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Governance as a Determinant of Total Factor Productivity

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Abstract

This paper analyzes the impact of governance quality in conjunction with capital and labor as a part of total factor productivity on a country's economic output level. As an extension of the existing literature, which predominantly examines elements of a specific country's government performance on its income level, this study works with two groups of countries of differing average government quality – G-20 and Sub-Saharan African countries – to examine the significance of governance quality as a part of total factor productivity. Using OLS regression with fixed effects, the GDP, capital, labor, and governance measures for 43 countries over the course of 12 years, from 1996 to 2010, were observed and analyzed. The study was able to find significant results supporting the hypothesis that better government quality has a statistically significant impact on output, indicating that governance plays a role in total factor productivity.

Introduction

The production function is an economic equation that expresses an economy's output as a function of its inputs of production. The traditional Cobb-Douglas form is written as

$$\mathbf{Y = A * K^{\alpha} * L^{\beta}}$$

This can be verbally translated to: output (Y) is a function of total factor productivity (A), capital (K), and labor (L). Capital and labor are raised to alpha and beta, respectively, to represent each of those inputs' shares of output. While capital and labor are the traditional inputs widely known to account for much of an economy's output, there is a piece left unexplained, and that will be the focus of this study.

Total factor productivity or TFP is a variable that accounts for effects in output not explained by the traditional inputs of capital and labor. It can be composed of a variety of factors, from technology to weather to human capital. This means that increased efficiency from technological advancement, a good crop season from favorable weather conditions, and better performance from a more educated workforce can all be examples of the positive effect of TFP on output.

There are a multitude of factors that could be included in TFP given differing circumstances. Since all economies are associated with governments of some sort, the relation between government structure and economic success has been explored in multiple studies, and a positive linkage has been found. Incorporating government with the production function, governance quality can be explored as a potential part of TFP. Therefore, this study attempts to show through empirical tests that governmental quality, along with the traditional inputs of capital and labor, has a significant positive effect on

output, constituting governance as a significant part of TFP.

Literature Review

Multiple studies have been conducted that suggest a linkage between governance and economic growth, whether the effects are direct or indirect. Feng (1997) explores the interactions between democracy, political stability, and growth. Using data from 1960-1980 for 96 countries, he tests for interdependence between any of the aforementioned variables. His tests reveal that democracy has a significant, indirect effect on economic growth, specifically through the reduced likelihood of regime change that generally comes along with a democratic government. In other words, Feng's study suggests that the political stability associated with democracy is the channel through which democracy positively influences economic growth.

Similarly, De (2010) explores another channel through which governance may influence output: infrastructure development. Specifying the terminology he uses, De defines governance as "the outcome of institutions, whether good or bad." He hypothesizes that good governance, as a result of its implementing institutions, encourages productive infrastructural work. Therefore, countries with institutions that receive high scores in the World Bank's Worldwide Governance Indicators (WGI) database should correspond with high rankings in the Physical Infrastructure Index, the two sources used to measure the independent variables in this study. De (2010) finds that institutions and governance quality are highly significant, positive determinants of infrastructural quality. In fact, a one point increase in governance can lead to as much as a one and a half point increase in level of infrastructure. Although this study does not bring total factor productivity into the discussion, its findings imply that there should be an indirect effect on GDP through the

capital differences (or infrastructure by De's measure) in countries with good governance versus those with bad governance.

Rodrik et. al. (2004) draws upon the theoretical logic of Adam Smith to test the effects of institutional quality on income level. In his Wealth of Nations, Smith says, "Commerce and manufactures…can seldom flourish in any state in which there is not a certain degree of confidence in the justice of government." Rodrik et. al. uses Smith's theory to create an empirical model to test three characteristics of a nation – institutions, geography, and trade. Acknowledging that human and physical capital are the traditional inputs used for analyzing growth, as well as technological change as a large part of traditional total factor productivity, Rodrik et. al. proclaims that there are "deeper determinants" of growth that actually cause the discrepancy between nations in their levels of accumulation and technology. Their measure of income is the log of per capita GDP, and the "institutions" variable is measured using the Rule of Law governance indicator established in the WGI Project.

