

Interlinkages Between Institution and Education in Developing Countries

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Abstract

Recent literature focuses on the role of institutions for economic expansion. According to institutional economics, institute is a fundamental determinant of cross country differences in education. In establishing the nexus between institution and education, this study takes the idea of institutional economics. This study contributes the present literature by finding an empirical nexus between institutions and education in case of developing countries over the period of 1996 to 2017. Breusch and Pagan Lagrangian Multiplier test has been used to choose between random effects and panel (pooled) OLS. Hausman test has been used to compare and choose between instrumental and non-instrumental approach. Fix effect or random effects or fix effect 2SLS or error components 2SLS has been chosen using Hausman test. Control of corruption is significantly and positively affected by secondary rate of enrollment. Control of corruption has positive and significant relationship with all three enrollment rates of i.e. tertiary, secondary and primary. Findings reveal that efforts are needed to curb corruption in less developed economies because it aids to improve primary, secondary and tertiary enrollment rates. Secondary enrollment rate further helps to improve control of corruption. Institution and education strengthen each other in two ways.

Keywords: Institution, corruption, primary, secondary and tertiary, education.

1. Introduction

Cross country disparities in economic growth is a questionable in social science. One of the essential debate is to examine the reasons that some countries are lagging behind the other countries. Some economies are attaining higher economic growth than the others.

Human capital means capacity building by obtaining informal and formal education, experience and training. The concept of human capital in economics came into being at least two centuries

before, but incorporation of this concept into the traditional economic analysis and its dynamic advancement occurred in last some decades. Integration of the idea of the human capital into economics widens the economic boundaries.

Physical capital depressed economies because they have relatively inadequate endowments of human capital (Lucas, 1990). Presently, many economists agree that the expansion of education is the main key step in economic and social development. Education elevates

efficiency, productivity and is considered as one of the important reasons for growth of the nations. Education is commonly divided into different stages: primary school, secondary school, college and then universities. Basically, more educated people get higher wages and consequently, average income increases. In case of positive externalities to education, average income increases by even more than the accumulated effect of the educated individual.

North and Thomas (1973) have presented cause of Western world development. They distinguished the proximate causes from fundamental causes of economic development. Education, capital accumulation and innovation are some of the proximate determinants. They arise new interesting questions: why do some countries allocate more money to education, why do some countries invest more on innovation than the others? North and Thomas (1973) theoretical approach to capture this is that proximate factors are determined by fundamental factors and then these factors determine economic development. So, an argument can be proven that institutions are the fundamental element to determine proximate elements i.e. technology, physical capital and education.

In late 1960s and the early 1970s, traditional economics took role of institution for granted in the economic development of nations. However, this is a different case now. It is shown by the transitional economies that Solow type models and conventional neoclassical economic theory are not sufficient to lighten the performance of an economy to enroute steady state. Institutions have their itself importance. North (1991) describes institutions as the humanly made restrictions that establish economic, social and political collaboration. They include of

both formal and informal rules. Formal rules include property privileges and laws. Informal rules comprise of traditions, taboos, sanctions, customs and codes of conduct. Institutions stimulate to an economy. Institutions emphasize to do and not to do list as Neale (1987) proposes.

La Porta et al. (1999) established political, economic and cultural theories of institutions and government quality with the intention of illumination of the differences across economies. According to economic theory, institutions are designed based when costs of making this design does not outstrip the social benefits. Political theory of institutions stresses on redistribution in place of efficiency. According to cultural theory, formation of government and collective activities are based on the views of societies in a manner that almost every society articulate beliefs and thoughts promising to credible government. Therefore, it is compulsory to investigate the particular social configuration where beliefs and thoughts shaped and expand the government capabilities.

1.1. Objective of the Study

This study examines the nexus between institution and education empirically for developing.

1.2. Organisation of the Study

Section two comprise of literature review. Section three consist of research design and methodology. Descriptive analysis is given in section four. Results of developing with discussion are given in section five. Section six of the study includes conclusion, suggestions and limitations.

