDI 1999

MGDP = Import penetration ratios in GDP from the WDI 1999

XGDP = Export shares in GDP from the WDI 1999

DENSITY = Ratio of total population to total Area from the Direction of Trade Statistics (DTS)

TOECD = Trade with OECD countries from the GDNGD[8]

TNOECD = Trade with non-OECD countries from the GDNGD

USBTRD = Ratio of country's total bilateral trade with the US from the DTS

USEXP = Ratio of country's total imports from the US from the DTS

USIMP = Ratio of country's total exports to the US from the DTS

The study employs a set of independent variables defining trade restrictions; also entered separately.

TARIFF = Total import duties from the WDI 1999

XTAX = Total export duties from the WDI 1999

XTAXTRD = Taxes on international trade from the WDI 1999

BPAIMF = Bilateral payments arrangement among International Monetary Fund (IMF) members; the IMF Annual Report on Exchange Restrictions

BPA = Arrangements of IMF members with non-IMF members; the IMF Annual Report on Exchange Restrictions

[8] The assessment of countries trading with OECD members and non-OECD members is to determine if trade with more developed countries is indeed more beneficial than trade with developing countries given their market sizes, access to intermediate goods, and importation of innovative technology; a theory receiving little support later in the study.

CURRENT = Restrictions on payments to current transactions; the IMF Annual Report on Exchange Restrictions[9]

Implementing the standard method of growth econometrics, a cross-country, time-series analysis, Yanikayya generates results, in part affirmative and in part contrary to conventional findings.

Trade volume indicators reflect positive correlations, of statistical significance, among each other. Trade restriction indicators, similarly, share statistically significant positive correlations among each other. Correlation coefficients between trade volumes and trade restrictions remain negative; yet not all variables have significant negative correlations. Provided the negative correlation between trade barrier measures and trade volume measures, as well as statistically significant positive relationships between trade volumes and growth, the study hypothesizes negative effects of trade barriers on growth; thus a bigger measure of trade barrier, indicating more restrictions, is expected to reduce economic growth.

Results on Trade Volumes

The study later addresses the possibility of reverse causation between *OPEN*, the ratio of exports and imports to GDP, and growth in GDP per capita. Following regressions that employ contemporaneous values of *OPEN* on GDP per capita growth, Yanikkaya regresses *OPEN* lagged values - using five previous years - on GDP per capita growth. The results of the new regressions provide that a positive, and statistically significant relationship between a higher ratio of exports and imports to GDP and GDP per capita growth exists. Furthermore, Yanikkaya omits outlier variables from Guyana, Hong Kong, Malta, Singapore, and Luxemburg, in an attempt to prevent skewed statistical results due to the extremity of their trade shares, averaging

[9] Restrictions on payments to current transactions result from security reasons or official action directly affecting the availability and cost of exchange.

at 213.6% over three decades. Yanikkaya finds significant positive relationships between *OPEN* and growth. He also finds significant positive relationships between *MGDP*, ratio of imports to GDP, and growth as well as *XGDP*, ratio of exports to GDP, and growth; thus equating the importance of both imports and exports relative to growth, a finding often missing in growth literature.

Shifting to more specific trade patterns, Yanikkaya hypothesizes greater coefficients, and thus greater benefits from trade with developed economies than from trade with developing economies, because the former provides access to greater markets and more innovative technology. Hence, an analysis is drawn from trade with OECD members, *TOECD*, as well as trade with non-OECD members, *TNOECD*. Contrary to his theory, generated results indicate greater coefficients, and thus greater results, from trade with non-OECD countries than from trade with OECD countries; suggesting that "access to new goods, [greater markets], and technologies is not particularly crucial to growth." (Yanikkaya, p. 72) Providing for the discrepancy between theory and empirical results with regard to growth and the level of development of the trading partner, Yanikkaya offers an alternative hypothesis. His newly found theory suggest that not all OECD members possess economies of advanced technologies, and thus provides new measures of trade with an economy of innovative technology: bilateral trade with the US, *USBTRD*, bilateral exports or imports received from the US, *USBEXP*, and bilateral imports or exports to the US, *USBIMP*. "Given that the US is one of the most highly innovative countries in the world," Yanikkaya hypothesizes that economic growth for countries conducting bilateral trade with the US ranks higher than growth of those countries not exploiting such an opportunity. Statistically significant and positive coefficients for each individual measure confirm Yanikkaya's hypothesis. Moreover, as with *OPEN* estimates, Yanikkaya provides

results for lagged data, as well as results for omitted outliers, such as Hong Kong, Malaysia, Singapore and Taiwan, to address concerns of simultaneity or reverse causation and skewed results. He concludes that diffusion of technology and knowledge, and access to greater markets indeed provide for faster growth via bilateral trade with developed economies that possess the above factors.

Concluding on measures of trade volumes, Yanikkaya observes the impact of population density, *DENSITY*, on GDP per capita growth. Relying on previous literature, the study hypothesizes a positive relationship between *DENSITY* and growth due to a greater extent of international contacts and a greater amount of human capital - the latter suggesting greater levels of productivity. Confirming the hypothesis, *DENSITY* possesses positive, and statistically significant coefficients. Hence, "countries with greater densities tend to grow faster." (Yanikkaya, p. 73)

Provided the positive relationships of trade volume indicators relative to growth and the negative correlations between trade volume indicators and trade restrictions, a negative impact of trade barriers on long run growth is hypothesized. Additionally, conventional theories and empirical studies on trade barriers lend support to the hypothesized relationship. However, when assessing more contemporary theories, primarily those focusing on strategic trade policies, infant-industry policies, and development economics, the relationship between trade barriers and growth bears a greater level of ambiguity. Yanikkaya's indicates positive and statistically significant coefficients for *TARIFF*, total import duties, levied by both developing as well as developed countries.[10] Positive and statistically significant coefficients are also derived from

[10] Trade restriction indicators, TARIFF, XTAX, XTAXTRD, BPAIMF, BPA, and CURRENT are entered individually, in a regression with only DENSITY as the constant indicator of trade volume.

regressions of lagged *TARIFF*. And consistent with theoretical literature, the results indicate that while both developed and developing economies benefit from levied tariffs, developing economies with higher average tariffs have a tendency to grow faster than developing economies with lower average tariffs.

Yanikkaya later introduces total export duties, *XTAX* as a new measure of restrictions with respect to international trade. Conflicting results between regressions employing contemporaneous *XTAX*, which indicate an insignificant negative coefficient, and lagged *XTAX*, indicating a significant positive effect on growth, offer an inconclusive outcome. However, provided the insignificance of the negative coefficient of the former as well as significant positive coefficients for contemporaneous and lagged *TAXTRD* - a measure combining import and export duties along with several other taxes on international trade - protective barriers imply a positive effect on growth.

Shifting to bilateral trade arrangements, treated as instruments for maintenance or expansion in export markets via discriminatory trade policies, Yanikkaya employs bilateral trade arrangements among IMF members, *BPAIMF*, and bilateral trade arrangements of IMF members with non-IMF members, *BPA*. Regression results for both *BPAIMF* as well as *BPA* indicate significant positive relationships between the two measures and growth, using contemporaneous data, and positive but statistically insignificant coefficients using lagged data. It is later argued that *BPA* may induce growth through effective use of a country's international reserves, which may trigger greater levels of investment and an accumulation of physical capital. However, due to insignificant coefficients of lagged *BPAIMF* and *BPA*, simultaneity is indeed evident. Reverse causation is also suggested in regressions employing restrictions on payments to current transactions, *CURRENT*, where estimated coefficients are generally negative and insignificant.

Referring to those countries possessing significant negative *CURRENT* coefficients, Yanikkaya asserts that such results remain the product of recessions that preceded the implementation of such barriers; "if a government faces balance of payments problems or foreign exchange crises... than it might employ these restrictions in an attempt to resolve these problems." (Yanikkaya, p. 77)

Utilizing the standard methodology of growth econometrics on a panel of 108 developing as well as developed economies over a period of three decades, through ordinary least squares, (OLS), seemingly unrelated regressions (SUR) and three staged least squares (3SLS), Yanikkaya succeeds in drawing results both consistent as well as contrary to growth literature. Consistent with findings of previous investigations, Yanikkaya generates significant positive relationships between different measures of trade volumes and long run economic growth. More striking results of this study, however, are defined by trade restrictions and the generally positive and significant coefficients of such indicators relative to long run growth. Among theories offered for such results, are Yanikkaya's own pertaining to comparative advantage, and the usage of protective barriers in efficiently allocating market resources:

> ... if tariffs cause a reallocation of productive resources to the goods on which the country has comparative advantage from the goods in which the country has no advantage, then tariffs are likely to affect growth positively. (Yanikkaya, p. 77)

Trade Openness and Economic Growth thus supports trade openness, given its positive effect on economic growth, as well as trade barriers, which evidently also provide for a positive effect on such growth.

The relationship between trade and economic growth, as well as the effect of trade policies on this relationship continues to be disputed throughout the growth literature. As noted within the review of such literature, works suggesting a positive relationship between trade and

growth continue to be criticized by subsequent literature that disputes their findings on the bases of faulty theories, faulty methodologies, or unreliable data employed in such works. The inability of such studies to "get it right," however, appears to have spurred greater waves of theoretical as well as empirical investigations of the relationship. It is thus of interest to conduct an investigation in a modest attempt to discover the costs and benefits associated with trade relative to economic performance, and the impact of trade policies on this relationship. This investigation employs a methodology similar in nature to Yanikkaya's study: a cross-country inquiry. The hypothesis of this study suggests that greater volumes of international trade do indeed generate greater levels of economic growth through relaxation of trade barriers. The study employs more recent data, covering the period 1998-2002, and measures of trade openness different from those used by Yanikkaya. This investigation employs an index on international trade taxation as a measure of trade policies or restrictions, and an index on trade sector size as a measure of trade volume.