Using OLS regression, they arrive at the conclusion that the significance of institutional quality far surpasses that of either of the two other variables, geography and trade. In fact, trade returned negative, though insignificant, coefficients throughout the regressions, while geography typically was positive but insignificant. The only significance of either other independent variable was an indirect effect of geography on institutional quality, suggesting a need to control for autocorrelation when involving multiple explanatory variables. Overall, this study shows that institutional quality has a highly significant effect on a country's income. This important conclusion begs the question, which other national economic accounts does this causal variable affect besides income?

The results of Rodrik et. al.'s experiments pave the way for further research to be done investigating the specific effects of institutional quality on income.

Cuzman et. al. (2010) conducts an analysis of the effects of governance quality on income, again utilizing the WGI to constitute governance quality. Their surveillance of existing literature acknowledges that separate aspects of government quality, while often related in a general sense, may have different effects on income when analyzed across a large group of data. They therefore choose separate regression equations for each of the six indicator variables on income. Using Generalized Method of Moments (GMM) estimation, their results show all six variables to have significant positive effects on the dependent variable, indicating an important impact of government quality on income across countries worldwide.

If the findings of Cuzman et. al. (2010) are indeed valid, though they use income as a dependent variable and do not draw productivity into the equation, it seems to follow that, when tested in conjunction with capital and labor, the same governance indicators should qualify as part of TFP determinants. This study is most similar to that of my own, although my study will elaborate on this hypothesis by including the six indicators in the same equation as capital and labor, and will consider an average of the six as an overall measure of government quality.

Finally, on the topic of total factor productivity, Chaudhry (2009) points out the difficulties that lie in measuring TFP growth due to uncontrollable factors that may reduce accuracy in the measurement process. He provides examples of potential errors in the measurement of capital, labor and output growth that necessarily cause erroneous reporting of growth in the residual, productivity. For instance, a country's capital stock will

increase even upon construction of an ineffective piece of infrastructure, such as a road, that does not increase output. Since GDP then does not increase but the capital stock does, calculations would reveal a decline in TFP. Along the same lines, if the average number of labor-hours worked increases, the increase in GDP would be attributed to TFP, while there actually was no real increase in productivity. Chaudhry (2009) concludes that, while the measurement of a single country's productivity may be distorted in a given year due to such errors, a general trend across countries or years in productivity changes is likely not to be significantly affected by them.

Following these principles, and because having more data points can improve the accuracy and truthfulness of an econometric test, my study measuring total factor productivity should benefit most from a large set of panel data incorporating both time-series and cross-sections. Additionally, to avoid potential effects on productivity from exogenous factors that may plague a particularly large region, such as climate, countries will be selected from dynamic settings around the world. Such a varied dataset will reduce the impact of measurement error in the economy of a given country or even region, as inspired by the insights of Chaudhry (2009).

Methodology

The analysis in this study attempts to empirically attribute part of the gap between GDP and capital and labor, or total factor productivity, to any or all of the six indicators of government quality evaluated by the World Bank's Worldwide Governance Indicators (WGI) Project. While there may be various sources that assign governmental ratings, the WGI database will be the only basis for government quality used in this experiment. Given the complexity of quantifying a qualitative analysis, WGI is the most comprehensive and

detailed evaluation available. Using some of the foundational concepts established in the literature reviewed above, this paper aims to solidify through regression analysis the contribution of government quality to a country's total factor productivity.