2. Literature Review

Different studies have been jointed in literature review in such a way that literature review has been divided into sub topics describing linkages (theoretical and empirical) between education and institution; institution and education. The effect of education has also been described in the presence of good and bad institutions. Some studies in literature do mention that these two variables are endogenous.

Many previous studies have explored on only one part of the nexus of education and economic growth. Despite of strong evidences for a positive theoretical and empirical relationship between education and economic growth (Hanushek ,2016; Hanushek & Woessmann ,2008; Pelinescu ,2015; Economicus & Stramineus, 2015; Baldacci et al. ,2008;

Gyimah et al. , 2006; Gutema & Bekele ,2004; Agiomirgianakis et al., 2002) , some studies find that education and economic growth have an inverse connection (Pritchett ,2006; Costantini & Monni ,2008) and these studies reveals that education has mixed effect on economic development across countries. There are three possible reasons of this mixed effect i.e. poor quality of education, poor institutional quality and low return to education.

Many proxies for institutions have been used by many studies. Definition of institutions is different in many studies. Average of six variables has been considered as a proxy for institutions by Dietsche (2007). These variables include government effectiveness, rule of law, voice and accountability, political stability, liberty from bribery and regulatory load.

Direction of relationship between education and institution has been discussed in previous studies and this relationship is still not clear in literature.

Some studies find the effect of education on institution is positive (Uslaner and Rothstein, 2016; Alonso & Garcimartin, 2013; Jetter & Parmeter, 2018) and find that more transparent and dynamic institutions are demanded by more educated folks. Truex (2011), Uslaner and Rothstein (2016) find that it is more expected that more educated folks do protest against corruption, even in authoritarian states. Talented persons, have access to schooling, earn reasonably more so they do not involve in corruption. Beets (2005) explores that people usually choose career in which they are competent depending on years of schooling. For example, less educated people can only get occupations that has reward of small wages. Consequently, less educated individuals are likely to more attract towards bribe to live. More educated people perhaps can perceive the adverse effects of bribe on society more comprehensively so they are less involved in corruption. Some studies find it negative (Mangafic & Veselinovic, 2020; Mocan, 2008). Glaeser and Saks (2006); and Jetter and Parmeter (2018) analyse that education is endogenous when study the effect of education on corruption. Countries with poorer and less educated population have fragile political institutions. Dirwan (2019) finds insignificant relationship between education and institution in case of Indonesia. Corruption is a hurdle in the survival strategy of a nation and hampers its development. Anticorruption education stuff can be taken as precautionary steps so that people have awareness about it. This stuff contains ethics.

Some studies find that education has positive effect on corruption. Mangafic and Veselinovic (2020) analyse the elements determining the corruption. Bribe includes gifts, services and cash money to medical workers, professors, judicial

workers, police officials and government servants. Mocan (2008) examines that government servants including government employee, customs and police inspector has been more involved in corruption. The results show that the possibility of disclosure of bribery depends on both personal and country characteristics. Examples are gender, income, size of city, education, average education, marital status, quality of the institutions and unemployment rate of a country.

Some studies find that institution (control of corruption) has positive effect on education (Dridi, 2014; Eicher et al., 2009; Dias & Tebaldi, 2012) but Pellegrini and Gerlagh (2004); Pellegrini (2011) finds insignificant relationship between them. Eicher et al. (2009), Dridi (2014) and Gupta et al. (2001) find that both variables are endogenous. Huang (2008) empirically investigates that education is negatively affected by corruption. Tanzi and Davoodi (2001) illustrate that there are less engineers than lawyers in a nation where there is a high bribe and there build a unproductive human capital in that situation.