III. Methodology

The objective of this study is to explore the impact of international trade and the role of trade policies on economic growth. The study employs the standard equation of long-run growth, used in a previous study by Halit Yanikkaya, which followed:

GRWB = f (log(GDPSH), TELPW, log(LIFE), REGIME, WAR, TROPIC, WATER, Z)

In his equation *GRWB*, or GDP per capita growth rate, served as a function of the explanatory variables: initial GDP per capita levels, *GDPSH;* telephone mainlines, *TELPW;* life expectancy at birth, *LIFE;* political regime type, *REGIME;* death inflicted by war, *WAR;* tropic climate, *TROPIC;* physical access to international waters, *WATER;* and a vector on trade openness, *Z*, which included nine measures of trade volumes, and six measures of trade barriers - observed in separate regressions. This study, however, substitutes his measures of trade openness, trade volume and restrictions, with the trade openness index, from the *Economic Freedom of the World 2002* annual report, discussed in greater detail later in the section;[11] a positive relationship between trade openness and economic growth is hypothesized. The study does not use Yanikkaya's exogenous factors affecting growth levels such as political type, war deaths, tropical climate, and physical access to international waters; however, it does adopt other variables of relevance to economic growth. Departing from Yanikkaya's three-pronged panel, which draws on cross-country investigations from three different time periods, 1970-1979, 1980-1989, 1990-1997, the study investigates cross-country data drawn from the period 1998-2002. Consistency within the data of explanatory variables was the initial intent of the study, however,

[11] The *Economic Freedom of the World* annual report, published by the Fraser Institute, contains 37 variables form among 123 countries, forming indices on the following: (i) the size of the government: expenditures, taxes, and enterprises; (ii) the legal structure and security of property rights; (iii) access to sound money; (iv) freedom to exchange with foreigners - otherwise referred to as the trade openness index; and (v) regulations of credit, labor, and business. The data utilized in the index is drawn from 2000.

due to missing data, the study utilizes data that is drawn between 1999 and 2002, assuming a high correlation between data of the same variables between the years.

The study investigates the impact of international trade and trade policies on economic growth through four models. The initial model is defined as follows:

$$G_t = f\,(\log(GDP_t),\ T_t,\ \log(L_t),\ F_t)$$

where, G_t, the country's gross domestic product (GDP) per capita growth in period t, provides for a measure of economic growth, as illustrated in Table 1. The first independent variable, GDP_t, is the initial GDP per capita, which addresses the subject of conditional convergence, as introduced in Yanikkaya, also found on Table 1. A negative relationship between this variable and the dependent variable, G_t, is hypothesized since a more developed economy possesses less potential for economic growth. Yanikkaya argues that this measure is sometimes used as a proxy for physical capital, in which case the hypothesized relationship between this independent variable and growth would be positive. A greater level of physical capital stock is hypothesized to further economic growth. This argument lends support to the correlation found in this study between GDP per capita and telephone mainlines per 1000 people in period t, T_t, which serves as a proxy for physical capital stock. Specifically the two independent variables share a correlation coefficient of .88. The variable of L_t, or life expectancy at birth in period t serves as a proxy for human capital stock, which is the same variable used by Yanikkaya; life expectancy is hypothesized to have a positive effect on growth.

Table 1: Variables

Type of Variable	Symbol	Name of Variable	Purpose	Measurement	Source of Data	Hypothesis	Time Period
Dependent Variable	G_t	Economic growth in period *t*	To measure the impact of trade on a given economy	GDP per capita annual growth rate, calculated using national accounts	World Development Indicator		2002
Dependent Variable	G_t1	Economic growth in period *t*	To measure the impact of trade on a given economy	GDP growth rate over a five year period, calculated using least-squares growth method	World Development Indicator		1998-2002
Dependent Variable	G_t2	Economic growth in period t	To measure the impact of trade on a given economy	GDP annual growth rate, calculated using national accounts	World Development Indicator		2002
Independent Variable	GDP_t	GDP per capita in period *t*	Addresses conditional convergence: the more industrialized an economy is, the lower its potential for growth	The value of all goods and services produced in a given economy in a given year divided by its population	World Development Indicator	Negative	2002
Independent Variable	GDP_t1	GDP in period *t*	Addresses conditional convergence: the more industrialized an economy is, the lower its potential for growth	The value of all goods and services produced in a given economy in a given year	World Development Indicator	Negative	1998
Independent Variable	T_t	Telephone mainlines in period *t*	Proxy for physical capital stock per person	Telephone mainlines per 1000 people in a given year	Human Development Report	Positive	2000
Independent Variable	L_t	Life expectancy rates in period *t*	Proxy for human capital per person	Average of life expectancy at birth in a given year	Human Development Report	Positive	1999

Type of Variable	Symbol	Name of Variable	Purpose	Measurement	Source of Data	Hypothesis	Time Period
Independent Variable	F_t	Index on freedom to exchange with foreigners in period *t*	Proxy for trade openness; a higher ranking indicates greater freedom	Comprised of the following indices: taxes on int'l trade; regulatory trade barriers; trade sector size; black market premium; and restrictions on capital markets	Economic Freedom of the World	Positive	2000
Independent Variable	I_t	Index on international trade taxation in period *t*	Proxy for trade policy/restrictions; a higher ranking indicates less taxation, or less restrictive policies	Comprised of the following indices: taxes as a percentage of exports and imports; mean tariff rate; and variability in the tariff rates	Economic Freedom of the World	Positive	2000
Independent Variable	V_t	Index on size of the trade sector in period *t*	Proxy for trade volume; a higher ranking indicates a greater volume, or more international trade	Comprised of the following: exports plus imports divided by GDP	Economic Freedom of the World	Positive	2000
Independent Variable	S_t	Index on the size of the government in period *t*	The size of the government; a higher ranking indicates a smaller government role	Comprised of the following indices: gov. consumption; transfers and subsidies; gov. enterprises and investments; and top marginal tax rate	Economic Freedom of the World	Positive	2000
Independent Variable	P_t	Index on the legal structure and security of property in period *t*	Proxy for political stability; a higher ranking indicates a greater level of political stability	Comprised of the following indices: judicial independence; impartial courts; protection of intellectual property; military interference; and integrity of legal system	Economic Freedom of the World	Positive	2000
Independent Variable	M_t	Index on access to sound money in period *t*	Proxy for macroeconomic stability; a higher ranking indicates a greater level of macroeconomic stability	Comprised of the following indices: growth of money supply; inflation variability; recent annual inflation; and freedom to own foreign currency	Economic Freedom of the World	Positive	2000
Independent Variable	R_t	Index on regulation of credit, labor, and business in period *t*	Proxy of internal regulation; a higher ranking indicates less internal regulation	Comprised of the following indices: regulation of credit markets; regulation of labor markets; and regulation of business	Economic Freedom of the World	Positive	2000
* Indices are measured on a 10-point scale, a higher rank indicating better performance							

Variable F_t, an index of the freedom to exchange with foreigners in period t consolidates five measures of international trade openness outlined in Table 1, also known as the trade openness index. This 10-point scale index ranks countries according to the following measures of trade, where a higher number indicates greater freedom or openness:

A. Taxes on International Trade
    i. Taxes as a Percentage of Exports and Imports
    ii. Mean Tariff Rate
    iii. Variability in Tariff Rates
B. Regulatory Trade Barriers
    i. Hidden Import Barriers
    ii. Costs of Importing
C. Size of Trade Sector[12]
D. Black Market Premium
E. Restrictions on Capital Markets
    i. Access to Foreign Capital
    ii. Restrictions on Capital Transactions with Foreigners

The minimum rank of this index, as noted in Table 2, is found to be 2.8, while the maximum reaches 9.8; although a large disparity exists, more countries appear to be moving towards greater openness, with a median rank of 7.1. The employment of this variable is justified on two grounds: (i) it is primarily derived from measures of trade volume and trade policies; and

[12] "Regression analysis was used to derive an expected size of the trade sector based on various structural and geographic characteristics... The actual size of the trade sector was then compared with the expected size of the country." (Gwartney et al., p. 27)

Table 2: Descriptive Statistics

Variable	N	Minimum	Maximum	Median	Mean	Std. Deviation
G_t	99	-14	7	1	1.11	3.64
G_t1	94	-5.28	8.03	2.95	2.85	2.29
G_{t2}	94	-11.9	9.57	2.73	2.28	3.59
GDP_t	99	162	56513	2978	9545.8	13206.06
GDP_t1	94	6.70E+08	8.72E+12	4.31E+10	3.01E+11	1.02E+12
T_t	99	2	750	175	245.26	228.47
L_t	99	33.4	81.3	71.5	67.79	12.13
F_t	99	2.8	9.8	7.1	7.01	1.17
I_t	99	2.4	10	7.4	7.03	1.85
V_t	99	0	10	5.4	5.5	2.35
S_t	99	2.5	9.2	6.1	5.93	1.52
P_t	99	2.3	9.6	6	6.07	2
M_t	99	1.5	9.7	7.5	7.52	2.01
R_t	99	2.7	8.4	6.1	5.97	1.06

(ii) it deviates from the bias imparted by trade volume as the only measure of trade openness.[13] Provided that a higher number indicates greater levels of openness, the hypothesized relationship between the index and growth is positive. The two logged independent variables follow Yanikkaya and allow for the hypotheses that a percent change in GDP per capita, *GDP,* triggers a unit decrease in GDP per capita growth, *G*, and a percent change in life expectancy at birth, *L,* is hypothesized to have a positive unit change on the growth rate *G*.

The second model introduces new variables in addition to those of the initial model, in an attempt to control for the exogenous factors affecting a country's level of growth. This second model employs the four other variables from the *Economic Freedom of the World* report in addition to the two primary independent variables of *T* and *L*.

$$G_t = f\,(\log(GDP_t),\ T_t,\ \log(L_t),\ F_t,\ S_t,\ P_t,\ M_t,\ R_t)$$

These variables serve as measures of the following: the size of the government, S_t, political stability, P_t, macroeconomic stability, M_t, and internal regulation, R_t. The index on government expenditures, taxes, and enterprises serves as a measure for the size of the government in period *t,* S_t; the legal structure and security of property rights index serves as a measure for political stability in period *t,* P_t; the access to sound money index serves as a measure for macroeconomic stability in period *t,* M_t; and the regulation of credit, labor, and business index serves as a measure for internal regulation in period *t,* R_t. Given that each index yields a higher rank for each country situated in an economy of a smaller government size, greater political stability,

[13] Trade volume is found to be an inadequate measure of trade openness provided that it is merely a measure of the ratio of exports to GDP, or export and imports to GDP - thus not accounting for other characteristics of a country affecting trade, such as geographic features, or the size of the economy.

greater macroeconomic stability, or less regulation, the study hypothesizes a positive relationship between each measure and GDP per capita growth rate, also indicated in Table 1.

