Does the Stage of Development Affect the Linkages Between Economic Growth and the Institutions of Economic Freedom, Political Rights, and Civil Liberties?

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There is a growing body of literature on the relationship between economic and political freedoms and the growth of national income. There now exists considerable evidence that greater economic freedom is conducive to more rapid development (Dawson, 1998; De Haan and Siermann, 1998; Farr et al, 1998;). However, the nature of the relationship between political freedoms and growth is a more controversial subject, as the empirical results have provided conflicting information on this linkage (Barro, 1996; Durham, 1999; Gould and Ruffin, 1993; and Levine and Renelt, 1992).

In a critique of international cross-sectional studies of growth, Harbarger (1987) warns there is potential danger in pooling data from so many disparate nations. For this reason, many studies of the relationship between freedoms and growth have divided their sample into higher and lower income countries (Durham, 1999; Farr et al, 1998; and Wu and Davis, 1999). A perusal of the results of these studies suggests that there are clear differences in the relationship between freedoms and growth for nations at different stages of development. One obvious short-coming of these earlier studies is that the definition of high and low income nations is always based on an arbitrary division. Farr et al (1998) uncovered differences between industrial and non-industrial countries, and Wu and Davis (1999) found similar variation between OECD and non-OECD states.

The primary goal of this paper is to apply a switching regression technique to a pooled cross-sectional sample of countries to allow the data itself to indicate if, and where, any structural break in how economic growth is determined occurs. A sample of 71 countries over the period 1976-1995 is employed. The results are very interesting, suggesting that institutional measures of freedom have an important impact on growth in the lower income countries, but at more advanced stages of development the relationship disappears. This finding in sensible as it is clear that most of the wealthiest nations in the world today are also relatively free societies.[1]

This paper follows earlier works by Dawson (1998), Knight, et al (1993), and Wu and Davis (1999) in using the neoclassical Solow Growth Model (1956) as a foundation to study growth. This compelling model has proven time and again to be a valuable resource in empirical studies of the causes of economic growth. It suggests that a country's convergence to its "steady state" income is determined by the rates of physical capital accumulation, workforce growth, and technology advances, as well as, initial level of per capita income and the state of technology. Mankiw, et al (1992) also demonstrated that the model's performance is significantly improved by including the rate of human capital accumulation.

However, it can be argued that even the augmented model is still not completely specified since it does not incorporate the influences of many other contemporaneous economic forces. Veblen and later institutionalists emphasize the importance of social, political and economic organizations in determining economic outcomes. Schumpeter (1950) and Schmookler (1966) suggest that economic decisions that lead to advances in productivity are strongly linked to the

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[1] An obvious set of exceptions to this rule are "oil economies," which have a huge natural resource endowment, and often very autocratic rule. Such states are normally excluded from analysis on economic growth since their wealth is not based on any rational "investment" policy.

national institutional structure. In recent years, a growing body of empirical evidence indicates that variations in income growth rates can be partially attributed to a country's institutional framework.[2,3] However, the extent of the impact of institutions and the mechanisms through which they are transmitted are still being debated (Abramovitz, 1993; Barro, 1996; Dawson, 1998; Easton and Walker, 1997; and Hanke and Walters, 1997).

Fortunately, today a number of quantifiable and objective measures of political and economic institutional factors exist, allowing empirical examination of their influences on economic growth. This study explores the impacts of institutional structure by analyzing how the latest published measures of economic freedoms, political rights, and civil liberties are related to cross-country differences in the rates of per capita income growth across different stages of economic development.

At the outset it is vital to understand the distinction between economic freedom and the political freedoms inherent in political rights and civil liberties. Political rights represent the ability of the citizenry to participate in the governmental process through meaningful democratic elections, while civil liberties are freedom of expression and personal choice. Economic freedom, on the other hand, reflects the ability of individuals to make personal choices in market transactions, the protection of personal property, and the ability of individuals to engage in mutually beneficial exchange. It is possible for a country to rate high in one measure of freedom and low in the other. For instance, Democratic Socialist states provide relatively unrestrained

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[2] Institutions refer to the roles of social, political, and economic organizations in shaping economic events.