Previous studies have shed the light on the significance of institutions and education. Direction and nature of the link between institutions and education is not clear yet. Many studies investigate that education has positive relationship with economic growth (Isola & Alani, 2012; Hanushek & Woessmann, 2010; Chen & Luoh, 2009; Keller, 2006; Jamison et al., 2007; Asteriou & Agiomirgianakis, 2001; Krueger & Lindahl, 2001). Despite of strong positive evidences, there exist some studies that claim an insignificant effect of education on economic growth (Rogers, 2008; Pritchett, 2001; Appiah and McMahan, 2002; Bloom et al., 1998) or find an adverse effect of education on economic growth (Pritchett, 2006;

Costantini & Monni, 2008). The causes of this insignificant or adverse effect are poor institutional quality, poor educational quality and low return to education. Some studies find the effect of education on institution is positive (Alonso & Garcimartin, 2013; Jetter & Parmeter, 2018) and others find it negative (Mangafic & Veselinovic, 2020; Mocan, 2008). Jetter and Parmeter (2018) explores that education and institution are endogenous when finds effect of education on corruption. Dirwan (2019) finds insignificant relationship between education and institution. Some studies find that institution (control of corruption) has positive effect on education (Dridi, 2014; Eicher et al., 2009) but Pellegrini (2011) finds insignificant relationship between them. Eicher et al. (2009) investigates that both institution and education are endogenous. Bi-directional linkages between these two variables institution and education has not been nearly studied collectively in literature. This study extends the present literature in such a way that it investigates empirical linkages between these two variables. It investigates the interlinkages between institution and education. These two variables are considered as endogenous.

3. Research Design

Different proxies have been used to measure institution. Political stability, low corruption, rule of law and protection of property rights are considered as proxies for institutions by Durlauf et al. (2005). According to Arndt and Oman (2006), issue is that these proxies do not fully capture their related characteristics.

Some proxies are being used for education in previous studies. Many studies have used years of schooling as a proxy for education (Lau et al. 1993; Krueger & Lindahl, 2001; Hoeffler, 2002; Beets, 2005;

Pritchett, 2006; Hanushek & Woessmann, 2011; Barro, 2013; Uslaner & Rothstein, 2016). Tertiary enrollment or education have been considered as a proxy for education by some studies (Gyimah et al., 2006; Lee & Kim, 2009; Tsai et al., 2010; Cheung & Chan, 2008). Primary, secondary and tertiary rate of enrollment are considered as proxy for education by Keller (2006); and Nowak and Dahal (2016). Literacy rate and primary enrollment rate have been used as proxies for education by Levine and Renelt (1992).

It is found that one of the reasons of negative effect of education on economic growth is poor institutional environment (Pritchett, 2006). Cross countries variances of education are caused by institutions as per institutional economics. Glaeser and Saks (2006), Rontos et al. (2015), Uslaner and Rothstein (2016), Jetter and Parmeter (2018) present that educated people are more likely to involve in bribe (Mocan, 2008). Eicher et al. (2009) investigate that both education and institution are endogenous.

There exists no study that find this two-way relationship between institutions and education and investigate empirical evidence. This study focus to contribute present literature by giving an organized investigation of institution and education jointly and provide empirical evidence that both variables are endogenous. It is assumed based on literature that there exist interlinkages between institution and education. This study also focuses to contribute to the present literature by investigating these empirical interlinkages for developed as well as for developing countries separately.

Trade percentage of gross domestic product, nonexistence of political rights and tax percentage of gross domestic product are considered as control variables for institution. Moore (2004); and Altunbas

and Thornton (2011) claim a favorable effect of tax revenue on institution in the developing countries. Government (public sector institutions) will be more accountable by their citizens if it depends more on general taxes to manage their financial resources. McDonald and Jumu (2008) explore that tax revenue has significant positive influence on institution.

Badinger and Nindl (2014), Ades and Di Tella (1997) analyse negative effect of political rights on corruption. Freedom of press and open electoral competitions are the features of democratic political systems that can improve the likelihood of illuminating corrupt activities.

Torrez (2002) finds negative association between corruption and trade openness. However, empirical evidence only presents fragile support for this debate that corruption is increased by trade restrictions. Ades and Di Tella (1997) find that both the expected total trade share and import share have a negative relationship with corruption. It is not clear if these results relate to poorer economies because data has been collected from only thirty-two most industrialized economies. Bhagwati (1982) finds that the effect of trade restrictions is directly unproductive and these restrictions are profitable actions. The empirical investigations of effect of corruption on trade is very less. Krueger (1974) was the first who presented the theoretical link between trade constraints and rent seeking activity. She analyses that trade boundaries shift the resource allocation from directly productive deeds to rent seeking deeds.