The third model employs the primary variables, while extracting the variable on trade openness, F_t, and substituting the variable with two components of the index: the taxes on international trade index, in period *t,* I_t, and the size of the trade sector index, also in period *t,* V_t. An interesting finding of descriptive statistics is a minimum rank of 0, found on the variable of trade sector size index, evident in Table 2. It is important to note, however, that such a number is derived from a comparison between the actual size of the trade sector and the expected size of the trade sector, and therefore does not actually equate the trade sector size to 0.

$$G_t = f\,(\log(GDP_t),\ T_t,\ \log(L_t),\ I_t,\ V_t)$$

The purpose of this model is similar to that of Yanikkaya's: observation of the separated impact of the volume of international trade and restrictiveness of trade policies on economic growth, where the trade sector size index and taxes on international trade serve as proxies for the areas respectively. Since the trade sector size index provides a higher rank for an economy possessing a greater volume, the hypothesized relationship between this variable and growth is positive. Likewise, the greater ranks given to economies imposing less taxation - contrary to Yanikkaya's measures - possess more receptive trade policies, thus providing for a positive hypothesized relationship between this variable and growth.

The fourth model observes the impact of each of these measures independently, while also attempting to control for the exogenous factors previously introduced.

$$G_t = f\,(\log(GDP_t),\ T_t,\ \log(L_t),\ I_t,\ V_t,\ S_t,\ P_t,\ M_t,\ R_t)$$

Estimates for all models are generated using ordinary least squares (OLS). Due to statistically insignificant results, discussed in greater detail in the *results* section, and speculations about problems with the use of annual GDP per capita growth drawn from 2002 as a measure of economic growth, the study introduces a new measure of growth: average GDP growth rates from the five-year time period 1998-2002.[14] Annual data on GDP per capita growth rate, initially used in the models of this study, captures snapshots of economic performance that may only reflect a stage of the business cycle in which an economy may be positioned that given year. Such data may also skew the results due to extraordinary social, political, or economic events that may mask the country's economic performance and thus its levels of growth. The study employs self-constructed least squares GDP growth rates. Correlation coefficients are run between these two measures of growth to ensure their lack of collinearity - evident in Table 3 - and thus justify employment of GDP growth rates over the five-year period 1998-2002 in the place of GDP per capita growth rate 2002. While GDP per capita growth over a period of time such as five years is a better measure of economic growth than GDP growth over the same period of time, these two variables are bound to be highly correlated. An example of such correlation is a correlation coefficient of .97 between GDP per capita growth 2002 and GDP growth of the same year that can be observed from Table 3.

[14] Provided that trade openness measures are drawn from 2000, the study employs averaged GDP growth rates from 1998-2002, in an attempt to capture changes in economic growth relative to trade openness.

Table 3: Correlation Coefficients of Growth Measures

	G	G1	G2
G	1	0.633017	0.965347
G1	0.633017	1	0.629757
G2	0.965347	0.629757	1

A Descriptive Guide to the *Economic Freedom of the World: 2002 Annual Report*

The report as the title provides, ranks the level of economic freedom of each individual country on a 10-point scale index for 123 countries, using a principle component analysis; whereby a higher rank indicates a greater level of economic freedom.[15] The report, by James Gwartney and Robert Lawson, is produced annually through collaboration of the Fraser Institute with other economic institutions of industrialized as well as developing economies such as the Cato Institute and the Albanian Center for Economic Research, among others. The report serves the interests of policy makers, as well as other investigations, economic or political, while it enjoys the support of renowned economists, such as Nobel Laureate, Milton Friedman, who describes the index as a credible source of information. This 2002 report incorporates data from the year 2000. As mentioned earlier in the methodology, the index found within the report employs 37 variables, comprising five categories affecting the level of economic freedom, 18 of which are survey-based as provided by the *International Country Risk Guide*, *(ICRG)*, and the *Global Competitiveness Report, (GCR)*. In the interest of clarity, this section introduces the index with all of the comprising categories, components, subcomponents and explanations as provided by the report.

[15] Economic freedom is defined to be the product of "personal choice, voluntary exchange, freedom to compete, and protection of person and property," while it is measured by the *Economic Freedom of the World* index. (Gwartney and Lawson, p. 5)

1. **Size of Government: Expenditures, Taxes, and Enterprises**
   A. General government consumption spending as a percentage of total consumption
   B. Transfers and subsidies as a percentage of GDP
   C. Government enterprises and investment as a percentage of GDP
   D. Top marginal tax rate (and income threshold to which it applies)
2. **Legal Structure and Security of Property Rights**
   A. Judicial independence: The judiciary is independent and not subject to interference by the government or parties in disputes (GCR)
   B. Impartial courts: A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation (GCR)
   C. Protection of intellectual property (GCR)
   D. Military interferences in rule of law and the political process (ICRG)
   E. Integrity of the legal system (ICRG)
3. **Access to Sound Money**
   A. Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years
   B. Standard inflation variability in the last five years
   C. Recent inflation rate
   D. Freedom to own foreign currency bank accounts domestically and abroad
4. **Freedom to Exchange with Foreigners**
   A. Taxes on international trade
      i. Revenue from taxes on international trade as a percentage of export plus import
      ii. Mean tariff rate
      iii. Standard deviation of tariff rates
   B. Regulatory trade barriers
      i. Hidden import barriers: No barriers other than published tariffs and quotas (GCR)
      ii. Costs of importing: The combined of import tariffs, license fees, bank fees, and the time required for administrative red-tape raises costs of importing equipment by (10 = 10% or less; 0 = more than 50%) (GCR)
   C. Actual size of trade sector compared to expected size
   D. Difference between official exchange rate and black market rate
   E. International capital market controls
      i. Access of citizens to foreign capital markets and foreign access to domestic capital markets (GCR)
      ii. Restrictions on the freedom of citizens to engage in capital market exchange with foreigners - index of capital controls among 13 IMF categories
5. **Regulation of Credit, Labor, and Business**
   A. Credit Market Regulations
      i. Ownership of banks: Percentage of deposits held in privately owned banks

ii. Competition: Domestic banks face competition from foreign banks (GCR)
iii. Extension of credit: Percentage of credit extended to private sector
iv. Avoidance of interest rate controls and regulations that lead to negative real interest rates
v. Interest rate controls: Interest rate controls on bank deposits and/or loans are freely determined by the market (GCR)

B. Labor Market Regulations
i. Impact of minimum wage: The minimum wage, set by law, has little impact on wages because it is too low or not obeyed (GCR)
ii. Hiring and firing practices: Hiring and firing practices of companies are determined by private contract (GCR)
iii. Share of labor force whose wages are set by centralized collective bargaining (GCR)
iv. Unemployment Benefits: The unemployment benefits system preserves the incentive to work (GCR)
v. Use of conscripts to obtain military personnel

C. Business Regulations
i. Price controls: Extent to which businesses are free to set their own prices
ii. Administrative conditions and new businesses: Administrative procedures are an important obstacle to starting a new business (GCR)
iii. Time with government bureaucracy: Senior management spends a substantial amount of time dealing with government bureaucracy (GCR)
iv. Starting a new business: Starting a new business is generally easy (GCR)
v. Irregular payments: Irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare (GCR)

(Gwartney et al., p. 8-9)

IV. Results

Prior to regression analyses of the models, the study investigates correlation coefficients of all variables employed by the study, so as to address the issue of potential multicollinearity. Most of the correlation coefficients are found to be relatively low, with a few exceptions, such as a correlation coefficient of 0.88 found between telephone mainlines, *T,* and GDP per capita, *GDP*, from the data corresponding to models 1-4, observable in Table 4. This correlation, as previously noted in the methodology, is anticipated, provided that telephone mainlines, *T*, serve as a proxy for physical capital stock, and GDP per capita, *GDP* – while it serves the purpose of measuring conditional convergence – may also be used as a proxy for physical capital, in which case a positive relationship with growth would be hypothesized. Since the variables are measures of two distinct areas, the correlation does not prevent employment of both explanatory variables. Other correlations found include: a correlation between political stability, *P*, and GDP per capita, *GDP*, observable in Table 4; political stability, *P,* and telephone mainlines, *T,* observable in Tables 4 and 5 – the latter providing for correlation coefficients of data employed in models 5-8; and telephone mainlines, *T*, and GDP per capita, *GDP,* observable in Table 4. Although these variables possess relatively high correlation coefficients, causing lack of statistical significance in their regressed coefficients, they are also measures of different areas. Thus a more industrialized economy may possess greater physical capital as well as higher levels of political stability. Also of interest is a correlation found between the trade openness index, *F,* and the international trade taxation index, *I,* visible in Tables 4 and 5. Provided that the international trade taxation index is a component of the trade openness index, however, such a correlation is not unexpected.