[3] For discussions of the wide array of variables that have been included in the work of previous authors, see Gould and Ruffin (1993) and Levine and Renelt (1992).

political freedom but circumscribe economic freedom. On the other hand, states such as Singapore and post-Allende Chile are noted for high levels of economic freedom mixed with more constraints on political freedom.

Model Specification

The empirical analysis in this paper builds on the Mankiw, et al (1992) augmented Solow growth model by extending the list of explanatory variables to include institutional measures of economic freedoms, political rights, and civil liberties. The fundamental model is stated as:

(1) $$Y_t = A_t K_t^{\alpha} H_t^{\beta} L_t^{(1-\alpha-\beta)}$$

where Y_t is output, K_t is the stock of physical capital, H_t is the stock of human capital, L_t is labor and A_t is the level of labor augmenting technology that reflects the current level of technology and its impact on efficiency in time period t. The parameters α and β represent, respectively, the output elasticity of physical and human capital investment where it is assumed that $0 < \alpha, \beta < 1$ and $\alpha + \beta < 1$, which implies declining marginal products and constant returns to scale. It is further assumed that A_t and L_t grow exogenously at rates g and n, respectively, shown as:

(2) $$A_t = A_0 e^{gt} E_{t-1}^{\theta_E} P_{t-1}^{\theta_P} C_{t-1}^{\theta_C}$$

(3) $$L_t = L_0 e^{nt}$$

The level of labor augmenting technology is expanded in equation (2) by specifying that A_t is also dependent upon a country's institutional structure; specifically measures of economic freedom

(*E*), political rights (*P*), and civil liberties (*C*).[4] Defining output, physical capital, and human capital per effective unit of labor as $y = Y/AL$, $k = K/AL$, and $h = H/AL$, respectively, and assuming that all capital depreciates at a constant rate δ, the following equation can be derived for estimation:[5]

$$(4) \quad lny_t - lny_{t-1} = lnA_0 + \pi_1 lns_{(k)t} + \pi_2 lns_{(h)t} + \pi_3 ln(n + g + \delta)_t + \pi_4 lny_0 + \pi_5 lnE_{t-1} + \pi_6 lnP_{t-1} + \pi_7 lnC_{t-1} + e_t$$

where;

$$\pi_1 = (1 - e^{-\lambda\tau})(\alpha/(1 - \alpha - \beta))$$

$$\pi_2 = (1 - e^{-\lambda\tau})(\beta/(1 - \alpha - \beta))$$

$$\pi_3 = (1 - e^{-\lambda\tau})((\alpha + \beta)/(1 - \alpha - \beta))$$

$$\pi_4 = (1 - e^{-\lambda\tau})$$

$$\pi_5 = (1 - e^{-\lambda\tau})\theta_E$$

$$\pi_6 = (1 - e^{-\lambda\tau})\theta_P$$

$$\pi_7 = (1 - e^{-\lambda\tau})\theta_C$$

This equation is commonly referred to as the conditional convergence model where the speed of convergence is defined as $\lambda = (n + g + \delta)(1 - \alpha - \beta)$. The dependent variable $(lny_t - lny_{t-1})$ represents the growth rate of income per laborer and the intercept term (lnA_0) includes the impact on total factor productivity of all factors not explicitly accounted for in the equation, such as

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[4] The superscripted τ in the equations represents the measurement of time (in years) from one observation to the next. For example, if annual data is used τ=1, if subsequent observations range over a five year period τ=5, etc.

[5] For a more detailed description of the derivation, see Mankiw et al (1992) and Wu and Davis (1999).

resource endowments, cultural characteristics, climate, etc. The terms $s_{(k)}$ and $s_{(h)}$ represent the fraction of income invested in physical and human capital, respectively. In the fourth term, g and δ, are assumed to be constant across countries and exogenously determined, which implies that the only variable factor in this term is the growth rate of labor (n). The fifth term represents the initial level of per laborer income (lny_0) that captures the convergence implied in the equation. Countries that begin with higher per capita incomes should grow more slowly over time due to the presence of diminishing marginal returns. The last three terms, lnE_{t-1}, lnP_{t-1}, and lnC_{t-1}, capture the impact on growth of the institutions of economic freedom, political freedom, and civil liberty, respectively. These measures enter the equation as instrumental variables; specifically as lagged observations of the institutional variables. Lagging the freedom measures is justified on two fronts. The first is that economic performance responds to changes that have occurred in institutions only after the participants in the economy have had time to digest and react to the changes. The second argument for lagging the institutional measures is to control for the possibility of reverse causation. It has been shown that previous changes in economic growth are significantly related with subsequent changes in economic freedom (Farr et al, 1998). The exact lag structure is an empirical question that must be addressed, however, for this study it is be assumed that a one period lag is sufficient.[6] Finally, the π_i represent parameters to be estimated that includes the restriction that $\pi_1 + \pi_2 = -\pi_3$.