Control variables of education include birth rate, industry employment and urban population. In poor countries, people consider children as their old age security in poor countries and are unable to finance their children's education. Moreover, high birth rates are associated with large families

and the need for school age children to look after their younger siblings especially in low income countries. They may also be associated with short life expectancy which implies lower returns to education. Furthermore, in countries with high birth rates, costs of education are raised both for individual families and society as a whole. Urban population growth is included as control variable because the extent of urbanization seems likely to influence the

enrollment rate because schools are likely to be better and more accessible in cities. Urban areas offer more employment opportunities for the educated and fewer employment opportunities for child labor. Industrial employment indicates the level of modernization of industry and the extent of wage earning opportunities which require literacy. Institutions and education linkages can be described as follows:

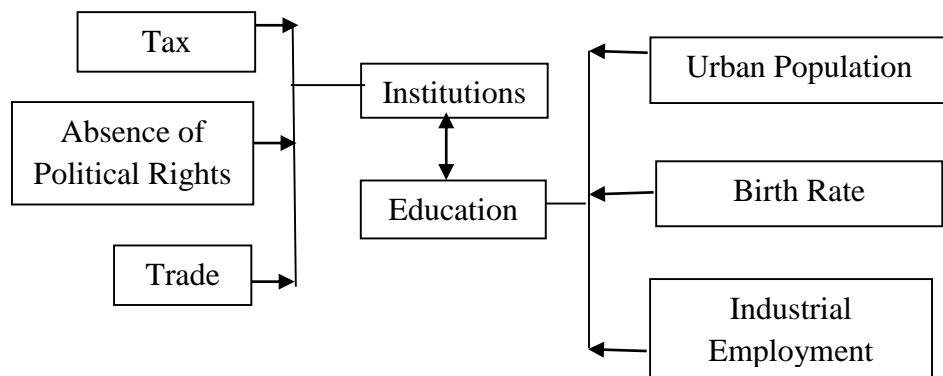


Figure 1: Institutions and Education Linkages

Source: Developed by the Researchers

3.1. Model Specification

This study use following simultaneous equation model to estimate the interlinkages between institutions and education.

$$INS_{it} = \alpha_1 + \beta_1 GDPPC_{it} + \beta_2 EDU_{it} + \gamma_1 TAX_{it} + \gamma_2 POLR_{it} + \gamma_3 TRADE_{it} + \eta_1 \tag{i}$$

$$EDU_{it} = \alpha_2 + \beta_3 GDPPC_{it} + \beta_4 INS_{it} + \gamma_4 BIRTH_{it} + \gamma_5 URBANPOP_{it} + \gamma_6 INDUSTRYEMP_{it} + \eta_2 \tag{ii}$$

Table 3.1 Description of the Variables and Data Sources

Variables	Definitions	Data Sources
Institution	Control of Corruption has been used as proxy for institution. This indicator value lies between -2.5 (weak) to 2.5 (strong). This value is transformed into index value ranges from 0 to 100 by applying basic formula $\frac{\text{Actual value}-\text{Minimum Value}}{\text{Maximum Value}-\text{Minimum Value}} * 100$	WB