Data:

The data consist of 5,160 individual observations of economic performance and government quality across 43 countries for 12 years. The countries were chosen in two groups presumed to have significantly different average values of governance quality – nineteen countries of the G-20 members and twenty-four countries in Sub-Saharan Africa. As a proxy for quality, the average of the six governance indicators across all G-20 countries is 62.9, while it is 31.03 for Sub-Saharan African countries, representing a twofold difference in governance quality between the two groups. G-20 is a group composed of some of the world's strongest economies whose finance ministers and central bank leaders represent each nation at biannual summits. This study uses nineteen of the members and excludes the twentieth, which is the European Union, to avoid overlap in the EU countries' data. Tables 1 and 2 in the Appendix include a full list of the G-20 and Sub-Saharan African countries examined in this study.

The World Bank, an international organization that provides finances to developing countries with the ultimate goal of poverty reduction, conducts research on countries worldwide and thereby has extensive, useful databases on a multitude of economic factors. The measures of GDP, Capital and Labor in this study utilize statistics from the World Bank website. GDP for each country and year is measured in current U.S. dollars to account for changes over time such as inflation, as well as to simplify the process of comparing numbers from one country to another by avoiding exchange rates. The Capital variable,

also measured in current U.S. dollars, is the value of capital used up in the production process for a given country in a given year. Finally, Labor represents the total labor force, consisting of employed and unemployed workers ages 15 and older. Labor is measured in number of people.

As previously mentioned, the data for government quality will be taken from the Worldwide Governance Indicators database, a project financed by the World Bank group. However, the WGI website specifically notes that it does not reflect the views of the World Bank or its other sponsors, and that resources are not allocated based on its findings. Based on 30 underlying data sources provided by survey institutes, nongovernmental organizations, private corporations and others, the WGI project utilizes a specific aggregation methodology to generate the most accurate estimates along with standard errors for each governance indicator. For 215 different economies from 1996 through 2011, the database has reported on six aggregate characteristics of government, all of which will be included for the purposes of this study.

The indicators are as follows: Voice and Accountability, which encompasses rights related to political elections and free speech; Political Stability and Absence of Violence, which reflects the likelihood of the existing government to be overthrown, namely with violence and terrorism; Government Effectiveness, which represents the quality of public services and policies, and the commitment of the government to carry them out; Regulatory Quality, which evaluates the government's ability to create and carry out policies that promote development; Rule of Law, which captures the legitimacy of law enforcement systems and likelihood of crime; and Control of Corruption, which measures the level of exploitation of public power for private profit. Each observation falls on a scale

of zero to one-hundred, with low numbers representing poor quality and high numbers meaning good governance.

Lastly, the WGI data is reported for 1996-2011, excluding years 1997, 1999, and 2001. Therefore, and because the World Bank has not yet reported economic data for 2011, this report is complete for 12 years, 9 of which are consecutive: 1996, 1998, 2000, and 2002-2010. The nonconsecutive nature of the beginning years was deemed not as detrimental to the overall analysis as it is beneficial to keep the extra data points and have a longer time-series set. Summary statistics for all data by country group can be found in Tables 3 and 4 in the Appendix.

Model:

Using the data detailed above, an econometric model will be constructed and regressions run with the intent of proving that along with Capital and Labor, the governance indicators make significant positive contributions to GDP. Therefore, GDP will be set as the dependent variable. There will be eight independent variables: six governance indicators, Capital, and Labor. Including coefficients and the error term, the full model will appear as

$$\mathbf{GDP = \beta_0 + \beta_1(Capital) + \beta_2(Labor) + \beta_3(Voice) + \beta_4(PoliStabil) + \beta_5(GovtEffect) + \beta_6(RegQuality) + \beta_7(RuleLaw) + \beta_8(Corcont) + u}$$

Regression analysis will also be performed on a model with only three variables, Capital, Labor, and the average of the six indicators to capture the significance of this aggregate governance value. This second model will appear as

$$\mathbf{GDP = \beta_0 + \beta_1(Capital) + \beta_2(Labor) + \beta_3(Average) + u}$$

Since the basic production function teaches that the inputs of capital and labor are directly related to output, the Capital and Labor variables in this equation are expected to return highly significant results. The coefficients should be positive, as an increase in either variable is expected to raise output in a system as large as a nation's economy, whereas a single factory, for example, may experience decreasing returns once it becomes overcrowded, according to Classical economics.