A priori, it might seem reasonable to expect that each of the freedom measures should have a positive impact on growth. There is a widely held perception that "freedom," defined broadly, and

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[6] In the discussion of the data below, it will be seen that the regression variables are averaged over five-year periods. Therefore, a one period lag implies that it takes five-years for changes in these measures of freedom to impact growth.

economic well-being are intertwined. Clearly, the circumstantial evidence suggests that most of the advanced economies in the world today are relatively free. There is now a large body of empirical evidence demonstrating the positive impact of institutional freedoms on economic growth. On the other hand, evidence concerning the impact of the political freedoms on economic growth has been mixed (see Dawson, 1998; Farr et. al., 1998; Przeworski and Limongi, 1993; and Wu and Davis 1999). In particular, the short-term relationship between democracy and growth is controversial (see Wade, 1990; and Olson 1993).

Data

Data to measure income per effective unit of labor (y), the fraction of income invested in physical capital ($s_{(k)}$) and human capital ($s_{(h)}$), and the rate of growth of labor (n) are taken from *The World Development Indicators 1999 CD-ROM*. Income per effective unit of labor (y) is measured as GDP at market prices in constant 1995 US dollars divided by the labor force. Investment in physical capital ($s_{(k)}$) is measured by gross domestic fixed investment as a percentage of GDP and investment in human capital ($s_{(h)}$) is proxied as the ratio of total secondary school enrollment to the population of the age group that officially corresponds to this level of education. The growth rate of labor (n) is proxied using data that measures the percentage changes in the total labor force.

The economic freedom measures are the most recently published that are available in the *Economic Freedom of the World 2000 Annual Report* by Gwartney and Lawson (2000). Further, these estimates arguably provide the most comprehensive measurement of economic freedoms to date. This version includes economic freedom measures (E) for 123 countries for five-year non-

overlapping periods dating back to 1970. The measure for each period is a continuous variable with a maximum value of ten, which represents the greatest economic freedom, to a minimum of zero. The composite index is a weighted average of 23 measures of economic freedom. These measures fall into seven sub-categories: (1) size of the government, (2) use of market institutions, (3) price stability, (4) freedom to hold foreign currency, (5) freedom to trade with foreigners, and (7) freedom to exchange in capital markets.

The measures of political rights (*P*) and civil liberties (*C*) are taken from the *Freedom in the World* annual surveys published by the Freedom House. Political rights measure the extent to which citizens are able to meaningfully participate in the political process. Civil liberties measure activities such as the right of citizens to speak freely, the ability to engage in personal activities of ones choosing and the ability to travel freely. Each is measured on an ordinal seven-point scale, with one representing the highest level of freedom and seven representing the lowest. However, to maintain consistency with the other data used in the study, these measures are inverted so that one represents the lowest level and seven represents the highest.

Panel data containing time-series observations for a large number of countries are used in this study. A panel data approach has many advantages that can be attributed to combining the information of both time-series and cross-sectional observations. However, there are also potential dangers, noted by Harbarger (1987), concerning whether it is appropriate to include so many disparate nations in a single regression.