Variables	Definitions	Data Sources
Education	Three proxies are used for education. Tertiary, secondary and primary gross enrolment ratio. Both sexes are included regardless of age.	World Development Indicator
Tax Percentage of gross domestic product	Tax revenue is a in percentage of GDP.	World Development Indicator
Trade Percentage of gross domestic product	Trade is the aggregate of imports and exports of goods and services as a percentage of GDP.	World Development Indicator
Absence of Political Right	This value lies between 1 to 7. Higher and lower value means non-existence and presence of political rights respectively in a country. This value of this variable is transformed into index score ranges from 0 to 100 by applying formula $\frac{\text{Actual value}-\text{Minimum Value}}{\text{Maximum Value}-\text{Minimum Value}} * 100$	Freedom House
Industry employment percentage of total employment	Working age group people involved in any kind of activity is defined as employment	WDI
Birth Rate	Number of alive births happen throughout of the year, per 1,000 people is defined as crude birth rate	WDI
Urban Population Percent of Total Population	Population existing in urban zones as a percentage of total population refer to as urban population.	WDI
Civil Liberty	Value lies between 1 to 7. Higher and lower value in country indicates non-existence and enjoying of civil liberty respectively. This value is transformed into index score ranges from 0 to 100 by applying formula $\frac{\text{Actual value}-\text{Minimum Value}}{\text{Maximum Value}-\text{Minimum Value}} * 100$	Freedom House

3.2. Methodology and Estimation of the Model

Panel data controls for variables that cannot be measured or observed like dissimilarity that do not change across entities but change over time. Fixed and random effects are used to analyze panel data. Fixed effect estimator cannot estimate the influence of time invariant variable such as race, sex and

religion. Fixed effects assumes that the endogeneity is completely a result of an association between the explanatory variables and the county effects. These effect does not interpret the endogeneity arises from traditional simultaneous equation.

Ordinary least square yields inconsistent and biased estimates of the

regression parameters when the model is fixed effects. Ordinary least square removes the individual dummies but in fact these are important so it creates omitted variables bias because of that fact.

Unlike the fixed effects model, the logic behind random effects model is that the difference across entities is supposed to be random and not correlated with the independent or predictor included in the model. Benefit of random effects is that time invariant variables like gender etc. can be included. In the fixed effects model, these time invariant variables are included in the intercept.

Above mentioned models (i) and (ii) are simultaneous equations model. Above simultaneous models (i) and (ii) have been estimated by 2SLS and this technique estimate model equation by equation. Two stage least square estimates are more reliable and decrease simultaneity bias than ordinary least square.

Breusch and Pagan Lagrangian Multiplier test is used to choose between random and pooled OLS. If null hypothesis of Breusch and Pagan LM test gets rejected, then it means random effects are preferred over ordinary least square. After Breusch and Pagan Lagrangian Multiplier test, Hausman test has been used to choose between fixed effect and random effect. Hausman test has been used to choose between fixed effect instrumental and error correction 2SLS. If fixed effects (fix vs. random) and fix effect instrumental (FEIV vs. EC2SLS) have been chosen based on Hausman test, then fixed effect instrumental has been compared with fix effect using Hausman test. If random effects (fix vs. random) and error correction 2SLS (FEIV vs. EC2SLS) have been chosen based on Hausman test, then error components 2SLS has been compared with random effects using Hausman test. FEIV

or EC2SLS is used depending on Hausman test for the purpose of controlling endogeneity bias. Error component three stage least square is better than error component two stage least square (Baltagi, 1981) but no software is currently estimating a system of equations using error component three stage least square. G2SLS estimates is less efficient than the EC2SLS estimates (Han, 2016; Baltagi & Liu, 2009).

3.3. Error Component 2SLS

EC2SLS is a weighted average matrix of between 2SLS and fixed effects 2SLS. Error component 2SLS is symbolized by EC2SLS. Valid selected instruments determine the reliability of the estimates (Baltagi, 2006).

3.4. Identification of the Model

There are two simultaneous equations and two endogenous variables in this study. There must be at least one variable absent from an equation for plausible parameter. Both two equations (i) and (ii) are identified because at least one variable is absent from an equation. Two variables non-existence of political rights, trade percent GDP and tax percentage of gross domestic product are present in equation (i) but not present in equation (ii) so it is identified. Urban population growth, birth rate and industry employment are present in equation (ii) but omitted from equation (i) and it is enough for identification.

