



Determinants of Economic Growth in a Panel of 86 Developing Countries

Alyssa Thiel and Ian Zarosinski

Linfield Department of Economics • Spring 2014

Abstract

We study the impact of factors embodied in Human Development Index on economic growth in a sample of 86 developing countries using a panel model. Our growth equation is specified as a function of average life expectancy, mean years of schooling, investment, and initial GDP per capita controlling for countries' level of development. We find that mean years of schooling, investment, and initial GDP per capita are significant factors explaining growth in our sample.

Model and Variables

We measured growth of 86 developing countries over two 5 year intervals. The first time period ranged from 2000 to 2005 and the second one measured growth from 2005 to 2010. The countries were separated into income brackets of low, medium, and high via dummy variables.

$$GRW_{it} = \beta_0 + \beta_1 LEX_{i,t-5} + \beta_2 SCHOOL_{i,t-5} + \beta_3 INVESTMENT_{i,t-5} + \beta_4 \ln(GDPCAP_{i,t-5}) + \beta_5 LOW_{it} + \beta_6 MED_{it} + \epsilon_{it}$$

GRW: The change in per capita GDP growth between periods t-5 and t as a percentage

$$GDP_t = \frac{GDP_{t-5}}{GDP_{t-5}}$$

LEX: Average life expectancy of a given country's population at the beginning of year t-5

SCHOOL: Mean years of schooling of the population for a given country at the beginning of year t-5

INVESTMENT: Investment spending as a percentage of the country's GDP at the beginning of year t-5.

GDPCAP: Gross Domestic Product per capita of a given country in 2005 U.S. dollars at the beginning of year t-5

We take the natural log of this because we see diminishing marginal returns to growth from GDP per capita

LOW: A dummy variable that is equal to 1 if the country is in the low income bracket

MED: A dummy variable that is equal to 1 if the country is in the medium income bracket

If the country is in the high income bracket both dummies will be equal to 0

Note that $\ln(GDPCAP)$ is not multiplied by the dummy variables since a country's GDP per capita determines what income bracket they are located in.

Theory and Hypotheses

We hypothesized the marginal effects (+/-) of our explanatory variables to be:

LEX (+): We expected to see a positive correlation with growth because that implies a healthier community and thus a stronger labor force.

SCHOOL (+): We expected to see a positive correlation with growth because schooling develops skills, creating a more productive labor force.

INVESTMENT (+): We expected to see a positive correlation with investment because the more a country invests, the more capital per worker they have. This is an increase in productivity.

GDPCAP(-): We expected to see a negative correlation with growth because the larger a country's GDP, the slower they grow.

LOW, MED: We did not expect our dummy variables to change the signs of the coefficients; we expected consistent signs for all levels of development.

Empirical Results

Dependent Variable: GRW

Variable	Coefficient	Prob.
C	1.152498	0.0014
LOG(GDPCAP)	-0.098158	0.0014
LEX	-0.001719	0.5546
SCHOOL	0.020218	0.0833
INVESTMENT	-0.005856	0.0307
LOW	-0.733485	0.0158
MED	-0.725769	0.0168
LOW*LEX	0.007933	0.0473
LOW*SCHOOL	-0.004606	0.7535
LOW*INVESTMENT	0.006961	0.0343
MED*LEX	0.006167	0.1202
MED*SCHOOL	0.001798	0.8956
MED*INVESTMENT	0.010193	0.0043

Adjusted R-squared 0.164479

Analysis

Catch-up Effect:

GDPCAP: For every percentage increase in GDP per capita we see the growth decrease by 0.098 percent. This is statistically significant at the 5% level.

High Income Countries:

SCHOOL: For an increase in the initial mean years of schooling by one year, we estimate a .0202 percentage increase in growth for high income countries. This is statistically significant at the 10% level.

INVESTMENT: For an increase in initial investment by one percentage point, we see a percentage decrease of .0059 in growth for high income countries. This is statistically significant at the 5% level.

Medium Income Countries:

INVESTMENT: For an increase in initial investment by one percentage point, we see a percentage increase of .0043 in growth for medium income countries. This is statistically significant at the 5% level.

Low Income Countries:

LEX: For an increase in the average life expectancy by one year, we see a percentage increase of .0062 in growth for low income countries. This is statistically significant at the 5% level.

INVESTMENT: For an increase in initial investment by one percentage point, we see a percentage increase of .0011 in growth for low income countries. This is statistically significant at the 5% level.

Summary

In conclusion to our estimation, we can illustrate the implications of our results. By isolating the marginal effects of our explanatory variables into income quartiles through the use of dummy variables we can estimate which factors of growth are most important for a country depending on the initial level of income of that country. If we were to present our findings to the countries in our study we could suggest which factors of growth would result in the highest returns based on the characteristics of that country.

The statistically significant, positive marginal effect of investment on the growth rate in the subsequent time period is most vital for countries within the two lowest income quartiles. Increases in life expectancy are most vital to those countries in which we see low initial levels; increasing the overall health of developing nations should boost productivity and the standard of living especially within the most impoverished countries. As countries develop and move towards higher initial levels of GDP, an emphasis on education and human capital would be the most beneficial to influence growth rates and continue development via an increase in productivity.