Due to the five-year aggregation employed in the composite measure of economic freedom and to help eliminate the "noise" that is common in annual data, all other variables used in the study are also averaged over five-year periods to maintain conformity. Each variable included in

the model has four time-series observations for each country. All variables, except the freedom measures, are calculated by averaging annual data observations over the four five-year, non-overlapping periods; 1976-1980, 1981-1985, 1986-1990, and 1991-1995. For the freedom measures, which are lagged one period, the observations for each country are gathered for periods; 1971-1975, 1976-1980, 1981-1985, and 1986-1990.[7] Only nations with complete data for each of the four five-year periods were employed in the study. This results in a data set containing 284 observations from a total of 71 countries.[8]

Estimation Procedure Using Switching Regressions

Rewriting equation (4) to incorporate the cross-country and time series components yields:

$$(5)\quad lny_{i,t} - lny_{i,t-1} = lnA_{i,0} + \pi_1 lns_{(k)i,t} + \pi_2 lns_{(h)i,t} + \pi_3 ln(n + g + \delta)_{i,t} + \pi_4 lny_{i,0} + \pi_5 lnE_{i,t-1} + \pi_6 lnP_{i,t-1} + \pi_7 lnC_{i,t-1} + \sum_{i=1}^{n} \phi_i D_i + \xi_i + \epsilon_t + \mu_{i,t}$$

(for country i= 1,2,...,N; and time period t= 1,2,...,T)

where ξ_i and ϵ_t represent the country- and time-specific effects, respectively. Country dummy variables (D_i) are added to account for the country specific effects, thereby controlling for differences in base levels of total factor productivity due to factors not explicitly included in the specified equation. Since the number of "time-series" observations are small relative to the

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[7] The measures of political rights and civil liberties begin in 1973 thus limiting the number of observations averaged during the first five year period to three.

[8] These nations are listed in the Table 5.

number of countries and because the time dimension data are averaged over five-year periods, it is assumed that the time-specific effects are insignificant and are hence ignored (Greene, 1997). It is assumed that the error term, $\mu_{i,t}$, has the usual properties, and therefore, OLS is used to estimate the equation parameters.

To test if the institutional freedoms significantly impact economic growth, equation (5) is estimated in both a restricted and unrestricted form. The restricted equation excludes the freedom measures while the unrestricted form is as defined in equation (5). After the two models are estimated it is possible to determine if, and how, the three lagged institutional freedom measures contribute to economic growth. This is done by first testing if the explanatory power of the unrestricted equation is significantly greater than restricted equation using a Wald-test. The results of this test, together with the estimates of the parameters (π's) from the two equations, make it possible to draw inferences about the channels through which the freedom measures impact economic growth. According to Dawson (1998), if institutional freedoms lead to economic growth primarily by altering physical and human capital investment, the inclusion of the freedom variables will add no additional explanatory power to the unrestricted equation but will alter the coefficients of these variables in the restricted equation. If the impact of the freedom variables is on total factor productivity, then their inclusion in the unrestricted equation will add significantly to the explanation of cross-country growth rates but not impact the magnitudes of the restricted equation π's. If the institutional measures of freedom affect both, then their parameter estimates will be statistically significant and their addition will alter the coefficients of the restricted augmented Solow growth model investment variables.

Several previous studies have found that the impact of the various types of freedom on economic growth vary with a nation's stage of development. For instance, Farr, et. al. (1998) detected differences between industrial and non-industrial countries[9] while Wu and Davis (1999) found variation between OECD and non-OECD states. In this study the restricted and unrestricted versions of equation (5) are estimated using a switching regression formulation that incorporates an unknown sample selection criterion based on income per laborer to allow for significant differences between developed and undeveloped economies (see Goldfeld and Quandt, 1976: chapter 2 for methodological details).

Because the data used in the estimation of the equations incorporate a time dimension, it is possible for countries to progress from one definition of development to another (Hotchkiss et al, 1994) This allows for structural change in the equations to be driven by levels of economic development rather than by country specific information. In this context the structural break in the growth model is assumed to depend on income where y^*, income per laborer, is defined as the income level where the structural separation occurs. The equations to be estimated for the two sub-samples are illustrated as:

$$lny_{i,t} - lny_{i,t-1} = lnA_{i,0} + \pi_1 lns_{(k)i,t} + \pi_2 lns_{(h)i,t} + \pi_3 ln(n + g + \delta)_{i,t} + \pi_4 lny_{i,0} +$$

$$\pi_5 lnE_{i,t-1} + \pi_6 lnP_{i,t-1} + \pi_7 lnC_{i,t-1} + \sum_{i-1}^{n} \phi_i D_i + \xi_i + \epsilon_t + \mu_{i,t}$$

when $y > y^*$, and

[9] The definitions of industrial and non-industrial states were taken from the *Economic Freedom of the World 1997 Annual Report* by Gwartney and Lawson (1997).