Table 4: Correlation Coefficients of Data Corresponding to Models: 1-4

	G	GDP	T	L	F	I	V	S	P	M	R
G	1	-0.050803	0.07736	0.072368	-0.005046	0.064974	0.115077	-0.191771	0.09553	-0.048083	-0.06083
GDP	-0.050803	1	0.88288	0.538025	0.58383	0.583455	-0.148124	-0.224823	0.769212	0.546752	0.586834
T	0.07736	0.88288	1	0.663544	0.599652	0.645141	-0.159725	-0.223284	0.801943	0.482678	0.601868
L	0.072368	0.538025	0.663544	1	0.462091	0.580463	-0.164604	0.036092	0.486195	0.47029	0.447042
F	-0.005046	0.58383	0.599652	0.462091	1	0.828373	0.353065	0.042869	0.582482	0.47175	0.656087
I	0.064974	0.583455	0.645141	0.580463	0.828373	1	0.066903	-0.033661	0.532339	0.420932	0.516154
V	0.115077	-0.148124	-0.159725	-0.164604	0.353065	0.066903	1	-0.025355	-0.0698	-0.216929	0.04225
S	-0.191771	-0.224823	-0.223284	0.036092	0.042869	-0.033661	-0.025355	1	-0.29069	0.094688	0.184556
P	0.09553	0.769212	0.801943	0.486195	0.582482	0.532339	-0.0698	-0.29069	1	0.502818	0.628756
M	-0.048083	0.546752	0.482678	0.47029	0.47175	0.420932	-0.216929	0.094688	0.502818	1	0.582597
R	-0.06083	0.586834	0.601868	0.447042	0.656087	0.516154	0.04225	0.184556	0.628756	0.582597	1

Table 5: Correlation Coefficients of Data Corresponding to Models: 5-8

	G1	GDP1	T	L	F	I	V	S	P	M	R
G1	1	-0.032051	0.052305	0.029474	-0.002866	-0.06677	0.158409	-0.150427	0.095841	0.004551	-0.092708
GDP1	-0.032051	1	0.377434	0.208571	0.159505	0.166663	-0.111517	-0.001839	0.301944	0.202448	0.291509
T	0.052305	0.377434	1	0.64761	0.619297	0.642913	-0.13981	-0.269311	0.818894	0.491861	0.617712
L	0.029474	0.208571	0.64761	1	0.45651	0.58283	-0.152807	-0.006446	0.501549	0.476219	0.451039
F	-0.002866	0.159505	0.619297	0.45651	1	0.837438	0.350952	0.021531	0.58422	0.46524	0.644164
I	-0.06677	0.166663	0.642913	0.58283	0.837438	1	0.070002	-0.046724	0.521372	0.417147	0.507139
V	0.158409	-0.111517	-0.13981	-0.152807	0.350952	0.070002	1	-0.004389	-0.084609	-0.225335	0.023984
S	-0.150427	-0.001839	-0.269311	-0.006446	0.021531	-0.046724	-0.004389	1	-0.312953	0.085349	0.185884
P	0.095841	0.301944	0.818894	0.501549	0.58422	0.521372	-0.084609	-0.312953	1	0.506094	0.618142
M	0.004551	0.202448	0.491861	0.476219	0.46524	0.417147	-0.225335	0.085349	0.506094	1	0.581811
R	-0.092708	0.291509	0.617712	0.451039	0.644164	0.507139	0.023984	0.185884	0.618142	0.581811	1

This correlation simply suggests that the international trade taxation index is a significant component of the trade openness index.

With respect to the first model, results are defined by a low R-squared estimate – suggesting that a relatively large portion of the variance of the dependent variable, GDP per capita growth rate, cannot be explained by the independent variables employed. The resulting effect of each variable on growth is found to be consistent with the hypothesized, however, all explanatory variable coefficients are found to be statistically insignificant with the exception of *T*. Telephone mainlines, *T*, or physical capital is found to induce growth with a statistically significant coefficient at the 10% level, evident in Table 6.[16]

Results for the second model are defined by a higher R-squared estimate in comparison to the previous model, but a low R-squared estimate overall. This model builds on the first by adding four exogenous variables. Increases in the primary explanatory variables are found in the direction of the results found in the initial equation, as Table 6 notes. While this model generates results for the exogenous variables mostly contrary to those hypothesized, the added variables have no statistical significance. Specifically, the only variables found to be statistically significant are *GDP* and life expectancy, *L*, with positive coefficients as hypothesized; coefficients of which are both found to be statistically significant at the 10% level. Therefore, higher levels of *GDP* indicate lower levels of economic growth, while higher levels of human capital, *L*, indicate higher levels of economic growth. The loss of statistical significance for the coefficient of telephone mainlines, *T*, can be explained by the addition of the political stability index, *P,* which as noted earlier is found to be highly correlated with *T*.

[16] Table 6 provides for consolidated results generated through models 1-8, while more detailed results of individual models can be viewed in Appendix One.

Table 6: Results on Economic Growth, Trade Openness, Policies, and Volumes

Variable	Model One	Model Two	Model Three	Model Four	Model Five	Model Six	Model Seven	Model Eight
Log(GDP)	-1.066043	-1.308109 *	-1.358345 **	-1.574524 **				
Std. Error	0.643559	0.688336	0.631722	0.698557				
Log(GDP1)					-0.057773	-0.052538	-0.145121	-0.136408
Std. Error					0.1627	0.164075	0.161436	0.161308
T	0.006225 *	0.003605	0.007509 **	0.00491	0.000909	-0.000485	0.002474	0.001775
Std. Error	0.003693	0.003942	0.003734	0.004026	0.001668	0.002316	0.001645	0.002371
Log(L)	2.814296	4.68307 *	3.272932	4.739861*	0.553043	0.949535	1.745723	1.834134
Std. Error	2.468992	2.631074	2.469948	2.603881	1.519459	1.603151	1.558303	1.606899
F	0.016701	0.219714			-0.123676	0.036071		
Std. Error	0.431576	0.463657			0.265517	0.294521		
I			0.143631	0.23367			-0.344592 *	-0.307089 *
Std. Error			0.291353	0.292149			0.176062	0.177807
V			0.257304	0.246461			0.23018 **	0.266286 **
Std. Error			0.163153	0.17114			0.105585	0.109953
S		-0.422301		-0.379887		-0.091513		-0.033428
Std. Error		0.301751		0.299035		0.20253		0.196095
P		0.380148		0.4099		0.251384		0.233946
Std. Error		0.358407		0.354828		0.234935		0.226008
M		-0.091632		0.012361		0.021938		0.118459
Std. Error		0.239828		0.246821		0.155578		0.154901
R		-0.165068		-0.311353		-0.499792		-0.63169 *
Std. Error		0.583076		0.57136		0.384049		0.366713
R-Squared	0.040358	0.094337	0.071834	0.124636	0.006993	0.053148	0.076235	0.127415
R-Adjusted	-0.000477	0.013834	0.021933	0.036116	-0.037637	-0.035967	0.023748	0.033923
Sample	99	99	99	99	94	94	94	94
* Statistically Significant at the 10% Level								
** Statistically Significant at the 5% Level								
*** Statistically Significant at the 1% Level								

The third model substitutes the trade openness index, *F*, with two of its components: the international trade taxation index, *I*, which serves as a measure of trade policy restrictions, and trade sector size index, *V*, serving as a measure of trade volume. This equation is also found to have a low R-squared. While the estimated coefficients possess signs consistent with those hypothesized earlier, outlined in Table 6, the statistical significance is found only in GDP per capita, *GDP,* and telephone mainlines, *T,* estimates, both significant at the 5% level. Theories on conditional convergence and physical capital relative to economic growth are thus supported.

The fourth model generates a higher R-squared estimate than model three, however, the estimate is still relatively low. This model produces results congenial to results of the second model, as Table 6 provides: GDP per capita shares a negative relationship with growth through a coefficient statistically significant at the 5% level; and higher levels of life expectancy at birth increase levels of growth, with a coefficient statistically significant at the 10% level. With respect to the rest of the explanatory variables, results indicate positive relationships between these variables and growth; however, lack of statistical significance provides no indications of the real effect that these variables impart on economic growth.

The lack of statistical significance on trade openness, or its comprising variables of trade policy and trade volume, induces employment of different measures of economic growth and thus initial levels of GDP. Additional results are drawn from regressions that utilize the same described models, but substitute GDP per capita growth in 2002, *G*, with averaged GDP growth from 1998-2002, *G1*, as the dependent variable and GDP values of 1998, *GDP1*, as the initial GDP level.

The fifth model, employing the new variable of growth, averaged GDP growth from 1998-2002, *G1,* for the dependent variable, and GDP of 1998,*GDP1*, as the initial GDP level generates a lower R-squared estimate than its homologous model (model one), as well as statistically insignificant coefficients for all of the variables employed. In a similar fashion, model six produces a lower R-squared estimate than model two, and statistically insignificant results for all of the variables employed.

Decomposition of the trade openness index, *F,* in model seven, however, interrupts the trend, with a higher R-squared than its corresponding model, (model three), as well as several variables of statistically significant results. This model, as noted earlier, substitutes the trade openness index with two of its components, the international trade taxation index, *I,* and the trade sector size index, *V,* in an attempt to observe the isolated effects of trade restrictions and trade volume on economic growth. Of great interest is the negative and statistically significant result of the international trade taxation index relative to economic growth; possessing a negative coefficient statistically significant at the 10% level, this variable rejects the earlier hypothesis. It can thus be inferred that a higher rank, indicating less international trade taxation, or tariffs, reduces a country's levels of economic growth; a result clearly supportive of Yanikkaya's findings. The coefficient of the trade sector size is also found to be positive and statistically significant, this one at the 5% level, indicating a positive relationship between trade volume and economic growth; supportive of the initial hypothesis, as well as results found in Yanikkaya.

Model eight, an expansion of model seven, produces an improved R-squared estimate relative to its corresponding model, (model four). Echoing results of model seven, this model generates a negative coefficient for the international trade taxation index, *I*, statistically

significant at the 10% level, and a positive coefficient for the trade sector size index, *V*, also significant at the 5% level, while controlling for exogenous variables. Returning to earlier results of models five and six, which depicted no statistical significance of the trade openness index, *F*, this outcome is clearly the product of the components of the index. Specifically, the trade openness index is largely comprised of indices on international trade taxation and trade sector size, and thus its statistical insignificance is justified on the ground of an adversarial relationship that these two variables share relative to economic growth. Another variable also generating statistically significant results in this model is the internal regulations index, *R,* which yielded a negative coefficient significant at the 10% level, rejecting the hypothesized relationship between such regulations and growth. The index, which provides a higher ranking for less regulation, possesses a negative relationship with growth, thus indicating a positive relationship between higher levels of internal regulation and economic growth.

V. Conclusion

Drawing on historical trends and economic growth literature, this study hypothesized trade-induced benefits particularly greater levels of economic growth through increased levels of international trade volume caused by less restrictive trade policies. The hypothesized relationship between trade and economic performance was investigated through a partial replica of an earlier study, performed by Halit Yanikkaya, which generated a positive relationship between trade volumes and economic growth, and an unexpected positive relationship between trade restrictions and economic growth. Through utilization of recent cross-section data on 99 developing as well as developed economies, the study yielded results that support Yanikkaya's work.