As for the governance indicators, an analysis of literature on the subject makes it appear that better governance quality results in higher output, so the coefficients for the six indicators are expected to be positive as well.

Results

In order to isolate results by economic group, various regressions were run on the G-20 data and Sub-Saharan Africa data separately, and then on the entire set of 43 countries as a whole. Initially, a simple regression was run for each group of countries, using GDP as the dependent variable and Capital, Labor, and the six Worldwide Governance Indicators as independent variables. Likely due to lack of panel estimation, across all groups many of the explanatory variables had a sign contrary to my expectations (other than Capital and Labor, which returned very significant effects in the expected positive direction throughout all regressions). It should be noted that since there are six government indicator variables, the following results will only mention those that were statistically significant at a 10% or lower level – the rest were found to be insignificant and therefore are not discussed.

The G-20 regression returned a highly significant and negative result for Political Stability, while Regulatory Quality was the only other significant, positive variable. The

same regression for the African countries provided similarly mixed results, with Political Stability being significant and this time positive at the 5% level along with Corruption Control at the 10% level, but Government Effectiveness was negative and significant at the 5% level and Rule of Law at the 10% level. Finally, across all countries there again was an assortment of coefficient signs – Political Stability and Government Effectiveness were negative, while Regulatory Quality was positive. Even when separate regressions were run for each government indicator with capital and labor, coefficient directions and significance were mixed and did not support this paper's predictions.

To account for the time series and cross-sectional effects, a set of regressions were run indicating panel data with fixed effects by country and year. Representing the number of countries and years the data sets encompass, the G-20 data has 19 cross sections and a time series length of 12. Fixed one way, results varied greatly by cross-section. Across the 12 years, 11 cross-sections had a positive sign while 7 were negative. Results were mixed: the significant indicators of the G-20 countries were Political Stability and Regulatory Quality (negative) and Rule of Law (positive). When the test was fixed two ways to incorporate the time series, all that changed were the signs of a couple cross-sections, so that 9 were positive and 9 were negative. Significant indicators remained the same as in the fixed one-way estimation.

Since data was collected for 24 Sub-Saharan African countries, this set has 24 cross-sections with the same time series length of 12 years. Neither the fixed one-way nor the two-way tests revealed any statistically significant variables for this group. When all 43 countries were run together in a one-way fixed estimation, two of the variables were significant in opposite directions: Political Stability was negative and Rule of Law was

positive. Incorporating the time series with the two-way fixed regression yielded the same results in terms of significance and coefficient signs. These results are summarized in Table 5 in the Appendix. When the same regression was run using just Capital, Labor, and an Average variable to represent the average of the six governance indicators, Average was not significant and slightly negative. Table 6 summarizes these results.

The first results to support this paper's hypothesis were found with slight manipulation of the original regression's variables. Primarily, the natural log function was applied to the GDP variable so that the resulting coefficients would represent percent changes in GDP for each 1-point change in the corresponding explanatory variable. Additionally, all values for Capital and Labor were transformed into much smaller numbers in the dataset. Capital, which generally was a number in the billions in the original data (millions for some African countries and trillions for Japan in 2008 and USA since 2000), was divided by one billion across all years and countries so that the new values for Capital represented "billions of dollars." Labor, originally a number in the millions for each observation, was divided by one million to provide a new unit of measurement for Labor, "millions of people." After scaling down the independent variables and applying natural log to the dependent variable, the new model appears as

$$\mathbf{ln(GDP) = \beta_0 + \beta_1(Capital/1B) + \beta_2(Labor/1M) + \beta_3(Voice) + \beta_4(PoliStabil) + \beta_5(GovtEffect) + \beta_6(RegQuality) + \beta_7(RuleLaw) + \beta_8(Corcont) + u}$$

The motive for making these transformations was that the regression results would be cleaner and easier to interpret as percentage changes; however, they also changed the values and significance of the actual results.