$$lny_{i,t} - lny_{i,t-1} = lnA^{*}_{i,0} + \pi^{*}_{1} lns_{(k)i,t} + \pi^{*}_{2} lns_{(h)i,t} + \pi^{*}_{3} ln(n + g + \delta)_{i,t} + \pi^{*}_{4} lny_{i,0} +$$

$$\pi^{*}_{5} lnE_{i,t-1} + \pi^{*}_{6} lnP_{i,t-1} + \pi^{*}_{7} lnC_{i,t-1} + \sum_{i=1}^{\infty} \phi^{*}_{i} D_{i} + \xi_{i} + \epsilon_{t} + \mu_{i,t}$$

when $y \leq y^{*}$.

To locate the structural break, y^{*}, the procedure begins by sorting the data according to y and then defining discrete values of y to divide the data set into lower and upper income groups.[10] At each level of y the log-likelihood function value is calculated for the estimated equations to determine where the data indicate the split to occur in the parameter estimates. The split occurs where the log-likelihood function is maximized. A log-likelihood ratio test is then performed to determine if the "optimal" separately estimated equations do a better job of describing the hypothesized relationship than a single equation using the entire data set.

Results

The parameter estimates of equation (5), along with other diagnostic statistics, are shown in Table (1).[11] The dummy variable parameter estimates are not shown in order to focus attention on the impact of the Solow variables and the various economic freedom measures.[12] The results, reveal a great deal of useful information. First, and perhaps most important, the evidence suggests

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[10] The discrete values chosen for y (RGDP per member of the labor force in constant 1995 $US) and used to split the data were 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000,10000,12500, 15000, 17500, 20000, 22500, 25000, 27500, 30000, 32500, and 35000.

[11] The Wald test results near the bottom of the Table confirm that the restrictions placed on the parameter estimates were not rejected for any of the estimated equations.

[12] These estimates are available from the authors upon request.

caution is in order when estimating the growth equations using data composed of observations gathered from economies over a wide range of development. There are significant differences in the impacts of the freedoms on growth that depend on the degree of economic development. Further, for each equation estimated, the implied α's, β's, and λ's suggest some differences in how the augmented Solow variables effect growth.

The switching regression procedure indicates that the structural break for both the restricted and unrestricted versions of equation (5) occurs at $12,500 income per laborer. The break point was determined by choosing the maximum value from all the log-likelihood functions that were calculated at each of the chosen discrete income levels. In addition, a log-likelihood ratio test shows that the log-likelihood function for the "optimal" growth equations estimated separately for the two groups is significantly greater than a single growth equation estimated using the entire data set.

In both the restricted and unrestricted versions of equation (5), the implied α's, β's and λ's estimated for both the higher and lower income countries (shown in columns 3 through 6) are generally consistent with theoretical expectations. The results obtained using the data sets defined by the switching regressions are arguably better than the ones obtained using the full data set (columns 1 and 2). The estimated α's fall within the range of likely outcomes for all the equations estimated, however, the return to human capital investment (β) obtained using the full sample is well below what is expected for developed nations. However, the estimated β's obtained using data for nations with incomes above $12,500 per laborer are consistent with expected returns to labor investment, while the estimates for countries with incomes below $12,500 suggest a low and statistically insignificant return to labor investment. Such results are

not uncommon in empirical studies and are often attributed to the imperfection of the proxy for investment in human capital, especially in the developing world. But it also likely to be indicative of the fact that during the early stages of economic development, a critical level of investment in physical capital is necessary before the returns to human capital achieve levels that merit the time and cost associated with labor investment. In the early stages of development, a country's labor force consists mainly of lower skilled workers that are associated with low rates of return to human capital. Only with time and further economic development will greater investments be made in a nation's labor supply.

The λ's suggest that more developed economies move to their steady states at a slower pace than do developing countries. The estimated results show that the high income nations move half-way to their steady state in approximately 26 years while lower income countries achieve the same results in 8 to 10 years. These findings are consistent with the expectation that as economic development progresses the marginal returns to investment decline resulting in slower growth.