The trade openness index, a category of the Economic Freedom Index was found to be statistically insignificant in its coefficients, relative to economic growth, particularly GDP per capita annual growth, and GDP growth over a five-year period, after controlling for factors affecting different areas of economic performance. Explaining for this insignificance were components of the index, primarily the trade taxation index, a measure serving as a proxy for trade policy or restrictiveness, and the trade sector size index, a measure serving as a proxy for trade volume, which were found to possess opposite relationships with economic growth. The ability to employ the trade openness index, as well as individual components comprising the index provided for observation of the aggregate effect of five trade measures, as well as observation of the isolated effects of trade volume and trade restrictions on economic growth. The international trade taxation index, which provided a higher rank for less trade restrictive policies, was found to enjoy a statistically significant and negative relationship with economic

growth; it can thus be inferred that tariffs and economic growth possess a positive relationship. The trade sector size index, however, was found to possess a positive coefficient, also of statistical significance; thus indicating a positive relationship between trade and economic growth.

Lending support to Yanikkaya's study, which investigates economic growth relative to trade volumes and trade policies during the 1970-1997, are thus results yielded by this study, which assess growth in a similar framework for subsequent years, 1998-2002. These striking results, while supportive of international trade, dispute arguments set forth by mainstream economic literature that rejects the notion of protection-induced growth; appropriate tariffs indeed appear to provide for higher levels of economic growth through adequate protection from international trade. Arguments offered by Yanikkaya for a positive and statistically significant relationship between trade restrictions, such as tariffs, and augmentation of economic growth, are plausible in the study: the infant industry argument and the classical theory of comparative advantage. The infant industry argument provides that small new firms, particularly in less developed economies, require the protection of the government from well-established international companies, mostly originating from industrialized countries, in their initial stages due to their inability to compete. The classical theory of comparative advantage, which indicates that any given economy possesses an advantage in the production of a good or a service relative to other countries, is used in a context in which protective barriers help bring reallocation of market resources in which that economy possesses a comparative advantage. While protective barriers such as tariffs induce higher levels of economic growth, it must be noted that such tariffs must be appropriately administered in generating such a positive outcome.

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Appendix 1

Table 7: Model One

2002 Annual Growth Rate and Trade Openness Index: the Aggregate Effect of Trade

$$G = f(\log(GDP), T, \log(L), F)$$

Dependent Variable: G				
Method: Least Squares				
Date: 04/10/04 Time: 18:22				
Sample: 1 99				
Included observations: 99				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.713468	9.234307	-0.402138	0.6885
LOG(GDP)	-1.066043	0.643559	-1.656482	0.101
T	0.006225	0.003693	1.685435	0.0952
LOG(L)	2.814296	2.468992	1.139857	0.2572
F	0.016701	0.431576	0.038698	0.9692
R-squared	0.040358	Mean dependent var		1.111111
Adjusted R-squared	-0.000477	S.D. dependent var		3.641845
S.E. of regression	3.642715	Akaike info criterion		5.47252
Sum squared resid	1247.321	Schwarz criterion		5.603587
Log likelihood	-265.8898	F-statistic		0.988309
Durbin-Watson stat	1.601306	Prob(F-statistic)		0.41788

Table 8: Model Two

2002 Annual Growth Rate and Trade Openness Index:
the Aggregate Effect of Trade when Controlling for Four Exogenous Variables

$$G = f(\log(GDP), T, \log(L), F, S, P, M, R)$$

Dependent Variable: G				
Method: Least Squares				
Date: 04/10/04 Time: 18:23				
Sample: 1 99				
Included observations: 99				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.505278	9.738448	-0.873371	0.3848
LOG(GDP)	-1.308109	0.688336	-1.900394	0.0606
T	0.003605	0.003942	0.914601	0.3628
LOG(L)	4.68307	2.631074	1.779908	0.0785
F	0.219714	0.463657	0.473872	0.6367
S	-0.422301	0.301751	-1.399501	0.1651
P	0.380148	0.358407	1.060661	0.2917
M	-0.091632	0.239828	-0.382073	0.7033
R	-0.165068	0.583076	-0.283098	0.7778
R-squared	0.094337	Mean dependent var		1.111111
Adjusted R-squared	0.013834	S.D. dependent var		3.641845
S.E. of regression	3.616567	Akaike info criterion		5.495435
Sum squared resid	1177.16	Schwarz criterion		5.731355
Log likelihood	-263.0241	F-statistic		1.171845
Durbin-Watson stat	1.569805	Prob(F-statistic)		0.324883

Table 9: Model Three

2002 Annual Growth Rate, International Trade Taxation Index, and Trade Sector Size Index: Isolated Effects of Trade Restrictions and Trade Volumes

$$G = f(\log(GDP), T, \log(L), I, V)$$

Dependent Variable: G				
Method: Least Squares				
Date: 04/10/04 Time: 18:23				
Sample: 1 99				
Included observations: 99				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.895034	9.114863	-0.64675	0.5194
LOG(GDP)	-1.358345	0.631722	-2.150225	0.0341
T	0.007509	0.003734	2.010808	0.0472
LOG(L)	3.272932	2.469948	1.325101	0.1884
I	0.143631	0.291353	0.492978	0.6232
V	0.257304	0.163153	1.577077	0.1182
R-squared	0.071834	Mean dependent var		1.111111
Adjusted R-squared	0.021933	S.D. dependent var		3.641845
S.E. of regression	3.601687	Akaike info criterion		5.459373
Sum squared resid	1206.41	Schwarz criterion		5.616653
Log likelihood	-264.239	F-statistic		1.439518
Durbin-Watson stat	1.611131	Prob(F-statistic)		0.217456

Table 10: Model Four

2002 Annual Growth Rate, International Trade Taxation Index, and Trade Sector Size Index: Isolated Effects of Trade Restrictions and Trade Volumes when Controlling for Four Exogenous Variables

$$G = f(\log(GDP), T, \log(L), I, V, S, P, M, R)$$

Dependent Variable: G				
Method: Least Squares				
Date: 04/10/04 Time: 18:25				
Sample: 1 99				
Included observations: 99				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.706416	9.59444	-0.907444	0.3666
LOG(GDP)	-1.574524	0.698557	-2.253967	0.0267
T	0.00491	0.004026	1.219684	0.2258
LOG(L)	4.739861	2.603881	1.820306	0.0721
I	0.23367	0.292149	0.799832	0.4259
V	0.246461	0.17114	1.440117	0.1533
S	-0.379887	0.299035	-1.270376	0.2073
P	0.4099	0.354828	1.155209	0.2511
M	0.012361	0.246821	0.050082	0.9602
R	-0.311353	0.57136	-0.544933	0.5872
R-squared	0.124636	Mean dependent var		1.111111
Adjusted R-squared	0.036116	S.D. dependent var		3.641845
S.E. of regression	3.575477	Akaike info criterion		5.481611
Sum squared resid	1137.779	Schwarz criterion		5.743744
Log likelihood	-261.3397	F-statistic		1.407993
Durbin-Watson stat	1.596674	Prob(F-statistic)		0.196743

Table 11: Model Five

Five-Year Average Growth Rate (1998-2002) and Trade Openness Index: the Aggregate Effect of Trade

G1 = f (log(GDP1), T, log(L), F)

Dependent Variable: G1				
Method: Least Squares				
Date: 04/13/04 Time: 18:04				
Sample: 1 94				
Included observations: 94				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.595439	6.393317	0.405961	0.6857
LOG(GDP1)	-0.057773	0.1627	-0.35509	0.7234
T	0.000909	0.001668	0.545025	0.5871
LOG(L)	0.553043	1.519459	0.363974	0.7167
F	-0.123676	0.265517	-0.465793	0.6425
R-squared	0.006993	Mean dependent var		2.856489
Adjusted R-squared	-0.037637	S.D. dependent var		2.288039
S.E. of regression	2.330698	Akaike info criterion		4.581938
Sum squared resid	483.4618	Schwarz criterion		4.717219
Log likelihood	-210.3511	F-statistic		0.156685

Table 12: Model Six

Five-Year Average Growth Rate (1998-2002) and Trade Openness Index: the Aggregate Effect of Trade when Controlling for Four Exogenous Variables

G1 = f (log(GDP1), T, log(L), F, S, P, M, R)

Dependent Variable: G1				
Method: Least Squares				
Date: 04/13/04 Time: 18:12				
Sample: 1 94				
Included observations: 94				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.863406	6.613678	0.28175	0.7788
LOG(GDP1)	-0.052538	0.164075	-0.320211	0.7496
T	-0.000485	0.002316	-0.209519	0.8345
LOG(L)	0.949535	1.603151	0.592293	0.5552
F	0.036071	0.294521	0.122474	0.9028
S	-0.091513	0.20253	-0.45185	0.6525
P	0.251384	0.234935	1.070014	0.2876
M	0.021938	0.155578	0.141009	0.8882
R	-0.499792	0.384049	-1.301378	0.1966
R-squared	0.053148	Mean dependent var		2.856489
Adjusted R-squared	-0.035967	S.D. dependent var		2.288039
S.E. of regression	2.328822	Akaike info criterion		4.619448
Sum squared resid	460.9902	Schwarz criterion		4.862955
Log likelihood	-208.1141	F-statistic		0.596399

Table 13: Model Seven

Five-Year Average Growth Rate (1998-2002), International Trade Taxation Index, and Trade Sector Size Index: Isolated Effects of Trade Restrictions and Trade Volumes

$$G1 = f(\log(GDP1), T, \log(L), I, V)$$

Dependent Variable: G1				
Method: Least Squares				
Date: 04/13/04 Time: 18:16				
Sample: 1 94				
Included observations: 94				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.38497	6.132457	-0.062776	0.9501
LOG(GDP1)	-0.145121	0.161436	-0.89894	0.3711
T	0.002474	0.001645	1.503765	0.1362
LOG(L)	1.745723	1.558303	1.120272	0.2656
I	-0.344592	0.176062	-1.957212	0.0535
V	0.23018	0.105585	2.18004	0.0319
R-squared	0.076235	Mean dependent var		2.856489
Adjusted R-squared	0.023748	S.D. dependent var		2.288039
S.E. of regression	2.260708	Akaike info criterion		4.530934
Sum squared resid	449.7503	Schwarz criterion		4.693272
Log likelihood	-206.9539	F-statistic		1.452455