A fixed one-way regression was run on the new model for all countries, setting the dependent variable lnGDP equal to the new measures of Capital and Labor along with the six indicators. This time, all significant indicators were positive – Capital, Labor, Voice, and Rule of Law all proved highly significant at the 1% level. The other indicators were insignificant and only Government Effectiveness was slightly negative. These results are shown in Table 7.

Given this finding, a regression was run with only three independent variables – Capital, Labor, and "Average," or the average of the six indicators. Supporting the hypothesis of this study, all three explanatory variables proved highly significant, with p-values of less than .0001, and large positive coefficients, as seen in Table 8. This regression revealed that the overall quality of government, determined by averaging together the six individual indicators, has a very strong effect on output. In fact, a one-point increase in the average of a country's indicators leads to a 2.3% increase in GDP, according to the results. That increase is larger than both Capital and Labor's contributions by the same standards: one billion dollars in capital will raise GDP by 0.17%, while one million additional workers will increase GDP by 1.04%.

More revealing results were found when the same regression was run on the Sub-Saharan Africa group and the G-20 group separately. The effect of a one-point increase in average governance quality was greater for the G-20 countries than for the African countries. In the G-20 group, each point on average yielded a 3.45% increase in GDP, whereas for Sub-Saharan Africa the increase was only 0.92%. As for Capital and Labor, there was an extremely significant difference between the effects in G-20 countries and Sub-Saharan African countries. While the effects of both inputs on GDP were highly

significant in both groups of countries, the magnitude of the effects was far greater for the Sub-Saharan African countries than for the G-20. On average, an increase of one billion dollars in Capital resulted in a 5.5% increase in GDP for the SSA countries, compared to a 0.18% increase for the G-20. Similarly, an increase of one million workers in the labor force resulted in a large 22% increase in GDP for SSA, compared to a .73% increase for G-20. These results are summarized in Table 9 in the Appendix.

Conclusion

The original model, in which the dependent variable was GDP, did not yield the expected results of this study, even once panel data estimation was applied in the regressions. However, using the natural log of GDP as the dependent variable did provide significant results that supported the hypothesis of this experiment. This is likely due to the control of heteroskedasticity and resulting improved reliability of test statistics that the natural log function produces. Smoothing out some of the variability in the data was effective in both transformed equations – one with all six governance indicators, and the other with an average of the six. Since the model with the Average variable returned highly significant, positive values for Capital, Labor, and Average, we can conclude that our experiments support the evidence that governance quality is a determinant of total factor productivity in conjunction with capital and labor.

This experiment suggests unique effects in the G-20 and Sub-Saharan Africa groups of countries individually. The magnitude of the effects of capital, labor, and governance is drastically different for each group. Capital and labor follow the same trend, and governance works in the opposite direction. Specifically, in G-20 countries, one additional point of governance quality (by the standards of the Worldwide Governance Indicators

Project) results in a 3.45% increase in GDP. In Sub-Saharan Africa, an additional point for governance results in a 0.92% increase in GDP. This difference suggests that governance has a higher marginal return to output for G-20 countries, where it is already relatively high on average, than for Sub-Saharan African countries, where it is relatively low.

Both capital and labor, on the other hand, have higher marginal returns to output in Sub-Saharan Africa than they do in G-20 countries. One billion additional dollars in capital results in a small 0.18% increase in GDP for G-20, compared to a significant 5.5% increase in GDP for Sub-Saharan Africa. Similarly, one million additional workers in G-20 countries only increase GDP by 0.73%, whereas in Sub-Saharan Africa the effect is an enormous 22% increase in GDP. These results imply that capital and especially labor have much more significant marginal effects than governance does on GDP in low-income countries.