The other results in Table (1) provide additional evidence of differences across stages of development. For the more developed countries, there is no evidence that the freedom measures are a driving force behind greater economic growth. This is seen in the failure to reject the null hypothesis for the Wald test for the added freedom measures, and in the lack of statistical significance of π_5, π_6, and π_7. There is also scant evidence of a change in the estimates of π_1 and π_2 in the unrestricted equation for the wealthier nations, suggesting that the freedom measures have little, if any, direct effect on investment decisions. This finding is not surprising since the

more advanced economies have had relatively minor variability in the freedom measures over the years studied.[13]

For the less developed economies (per laborer income below $12,500), when the three freedom measures are added to the restricted equation (column 6), R^2 rises from 82% to 86%. The Wald-test indicates this is a significant increase in explanatory power, suggesting the freedom measures impact economic growth through enhancements to total factor productivity. Further, the parameter estimate for economic freedom, $\pi_{5,}$ is positive and statistically significant and the estimate for political rights, π_6, is negative and significant while the civil rights parameter estimate, π_7, is not statistically significant. The significant freedom parameter estimates imply that $\hat{\theta}_E = .53$ and $\hat{\theta}_p = -.13$ suggesting that a one percent increase in economic freedom will offset the negative effects of a four percent enhancement in political freedoms in developing economies. Finally, the parameter estimate π_1 diminishes by 26% upon the addition of the freedom measures implying that freedom also impacts growth through an effect on the level of investment in physical capital. Finally, as mentioned earlier, the variable included to capture human capital is statistically insignificant for less developed economies.

[13] Comparing the means for the logarithms of the freedom measures between Tables (3) and (4) reveals that the levels of all three freedoms are higher for the wealthier countries, comparison of the standard deviations suggest that the level of the freedoms are much more variable in the lower income countries.

Summary

There is a growing body of literature on the international relationship between economic and political freedoms and economic growth. One interesting feature of the empirical research in this area is the apparent difference of the impact of freedoms on growth between high and low income countries. Such differences appear in earlier works by Durham (1999), Farr et al, (1998), and Wu and Davis (1999). However, all of these previous efforts have used arbitrary definitions of rich and poor countries. The primary aim of this study is to use a switching regression technique to objectively determine where the structural break between rich and poor nations occurs so that the impact of freedoms on growth at different stages of development can more clearly be understood.

In this work, the three institutional measures of freedom are added to the augmented Solow growth model to explore the impact of freedoms on economic growth. The three quantitative measures of freedom employed are (1) economic freedom, taken from the *Economic Freedom of the World 2000 Annual Report* by Gwartney and Lawson (2000), (2) political rights and (3) civil liberties, both collected from annual issues of the *Freedom in the World* reports published by the Freedom House. After, eliminating nations with incomplete or distorted observations, the analyses are performed on a set of panel data comprising 71 countries with four, five-year non-overlapping period observations gathered from 1976 through 1995.

For each sample it is possible to determine whether, and through what mechanism, these three measures of freedom affect economic performance by determining if adding the three freedom measures, lagged one five-year period, to the restricted augmented Solow growth model increases explanatory power. If the freedom measures do significantly affect growth, after controlling for the other factors in the augmented Solow growth model, this indicates that the institutional freedoms impact growth through national total factor productivity. In addition, if inclusion of the freedom measures to the model results in a significant decrease in the impact of investment in

either physical or human capital, this can be interpreted as evidence that freedoms also have an impact on growth through and effect on investment.

The results of the switching regime procedure indicate that the optimal break-point in the sample occurs at an annual GDP/ laborer of $12,500. The Log Likelihood Ratio Test suggest that nations with GDP/ aborer higher than this level behaved marked differently than countries below this income level.

The results for the wealthier states suggest that adding the freedom measures does not appear to improve the estimation of the augmented Solow growth model. There is no evidence that freedom impacts growth through total factor productivity or through either investment in physical or human capital. The output elasticity estimates for investment in both human and physical capital are theoretically plausible and the time frame towards convergence to steady state is shown to be of a reasonable approximation. Collectively, these results seem to imply that for the wealthy nations, with GDP/ Laborer > $12,500, the augmented Solow growth model is more accurately specified without inclusion of measures for institutional freedoms.