Table 14: Model Eight

Five-Year Average Growth Rate (1998-2002), International Trade Taxation Index, and Trade Sector Size Index: Isolated Effects of Trade Restrictions and Trade Volumes when Controlling for Four Exogenous Variables

$$G1 = f(\log(GDP1), T, \log(L)\ I, V, S, P, M, R)$$

Dependent Variable: G1				
Method: Least Squares				
Date: 04/13/04 Time: 18:23				
Sample: 1 94				
Included observations: 94				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.401812	6.358529	0.063193	0.9498
LOG(GDP1)	-0.136408	0.161308	-0.84564	0.4002
T	0.001775	0.002371	0.748603	0.4562
LOG(L)	1.834134	1.606899	1.141412	0.2569
I	-0.307089	0.177807	-1.727097	0.0878
V	0.266286	0.109953	2.421808	0.0176
S	-0.033428	0.196095	-0.170469	0.8651
P	0.233946	0.226008	1.035121	0.3036
M	0.118459	0.154901	0.764741	0.4466
R	-0.63169	0.366713	-1.722573	0.0886
R-squared	0.127415	Mean dependent var		2.856489
Adjusted R-squared	0.033923	S.D. dependent var		2.288039
S.E. of regression	2.248895	Akaike info criterion		4.559043
Sum squared resid	424.8325	Schwarz criterion		4.829606
Log likelihood	-204.275	F-statistic		1.36285

Appendix 2

Table 15: Economic Freedom Ranking

Country	Economic Freedom	Rank
Hong Kong	8.8	1
Singapore	8.6	2
United States	8.5	3
United Kingdom	8.4	4
New Zealand, Switzerland	8.2	5
Australia, Canada, Ireland, Netherlands	8	7
Finland, Iceland	7.7	11
Denmark, Luxembourg	7.6	13
Austria, Belgium, Chile, Germany	7.5	15
Oman, Panama, Portugal, Sweden, United Arab Emirates	7.4	19
Bahrain, Costa Rica, Japan, Jordan, Norway, Spain	7.3	24
Argentina, El Salvador, Mauritius, Taiwan, Trinidad and Tobago	7.2	30
Bahamas, Estonia, Italy	7.1	35
Botswana, Czech Republic, France, Jamaica, Kuwait, Philippines, South Korea	7	38
Greece, Peru	6.9	45
Israel, Latvia, South Africa, Uruguay	6.8	47
Bolivia, Dominican Republic, Egypt, Hungary, Malaysia	6.7	51
Guyana, Kenya, Namibia, Thailand	6.6	56
Haiti, Lithuania, Malta, Nicaragua, Uganda, Zambia	6.5	60
Guatemala, Honduras, Mexico, Paraguay	6.3	66
Belize, Cyprus, Fiji	6.2	70
India, Morocco, Slovenia, Tunisia	6.1	73
Indonesia, Sri Lanka, Tanzania	6	77
Cote d'Ivoire, Napal	5.9	80
Barbados, Benin, Brazil, Papua New Guinea, Slovak Republic, Turkey, Venezuela	5.8	82
Ghana, Poland, Senegal	5.7	89
Burundi, Chad, Colombia, Croatia, Mali	5.6	92
Albania, Bulgaria, Cameroon, Niger	5.5	97
China, Ecquador, Nigeria, Rwanda	5.3	101
Gabon, Madagascar	5.2	105
Bangladesh, Pakistan	5.1	107
Central African Republic, Iran, Sierra Leone, Syria	5	109
Congo, Republic of	4.9	113
Romania, Zimbabwe	4.8	114
Malawi, Russia, Togo	4.7	116
Ukraine	4.5	119
Algeria	4.1	120
Guinea-Bissau	3.8	121
Myanmar	3.3	122
Congo, Democratic Republic of	3.2	123

Table 16: Measures of Growth

GDP Growth Rates and GDP per Capita Growth Rates

Country	GDP per Capita Growth (G) (2002)	GDP Growth (G1) (1998 - 2002)	GDP Growth (G2) (2002)
Albania	4	6.67	4.7
Algeria	2	2.81	4.1
Argentina	-12	-4.49	-10.94
Australia	2	3.3	3.5
Austria	1	1.96	1.04
Bangladesh	3	5.22	4.4
Belgium	0	2.24	0.7
Bolivia	0	1.66	2.5
Botswana	2	6.4	3.5
Brazil	0	2.2	1.52
Bulgaria	5	4.13	4.3
Cameroon	2	4.61	4.4
Canada	2	3.54	3.3
Chile	1	2.33	2.1
China	7	7.61	8
Colombia	0	0.66	1.5
Congo, Republic of	1	3.57	3.5
Costa Rica	1	3.03	2.76
Cote d"Ivoire	-3	-0.25	-0.87
Croatia	5	2.1	5.23
Czech Republic	2	4.04	1.96
Denmark	1	2.39	1.56
Dominican Republic	3	-1.85	4.1
Ecuador	2	6.23	3.04
Egypt	1	1.64	2.96
El Salvador	0	4.42	2.3
Estonia	6	0.81	5.75
Finland	1	3.17	1.63
France	1	3.01	1
Germany	0	3.62	0.18
Ghana	3	1.47	4.5
Greece	4	4.09	3.95
Guatemala	-1	2.89	2
Honduras	-1	2.45	2
Hong Kong	2	4.26	2.26
Hungary	4	4.18	3.3
Iceland	-1	3.26	0
India	3	5.12	4.4

Country	GDP per Capita Growth (G) (2002)	GDP Growth (G1) (1998 - 2002)	GDP Growth (G2) (2002)
Indonesia	2	3.39	3.66
Iran	4	4.88	5.87
Ireland	3	8.03	3.6
Italy	0	1.78	0.37
Jamaica	0	0.84	1.03
Japan	-1	0.52	-0.7
Jordan	2	4.12	4.85
Kenya	0	0.9	1.8
Latvia	7	6.2	6.07
Lithuania	7	4.08	6.71
Luxembourg	0	3.86	0.8
Madagascar	-14	1.53	-11.9
Malawi	0	1.21	1.77
Malaysia	2	4.66	4.21
Mali	7	4.8	9.57
Mauritius	3	5.14	4.4
Mexico	-1	2.75	0.74
Morocco	3	3.08	4.54
Netherlands	-1	4	0.1
Nigeria	-3	2.13	-0.9
Norway	1	2.15	2
Oman	0	1.71	2.2
Pakistan	2	4.74	4.41
Panama	-1	0.11	0.75
Papa New Guinea	-5	2.07	-2.49
Paraguay	-4	-0.45	-2.2
Peru	4	0.35	5.24
Philippines	2	2.33	4.56
Poland	1	3.87	1.2
Portugal	0	2.55	0.4
Romania	5	2.36	4.3
Russia	5	6.12	4.3
Senegal	0	4.9	2.4
Sierra Leone	4	2.26	6.3
Singapore	1	3.74	2.25
Slovakia	4	2.79	4.4
Slovenia	3	3.88	2.9
South Africa	2	2.9	2.98

Country	GDP per Capita Growth (G) (2002)	GDP Growth (G1) (1998 - 2002)	GDP Growth (G2) (2002)
Spain	2	3.24	1.8
Sri Lanka	2	2.78	3
Sweden	2	2.72	1.89
Switzerland	0	1.57	-0.2
Syria	1	1.22	3.1
Tanzania	4	5.11	5.82
Thailand	4	3.9	5.22
Trinidad & Tobago	2	4.24	2.7
Tunisia	1	4.47	1.9
Turkey	6	0.33	7.78
Uganda	4	5.2	6.33
Ukraine	5	5.28	4.5
United Kingdom	1	2.3	1.5
United States	1	2.61	2.3
Uruguay	-11	-4.23	-10.77
Venezuela	-11	-1.33	-8.88
Zambia	1	3.6	3.03
Zimbabwe	-7	-5.28	-5.58

Table 17: Data Corresponding to Models: 1-4

Country	GDP per Capita Growth (2002)	GDP per Capita (2002)	Physical Capital: Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Albania	4	1,071	39	73.4	5.2	6.2	0	6.2	4.7	6.3	5
Algeria	2	1,657	57	69.2	5.4	4.3	5.1	4	2.3	5.8	3.1
Argentina	-12	6,579	213	73.9	6.4	6.9	2.1	8	5.4	9.5	6.6
Australia	2	24,801	525	79	7.7	8.5	5.3	6.2	9.5	9.3	7.3
Austria	1	33,480	467	78.3	8.3	9.1	5.4	3.9	9.3	9.5	6.4
Bangladesh	3	396	250	60.5	4.9	3.7	3.1	5.2	2.9	6.9	5.7
Belgium	0	31,333	498	78.5	8.9	9	7.4	3.7	8.3	9.6	7
Bolivia	0	947	61	63.3	7.3	8.6	4.6	7.5	3.4	9.3	6.1
Botswana	2	4,233	93	44.7	7.7	6.8	6.7	5.3	7.1	8.6	6.5
Brazil	0	4,644	182	67.8	5.6	6.2	2.5	6.7	5.4	5.1	6.1
Bulgaria	5	1,733	350	70.9	7.1	7.9	5.9	4.9	5.4	4.8	5.5
Cameroon	2	711	6	48	5.8	5.1	4.8	5.5	4.7	6.4	5
Canada	2	23,590	677	79.2	7.9	6.7	5.8	6	9.3	9.3	7.6
Chile	1	5,436	221	75.8	7.4	8.7	5.8	7.1	6.5	9.3	7
China	7	942	112	70.6	6.7	7.2	9.8	3.8	4.1	6.5	5.2
Colombia	0	2,274	169	71.8	6.3	7.6	3.7	5.4	3.5	7.1	5.7
Congo, Republic of	1	803	7	48.5	7	7.3	9.5	3.5	2.3	6.8	4.8
Costa Rica	1	3,927	249	77.9	8.1	8.5	5.9	7.1	6.9	7.6	6.8
Cote d"Ivoire	-3	712	18	41.7	6.2	5.7	7.4	7.7	3.5	6.8	5.4
Croatia	5	5,549	365	74	6.1	7.7	4.5	3.3	7.1	6.2	5.5
Cyprus	1	14,800	647	78.1	5.8	7.9	2.7	5.9	7.1	6.8	5.4
Czech Republic	2	5,691	378	75.1	7.8	6.7	7.4	5.3	6.9	9.2	5.7
Denmark	1	39,211	720	76.4	8.1	9	3	3.7	9.5	9.6	7.2