This finding could have important policy implications for the future of developing countries. While quality of governance in a nation is of course desirable for human rights reasons, speaking strictly from an economic standpoint, it appears that improving a country's labor force and capital consumption in production is far more effective than improving governance quality. Governance quality still has a positive impact in these countries, but it is only when governance is already high that additional improvements in governance make marginal larger contributions to GDP. Therefore, G-20 and developed countries can more effectively increase GDP by improving governance quality than by increasing labor or capital.

This study can be improved upon by expanding data collection to include various groups of countries beyond Sub-Saharan Africa and G-20. It would be clarifying to test the marginal return to output of capital and labor versus that of governance in parts of the

world that are not in Africa, and thereby escape a regional bias that this study has when it discusses “developing” countries.

As a study’s results can only be as reliable as the data it uses, there are often data limitations when testing a qualitative argument that may affect the results. In this study, the main limitation is that of governance quality, as even the well-aggregated WGI data provides indicators based on perceptions, not necessarily actuality. However, surveys collecting public and private opinions are an important tool for retrieving data about government quality, so for this type of experiment they must be taken as reliable.

Bibliography

Chaudhry, Azam Amjad. "Total Factor Productivity Growth in Pakistan: An Analysis of the Agricultural and Manufacturing Sectors." *The Lahore Journal of Economics* 14 (2009): 1-16. Print.

Cuzman, Ioan, Bogdan Dima, and Stefana Maria Dima. "New Empirical Evidences on the Linkages between Governance and Growth." *Social Science Research Network* (2010): n. pag.

De, Prabir. 2010. "Governance, Institutions, and Regional Infrastructure in Asia." *ADBI Working Paper 183*. Tokyo: Asian Development Bank Institute.

Feng, Yi. "Democracy, Political Stability and Economic Growth." *British Journal of Political Science* 27.3 (1997): n. pag. Web.

Fleck, Susan, John Glaser, and Shawn Sprague. "The Compensation-Productivity Gap: A Visual Essay." *Monthly Labor Review* (2011): 57-67. Print.

Hespe, Kathryn. *Determinants of Total Factor Productivity: Does Governance Play a Role*? Thesis. The College of New Jersey, 2010. Print.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi. "The Worldwide Governance Indicators: Methodology and Analytical Issues." *Hague Journal on the Rule of Law* 3.02 (2011): 220-46. Print.

Kong, Tao. 2011. "Governance Quality and Economic Growth." Research School of Economics Australian National University Canberra, ACT 2601, Australia.

Rodrik, Dani, Arvind Subramanian, and Francesco Trebbi. "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development." *Journal of Economic Growth* 9.2 (2004): 131-65. Print.

Said, Fatimah, and Saad Mohd. Said. "Total Factor Productivity Growth In Malaysian Manufacturing Sector: Emphasis on Heavy Industries." *IIUM Journal of Economics and Management* 2 (2004): n. pag. Print.

Appendix

Tables 1 and 2 – All Countries Examined

G-20 (19 countries)

Argentina	France	Japan	South Korea
Australia	Germany	Mexico	Turkey
Brazil	India	Russia	United Kingdom
Canada	Indonesia	Saudi Arabia	United States
China	Italy	South Africa	

Sub-Saharan Africa (24 countries)

Benin	Gabon	Mali	Sierra Leone
Burkina Faso	Gambia	Mauritius	Sudan
Cameroon	Ghana	Niger	Tanzania
Central African Republic	Kenya	Nigeria	Togo
Republic of the Congo	Madagascar	Rwanda	Uganda
Cote d'Ivoire	Malawi	Senegal	Zambia