For the poorer nations, on the other hand, the level of the freedoms available to the citizens seems to have a discernable impact on growth. Freedom appears to impact growth through total factor productivity, and there is also evidence of an impact through an effect on investment in physical capital. However, these results provide no indication that investment in human capital has a significant effect on growth. For these less developed states, economic freedom is positively correlated with economic development, and one of the more interesting findings in the study is a negative relationship between political rights, or democratic institutions, and growth. Such negative results have been observed in previous empirical studies (Farr et al, 1998) and there are theoretical arguments that, at least in the short-run, democratic institutions might slightly hinder economic advancement (see Wade, 1990 for further details). However, in the world today it is

clear that most of the wealthy nations are democracies and theoreticians, such as Olson (1993), have offered reasons for democracies to be more successful in the long-run. Clearly, this subject is still quite controversial and provides fertile groundwork for empirical analyses on the interplay between the short-term and long-term impacts of political freedom on economic growth.

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Table 1: Augmented Solow Growth Model with Institutional Measures
{dependent variable = $\ln(y_{i,t}) - \ln(y_{i,t-1})$}

Variable	All Countries (n=284)		Higher Income Countries (per worker income > $12,500) (n=110)		Lower Income Countries (per worker income <= $12,500) (n=174)	
	restricted	unrestricted	restricted	unrestricted	restricted	unrestricted
$\ln(s_k)$ (π_1)	0.237* (.028)	0.195* (.026)	0.291* (.049)	0.272* (.055)	0.259* (.031)	0.192* (.031)
$\ln(s_h)$ (π_2)	0.056** (.027)	0.036 (.027)	0.236* (.036)	0.224* (.042)	0.031 (.032)	0.025 (.029)
$\ln(n + .05)$ (π_3)	-0.293* (.045)	-0.231* (.043)	-0.526* (.068)	-0.497* (.075)	-0.289* (.050)	-0.218* (.047)
$\ln(y_0)$ (π_4)	-0.248* (.036)	-0.303* (.035)	-0.126* (.023)	-0.124* (.028)	-0.303* (.044)	-0.358* (.042)
$\ln(E_{t-1})$ (π_5)		0.190* (.033)		-0.019 (.068)		0.191* (.038)
$\ln(P_{t-1})$ (π_6)		-0.38** (.019)		0.079 (.056)		-0.047** (.020)
$\ln(C_{t-1})$ (π_7)		0.061** (.028)		-0.058 (.074)		0.043 (.029)
Implied λ	.057	.072	.027	.027	.072	.089
Implied α	.438	.365	.446	.439	.437	.334
Implied β	.103	.067	.361	.361	.052	.043
R^2	.766	.805	.746	.754	.820	.858
Wald test of Restriction ($\pi_1 + \pi_2 = -\pi_3$)	3.415	3.098	1.225	0.612	1.449	1.462
Wald test for added variables		13.678*		0.739		10.777*
Log(L)	379.36	404.54	416.51	437.40	416.51	437.40

Standard errors are shown in parentheses

* Significant at the 1% level

** Significant at the 5% level

Table 2: ***All Countries: Data Correlation Matrix***[1]

	y_t-y_{t-1}	y_0	s_k	s_h	n	E	P	C
y_t-y_{t-1}	1.00	.08	.55	.12	-.15	.24	.10	.09
y_0		*1.00*	*.32*	*.84*	*-.55*	*.65*	*.70*	*.71*
s_k			1.00	.31	-.01	.30	.27	.21
s_h				1.00	-.47	.49	.71	.69
n					1.00	-.40	-.39	-.43
E						1.00	.44	.49
P							1.00	.87
C								1.00
Mean	0.06	8.85	3.02	3.88	0.17	1.69	1.45	1.48
Std. Dev.	0.13	1.55	0.28	0.75	0.06	0.30	0.59	0.47
Min.	-0.26	5.66	1.74	0.96	0.03	0.69	0.00	0.00
Max.	0.65	11.34	3.82	4.90	0.32	2.24	1.95	1.95

[1] All variables are measured in natural logs. (N=284)