Country	GDP per Capita Growth Rate (2002)	GDP per Capita (2002)	Physical Capital: Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Dominican Republic	3	2,129	105	66.7	6.5	5.8	6.8	8.6	4.3	7.5	6.7
Ecuador	2	1,756	100	70.5	7	7.1	6.3	8.7	3.3	3.3	4.4
Egypt	1	1,250	86	70.5	6.3	3.7	4.7	6.5	5.9	9.4	5.4
El Salvador	0	1,763	100	68.3	7.4	8	2.7	8.4	4.5	9.4	6.4
Estonia	6	5,000	363	71.2	8.7	10	7.4	5.9	6.7	7.7	6.5
Finland	1	32,575	550	77.8	8.3	9	4.6	4.3	9.5	9.3	7
France	1	30,667	579	78.7	8.1	9	4.8	2.5	8.1	9.5	7
Gabon	1	4,405	32	56.6	5.9	6	5.4	3.7	4.1	6.9	5.5
Germany	0	32,807	611	78	8.6	9	5.6	4.3	9.1	9.6	6.1
Ghana	3	432	12	78	6.5	7	5.7	6.8	4.1	5.2	5.9
Greece	4	14,157	532	78.1	7.5	9	1.4	6.6	5.7	9.1	5.3
Guatemala	-1	1,545	57	65.3	6.4	7.5	2.7	9.1	3	7.5	5.6
Honduras	-1	711	46	68.8	6.9	7.8	6.7	7.5	3.5	7.9	5.9
Hong Kong	2	25,508	583	79.7	9.8	9.9	10	9.2	7.2	9.4	8.4
Hungary	4	5,735	372	71.5	7.2	6.5	6.5	5.4	7	6.7	7
Iceland	-1	31,835	701	79.6	6.8	8	1.1	7.7	9	9	7.6
India	3	494	32	63.3	5.1	2.4	5.4	6.9	6	6.5	5.8
Indonesia	2	1,060	31	66.2	7.6	7.2	10	7.8	3.4	6.5	4.7
Iran	4	1,787	149	69.8	2.8	3.1	2.8	4.5	6.5	7.2	3.9
Ireland	3	30,157	420	76.7	8.9	9	8.2	6.1	9	9.5	7.1
Italy	0	21,233	474	78.6	8.1	9.1	4.5	4.6	7.7	9.4	5.6
Jamaica	0	2,174	199	75.5	7	5.6	5.3	7.5	5.8	8.2	6.5
Japan	-1	44,108	586	81.3	6.8	8.4	0	5.3	8.2	9.5	6.7
Jordan	2	1,661	92	70.6	7.7	6.8	7.2	7.3	7.2	9.6	6.4
Kenya	0	325	10	46.4	7.1	6	6.1	6.6	4.1	8.9	6.2

Country	GDP per Capita Growth Rate (2002)	GDP per Capita (2002)	Physical Capital: Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Latvia	7	3,100	303	70.5	7.3	8.3	5.4	5.9	6.8	8.2	5.8
Lithuania	7	2,659	321	72.3	7.4	8.3	5.7	6.5	6.6	6.7	5.6
Luxembourg	0	56,513	750	78.1	8.5	9.1	4.8	4.6	8.3	9.7	6.9
Madagascar	-14	217	3	53	6	3.7	4.9	6.5	4.7	4.5	4.4
Malawi	0	162	4	38.5	6	5.2	5.8	4.2	5.9	2.1	5.1
Malaysia	2	4,811	199	72.8	7.5	5.8	10	6.7	5.6	7.2	6.5
Mali	7	313	3	48.4	5.9	5.6	5.6	5.7	5.3	6.6	4.6
Mauritius	3	4,537	235	71.6	7	4.8	5	7.1	6	9.6	6.2
Mexico	-1	3,713	125	73.1	7.8	7.9	9	7.6	4.2	6.2	5.4
Morocco	3	1,476	50	68.1	5.5	4.7	4.7	5.9	7.1	6.7	5.1
Namibia	1	2,412	63	47.4	6.9	7.3	9	3.9	8.3	7.1	6.6
Netherlands	-1	31,160	618	78.2	8.8	9	5.9	4.6	9.6	9.4	7.6
New Zealand	3	19,024	500	78.1	8.3	8.9	4.5	6.7	9.1	9	7.9
Niger	0	207	2	45.6	5.4	5.6	3.4	5.9	4.7	6.7	4.6
Nigeria	-3	248	4	51.8	5.8	3.4	7.7	5.5	3.6	5.5	6.1
Norway	1	38,843	532	78.7	7.6	7.5	4.4	4.1	8.8	9.5	6.6
Oman	0	6,277	89	72.2	7.7	9	4.8	6.1	7.1	9.2	6.6
Pakistan	2	527	22	60.4	4.3	2.7	4.8	6.7	2.9	6.4	5.2
Panama	-1	3,839	151	74.4	7.2	7.7	4.4	7.4	5.8	9.7	6.6
Papa New Guinea	-5	856	13	57	6.8	4.5	10	6.5	4.1	5.4	6.4
Paraguay	-4	1,703	50	70.5	6.6	7.4	5.9	7.6	3.5	9	5
Peru	4	2,404	67	69.4	7.1	7.7	2.5	8.7	3.9	8.5	6.4
Philippines	2	1,195	40	69.5	7.6	7.5	10	7.1	4.6	9	6.5
Poland	1	3,762	282	73.6	6.4	5.2	5.5	3.9	6.5	6.2	5.6
Portugal	0	13,151	430	75.9	8	9	4.5	5.6	7.6	9.3	6.4
Romania	5	1,611	175	70.5	6.3	6.7	4.5	4.6	6.4	1.6	5.4

Country	GDP per Capita Growth Rate (2002)	GDP per Capita (2002)	Physical Capital: Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Size Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Russia	5	2,734	218	66.6	6.9	7.5	9.4	6.4	4.4	1.5	4.4
Senegal	0	628	22	52.3	6	4	5.6	6.7	4.1	7	4.6
Sierra Leone	4	165	4	34.5	4.1	2.4	0	6.2	2.9	7	4.8
Singapore	1	27,254	484	77.8	9.3	9.9	10	8.1	8.5	9.7	7.4
Slovakia	4	4,595	314	73.3	7.8	8.9	7.2	3.5	6.3	6.5	5.2
Slovenia	3	12,326	386	75.9	7.1	8.1	4.7	3.2	7.3	7.1	5.7
South Africa	2	4,183	114	50.9	7.3	7.7	7.1	5.4	6.5	7.5	7
Spain	2	17,885	421	79.1	8.3	9	5.6	4.6	7.5	9.3	6.8
Sri Lanka	2	891	41	72.3	6	6	6.2	6	3.9	6.8	6.1
Sweden	2	32,117	682	79.9	8.3	9.1	6	3.3	9	9.7	6.7
Switzerland	0	46,993	727	79	8.3	9.9	3.8	7.2	9.3	9.4	7
Syria	1	801	103	71.5	6.2	7.3	5.5	3.7	5.3	7.1	2.7
Tanzania	4	204	5	44	5.6	4.2	5	5.5	6.5	8.4	3.7
Thailand	4	2,986	92	68.9	7.6	6.8	10	6.8	6	6.5	6.2
Trinidad & Tobago	2	5,466	231	71.5	6.6	5.4	3.7	5.9	6.8	9.5	7.2
Tunisia	1	2,580	90	72.5	6.1	5.3	6	5.3	6.5	6.9	5.6
Turkey	6	2,942	280	70.1	7.3	7.6	5.9	6.9	5.4	3.6	5.6
Uganda	4	367	3	70.1	6.8	6.6	0.9	6.2	4.7	9.2	5.6
Ukraine	5	1,038	206	44.7	6.6	6.8	8.4	3.8	4.8	2.6	4.5
United Kingdom	1	23,015	589	77.9	8.5	9	4.9	6.2	9.3	9.7	8.1
United States	1	31,977	700	76.9	8	8	5	7.6	9.2	9.7	8.2
Uruguay	-11	5,463	278	75	7.3	8.5	1.9	6.7	6.3	7.6	6.2
Venezuela	-11	2,978	108	73.5	7.1	7.4	4.1	7.1	3.7	5.7	5.2
Zambia	1	410	8	33.4	8.1	6.9	6.4	6.6	6.5	5.9	5.6
Zimbabwe	-7	522	18	35.4	6.3	4.5	8.6	4.8	5	2.8	5.4

Table 18: Data Corresponding to Models: 5-8

Country	GDP Growth (1998-2002)	GDP (1998)	Physical Capital Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Albania	6.67	3.06E+09	39	73.4	5.2	6.2	0	6.2	4.7	6.3	5
Algeria	2.81	4.74E+10	57	69.2	5.4	4.3	5.1	4	2.3	5.8	3.1
Argentina	-4.49	2.99E+11	213	73.9	6.4	6.9	2.1	8	5.4	9.5	6.6
Australia	3.30	3.72E+11	525	79	7.7	8.5	5.3	6.2	9.5	9.3	7.3
Austria	1.96	2.11E+11	467	78.3	8.3	9.1	5.4	3.9	9.3	9.5	6.4
Bangladesh	5.22	4.41E+10	250	60.5	4.9	3.7	3.1	5.2	2.9	6.9	5.7
Belgium	2.24	2.51E+11	498	78.5	8.9	9	7.4	3.7	8.3	9.6	7
Bolivia	1.66	8.50E+09	61	63.3	7.3	8.6	4.6	7.5	3.4	9.3	6.1
Botswana	6.40	4.93E+09	93	44.7	7.7	6.8	6.7	5.3	7.1	8.6	6.5
Brazil	2.20	7.88E+11	182	67.8	5.6	6.2	2.5	6.7	5.4	5.1	6.1
Bulgaria	4.13	1.27E+10	350	70.9	7.1	7.9	5.9	4.9	5.4	4.8	5.5
Cameroon	4.61	8.70E+09	6	48	5.8	5.1	4.8	5.5	4.7	6.4	5
Canada	3.54	6.07E+11	677	79.2	7.9	6.7	5.8	6	9.3	9.3	7.6
Chile	2.33	7.31E+10	221	75.8	7.4	8.7	5.8	7.1	6.5	9.3	7
China	7.61	9.46E+11	112	70.6	6.7	7.2	9.8	3.8	4.1	6.5	5.2
Colombia	0.66	9.88E+10	169	71.8	6.3	7.6	3.7	5.4	3.5	7.1	5.7
Congo, Republic of	3.57	1.95E+09	7	48.5	7	7.3	9.5	3.5	2.3	6.8	4.8
Costa Rica	3.03	1.41E+10	249	77.9	8.1	8.5	5.9	7.1	6.9	7.6	6.8
Cote d"Ivoire	-0.25	1.28E+10	18	41.7	6.2	5.7	7.4	7.7	3.5	6.8	5.4
Croatia	2.10	2.16E+10	365	74	6.1	7.7	4.5	3.3	7.1	6.2	5.5
Czech Republic	4.04	5.70E+10	378	75.1	7.8	6.7	7.4	5.3	6.9	9.2	5.7
Denmark	2.39	1.72E+11	720	76.4	8.1	9	3	3.7	9.5	9.6	7.2
Dominican Republic	-1.85	1.59E+10	105	66.7	6.5	5.8	6.8	8.6	4.3	7.5	6.7