Tables 3 and 4 – Summary Statistics

G-20 Countries

Variable	Mean	Standard Deviation	Skewness	Kurtosis	Observations
GDP	1851270000000	2695720000000	3.10577628	10.1219278	228
Capital	243354000000	357363000000	2.73749256	7.89133534	228
Labor	100597372	182966413	2.79000919	6.81828688	228
Voice	63.2499123	27.8694576	-0.6868317	-0.5178943	228
PoliStabil	48.1578947	25.1673094	0.0655111	-1.2096149	228
GovtEffect	70.3903509	19.6242521	-0.1614813	-1.2479581	228
RegQuality	67.7061404	22.0567262	-0.2864076	-1.0141609	228
RuleLaw	64.1214912	25.5217028	-0.1596729	-1.3617582	228
Corcont	63.9517544	25.5536465	-0.2692286	-1.1088733	228

Sub-Saharan Africa

Variable	Mean	Standard Deviation	Skewness	Kurtosis	Observations
GDP	12928600000	26339200000	5.56113192	35.337358	288
Capital	828040622	1291596681	8.19495827	98.3026869	288
Labor	7197538.67	8784168.62	3.07008855	10.4292579	288
Voice	32.3730208	17.4179375	0.39654721	-0.4148177	288
PoliStabil	33.2673611	20.9777062	0.23185465	-0.7485906	288
GovtEffect	27.6666667	17.265502	0.61902939	-0.0107969	288
RegQuality	32.5798611	15.2072973	0.22947582	-0.300343	288
RuleLaw	30.5650347	18.8214541	0.45439861	-0.0842811	288
Corcont	29.8854167	18.2391411	0.66594789	-0.5132057	288

Table 5 – Regression Results for Original Model Including All Independent Variables

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.12E+10	9.07E+10	0.23	0.8153
Capital	1	6.15005	0.1225	50.18	<.0001
Labor	1	6629.479	984.3	6.74	<.0001
Voice	1	-8.78E+08	1.51E+09	-0.58	0.5625
PoliStabil	1	-2.61E+09	1.10E+09	-2.38	0.0178
GovtEffect	1	2.33E+09	1.89E+09	1.23	0.2179
RegQuality	1	-1.83E+09	1.50E+09	-1.22	0.2240
RuleLaw	1	4.18E+09	2.02E+09	2.07	0.0394
Corcont	1	-8.16E+08	1.35E+09	-0.61	0.5454

Table 6 – Regression Results for Original Model Including Capital, Labor, and an Average of the Six Governance Variables

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-2.64E+10	8.13E+10	-0.32	0.7457
Capital	1	6.218205	0.1208	51.49	<.0001
Labor	1	6620.123	972.7	6.81	<.0001
Average	1	-6.50E+07	1.87E+09	-0.03	0.9723

Table 7 – Regression Results for Natural Log (GDP) Including All Independent Variables

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.16E+01	2.07E-01	104.28	<.0001
Capital	1	0.001588	0.000279	5.68	<.0001
Labor	1	0.010814	0.00224	4.82	<.0001
Voice	1	1.01E-02	3.45E-03	2.93	0.0035
PoliStabil	1	7.84E-04	2.50E-03	0.31	0.7543
GovtEffect	1	-1.46E-03	4.30E-03	-0.34	0.754
RegQuality	1	2.15E-03	3.42E-03	0.63	0.5297
RuleLaw	1	1.49E-02	4.62E-03	3.22	0.0014
Corcont	1	2.27E-04	3.08E-03	0.07	0.9412

Table 8 – Regression Results for Natural Log (GDP) Including Capital, Labor, and an Average of the Six Governance Variables

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.18E+01	1.86E-01	117.39	<.0001
Capital	1	0.001675	0.000276	6.08	<.0001
Labor	1	0.010392	0.00222	4.68	<.0001
Average	1	0.023	4.27E-03	5.4	<.0001

Table 9 – Summary of Interpreted Coefficients for Capital, Labor, and Governance (Average) by Country Group

Variable	All Countries	G-20	SSA
Capital	0.17%	0.18%	5.50%
Labor	1.04%	0.73%	22%
Avg(Gov)	2.30%	3.45%	0.92%