Table 3: ***Higher Income Countries: Data Correlation Matrix***[1]
(per laborer income > $12,500)

	y_t-y_{t-1}	y_0	s_k	s_h	n	E	P	C
y_t-y_{t-1}	1.00	-.18	.53	-.06	-.07	.03	-.18	-.36
y_0		*1.00*	*-.25*	*.46*	*-.27*	*.59*	*.39*	*.48*
s_k			1.00	-.49	.40	-.15	-.44	-.51
s_h				1.00	-.46	.41	.45	.45
n					1.00	-.15	-.39	-.34
E						1.00	.26	.27
P							1.00	.87
C								1.00
Mean	0.08	10.44	3.11	4.47	0.12	1.90	1.86	1.83
Std. Dev.	0.09	0.47	0.21	0.21	0.05	0.21	0.21	0.23
Min.	-0.09	9.22	2.57	3.55	0.03	1.16	0.69	0.92
Max.	0.42	11.34	3.82	4.90	0.32	2.24	1.95	1.95

[1] All variables are measured in natural logs. (N=110)

Table 4: ***Lower Income Countries: Data Correlation Matrix***[1]
(per laborer income <= $12,500)

	y_t-y_{t-1}	y_0	s_k	s_h	n	E	P	C
y_t-y_{t-1}	1.00	-.004	.54	.07	-.12	.25	.07	.10
y_0		*1.00*	*.30*	*.76*	*.12*	*.39*	*.54*	*.48*
s_k			1.00	.29	.18	.33	.26	.21
s_h				1.00	.02	.20	.56	.51
n					1.00	.03	.10	.10
E						1.00	.18	.23
P							1.00	.81
C								1.00
Mean	0.05	7.85	2.97	3.50	0.20	1.55	1.19	1.26
Std. Dev.	0.15	1.09	0.31	0.73	0.03	0.27	0.61	0.45
Min.	-0.26	5.66	1.74	0.96	0.07	0.69	0.00	0.00
Max.	0.65	9.47	3.69	4.46	0.27	2.09	1.95	1.95

[1] All variables are measured in natural logs. (N=174)

Table 5: List of Included Countries

1.	Argentina	$20,095[1]	37.	Madagascar	$ 599
2.	Australia	35,503	38.	Malawi	312
3.	Austria	53,484	39.	Malaysia	7,286
4.	Bangladesh	537	40.	Mali	497
5.	Barbados	13,188	41.	Malta	16,243
6.	Belgium	57,923	42.	Mauritius	6,384
7.	Benin	761	43.	Mexico	9,097
8.	Botswana	5,061	44.	Morocco	3,210
9.	Brazil	9,709	45.	Netherlands	50,832
10.	Burundi	348	46.	New Zealand	33,232
11.	Canada	34,494	47.	Nicaragua	1,772
12.	Chile	7,383	48.	Niger	536
13.	Colombia	4,639	49.	Nigeria	648
14.	Costa Rica	6,559	50.	Norway	54,431
15.	Denmark	53,728	51.	Pakistan	1,094
16.	Dominican Republic	3,523	52.	Panama	7,436
17.	Ecuador	4,411	53.	Peru	7,653
18.	Egypt	2,375	54.	Philippines	2,688
19.	Fiji	6,736	55.	Portugal	17,169
20.	Finland	43,207	56.	Singapore	35,076
21.	France	52,594	57.	South Korea	12,917
22.	Ghana	769	58.	South Africa	9,766
23.	Greece	24,338	59.	Spain	29,990
24.	Guatemala	4,153	60.	Sweden	45,840
25.	Honduras	2,066	61.	Switzerland	81,517
26.	Iceland	44,919	62.	Syria	3,631
27.	India	611	63.	Thailand	2,894
28.	Indonesia	1,554	64.	Trinidad & Tobago	11,024
29.	Iran	5,208	65.	Tunisia	4,961
30.	Ireland	31,708	66.	Turkey	5,331
31.	Israel	32,337	67.	United States	47,569
32.	Italy	38,453	68.	United Kingdom	32,795
33.	Jamaica	3,295	69.	Uruguay	11,561
34.	Japan	64,449	70.	Venezuela	10,475
35.	Kenya	693	71.	Zambia	1,204
36.	Luxemburg	69,928			

[1] Average annual per laborer income over the period 1976 through 1995.