Country	GDP Growth (1998-2002)	GDP (1998)	Physical Capital Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Ecuador	6.23	1.07E+11	100	70.5	7	7.1	6.3	8.7	3.3	3.3	4.4
Egypt	1.64	8.21E+10	86	70.5	6.3	3.7	4.7	6.5	5.9	9.4	5.4
El Salvador	4.42	1.20E+10	100	68.3	7.4	8	2.7	8.4	4.5	9.4	6.4
Estonia	0.81	5.23E+09	363	71.2	8.7	10	7.4	5.9	6.7	7.7	6.5
Finland	3.17	1.29E+11	550	77.8	8.3	9	4.6	4.3	9.5	9.3	7
France	3.01	1.45E+12	579	78.7	8.1	9	4.8	2.5	8.1	9.5	7
Germany	3.62	2.14E+12	611	78	8.6	9	5.6	4.3	9.1	9.6	6.1
Ghana	1.47	7.47E+09	12	78	6.5	7	5.7	6.8	4.1	5.2	5.9
Greece	4.09	1.22E+11	532	78.1	7.5	9	1.4	6.6	5.7	9.1	5.3
Guatemala	2.89	1.94E+10	57	65.3	6.4	7.5	2.7	9.1	3	7.5	5.6
Honduras	2.45	5.26E+09	46	68.8	6.9	7.8	6.7	7.5	3.5	7.9	5.9
Hong Kong	4.26	1.65E+11	583	79.7	9.8	9.9	10	9.2	7.2	9.4	8.4
Hungary	4.18	4.70E+10	372	71.5	7.2	6.5	6.5	5.4	7	6.7	7
Iceland	3.26	8.08E+09	701	79.6	6.8	8	1.1	7.7	9	9	7.6
India	5.12	4.14E+11	32	63.3	5.1	2.4	5.4	6.9	6	6.5	5.8
Indonesia	3.39	9.54E+10	31	66.2	7.6	7.2	10	7.8	3.4	6.5	4.7
Iran	4.88	1.02E+11	149	69.8	2.8	3.1	2.8	4.5	6.5	7.2	3.9
Ireland	8.03	8.65E+10	420	76.7	8.9	9	8.2	6.1	9	9.5	7.1
Italy	1.78	1.20E+12	474	78.6	8.1	9.1	4.5	4.6	7.7	9.4	5.6
Jamaica	0.84	7.48E+09	199	75.5	7	5.6	5.3	7.5	5.8	8.2	6.5
Japan	0.52	3.94E+12	586	81.3	6.8	8.4	0	5.3	8.2	9.5	6.7
Jordan	4.12	7.91E+09	92	70.6	7.7	6.8	7.2	7.3	7.2	9.6	6.4
Kenya	0.90	1.14E+10	10	46.4	7.1	6	6.1	6.6	4.1	8.9	6.2
Latvia	6.20	6.09E+09	303	70.5	7.3	8.3	5.4	5.9	6.8	8.2	5.8
Lithuania	4.08	1.09E+10	321	72.3	7.4	8.3	5.7	6.5	6.6	6.7	5.6

Country	GDP Growth (1998-2002)	GDP (1998)	Physical Capital Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Luxembourg	3.86	1.89E+10	750	78.1	8.5	9.1	4.8	4.6	8.3	9.7	6.9
Madagascar	1.53	3.74E+09	3	53	6	3.7	4.9	6.5	4.7	4.5	4.4
Malawi	1.21	1.74E+09	4	38.5	6	5.2	5.8	4.2	5.9	2.1	5.1
Malaysia	4.66	7.22E+10	199	72.8	7.5	5.8	10	6.7	5.6	7.2	6.5
Mali	4.80	2.70E+09	3	48.4	5.9	5.6	5.6	5.7	5.3	6.6	4.6
Mauritius	5.14	4.15E+09	235	71.6	7	4.8	5	7.1	6	9.6	6.2
Mexico	2.75	4.21E+11	125	73.1	7.8	7.9	9	7.6	4.2	6.2	5.4
Morocco	3.08	3.58E+10	50	68.1	5.5	4.7	4.7	5.9	7.1	6.7	5.1
Netherlands	4.00	3.93E+11	618	78.2	8.8	9	5.9	4.6	9.6	9.4	7.6
Nigeria	2.13	3.21E+10	4	51.8	5.8	3.4	7.7	5.5	3.6	5.5	6.1
Norway	2.15	1.48E+11	532	78.7	7.6	7.5	4.4	4.1	8.8	9.5	6.6
Oman	1.71	1.41E+10	89	72.2	7.7	9	4.8	6.1	7.1	9.2	6.6
Pakistan	4.74	6.22E+10	22	60.4	4.3	2.7	4.8	6.7	2.9	6.4	5.2
Panama	0.11	1.09E+10	151	74.4	7.2	7.7	4.4	7.4	5.8	9.7	6.6
Papa New Guinea	2.07	3.78E+09	13	57	6.8	4.5	10	6.5	4.1	5.4	6.4
Paraguay	-0.45	8.60E+09	50	70.5	6.6	7.4	5.9	7.6	3.5	9	5
Peru	0.35	5.68E+10	67	69.4	7.1	7.7	2.5	8.7	3.9	8.5	6.4
Philippines	2.33	6.52E+10	40	69.5	7.6	7.5	10	7.1	4.6	9	6.5
Poland	3.87	1.58E+11	282	73.6	6.4	5.2	5.5	3.9	6.5	6.2	5.6
Portugal	2.55	1.12E+11	430	75.9	8	9	4.5	5.6	7.6	9.3	6.4
Romania	2.36	4.21E+10	175	70.5	6.3	6.7	4.5	4.6	6.4	1.6	5.4
Russia	6.12	2.82E+11	218	66.6	6.9	7.5	9.4	6.4	4.4	1.5	4.4
Senegal	4.90	4.67E+09	22	52.3	6	4	5.6	6.7	4.1	7	4.6
Sierra Leone	2.26	6.72E+08	4	34.5	4.1	2.4	0	6.2	2.9	7	4.8
Singapore	3.74	8.19E+10	484	77.8	9.3	9.9	10	8.1	8.5	9.7	7.4

Country	GDP Growth (1998-2002)	GDP (1998)	Physical Capital Telephone Mainlines (2000)	Human Capital: Life Expectancy at Birth (1999)	Trade Openness Index (2000)	Int'l Trade Taxation Index (2000)	Size of the Trade Sector Index (2000)	Size of the Gov. Index (2000)	Political Stability Index (2000)	Macroecon. Stability Index (2000)	Internal Regulation Index (2000)
Slovakia	2.79	2.20E+10	314	73.3	7.8	8.9	7.2	3.5	6.3	6.5	5.2
Slovenia	3.88	1.96E+10	386	75.9	7.1	8.1	4.7	3.2	7.3	7.1	5.7
South Africa	2.90	1.34E+11	114	50.9	7.3	7.7	7.1	5.4	6.5	7.5	7
Spain	3.24	5.88E+11	421	79.1	8.3	9	5.6	4.6	7.5	9.3	6.8
Sri Lanka	2.78	1.58E+10	41	72.3	6	6	6.2	6	3.9	6.8	6.1
Sweden	2.72	2.40E+11	682	79.9	8.3	9.1	6	3.3	9	9.7	6.7
Switzerland	1.57	2.62E+11	727	79	8.3	9.9	3.8	7.2	9.3	9.4	7
Syria	1.22	1.52E+10	103	71.5	6.2	7.3	5.5	3.7	5.3	7.1	2.7
Tanzania	5.11	8.38E+09	5	44	5.6	4.2	5	5.5	6.5	8.4	3.7
Thailand	3.90	1.16E+11	92	68.9	7.6	6.8	10	6.8	6	6.5	6.2
Trinidad & Tobago	4.24	6.12E+09	231	71.5	6.6	5.4	3.7	5.9	6.8	9.5	7.2
Tunisia	4.47	1.99E+10	90	72.5	6.1	5.3	6	5.3	6.5	6.9	5.6
Turkey	0.33	2.00E+11	280	70.1	7.3	7.6	5.9	6.9	5.4	3.6	5.6
Uganda	5.20	6.53E+09	3	70.1	6.8	6.6	0.9	6.2	4.7	9.2	5.6
Ukraine	5.28	4.19E+10	206	44.7	6.6	6.8	8.4	3.8	4.8	2.6	4.5
United Kingdom	2.30	1.42E+12	589	77.9	8.5	9	4.9	6.2	9.3	9.7	8.1
United States	2.61	8.72E+12	700	76.9	8	8	5	7.6	9.2	9.7	8.2
Uruguay	-4.23	2.24E+10	278	75	7.3	8.5	1.9	6.7	6.3	7.6	6.2
Venezuela	-1.33	9.58E+10	108	73.5	7.1	7.4	4.1	7.1	3.7	5.7	5.2
Zambia	3.60	3.24E+09	8	33.4	8.1	6.9	6.4	6.6	6.5	5.9	5.6
Zimbabwe	-5.28	5.73E+09	18	35.4	6.3	4.5	8.6	4.8	5	2.8	5.4