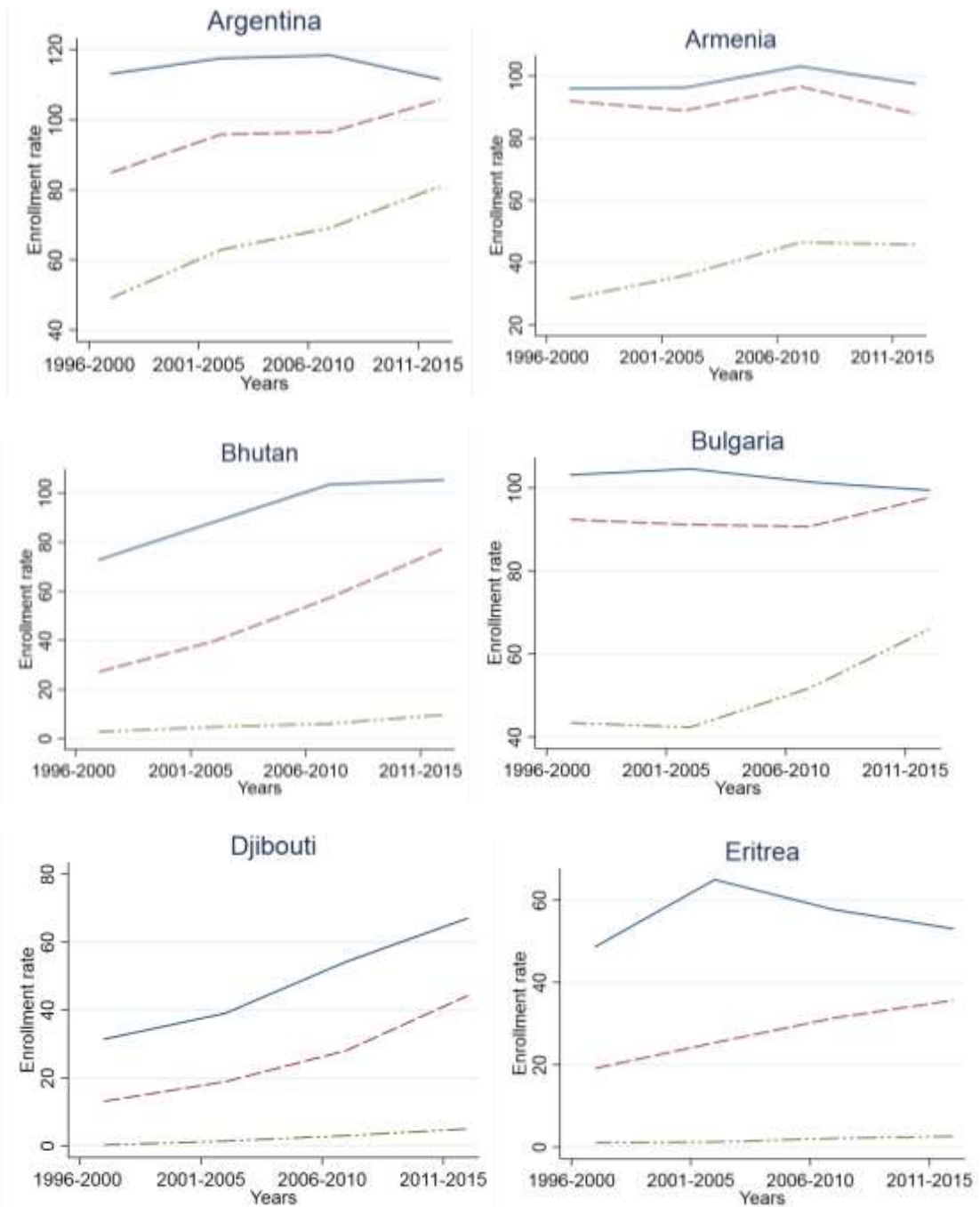
4. Descriptive Analysis

Descriptive analysis helps to demonstrate data in more meaningful way. It also helps to simply interpret the data. Without descriptive analysis, it is difficult to visualize raw data. Table 4.1 shows that there is no outlier in the data.

Table 4.1 *Descriptive Summary of Developing Countries*

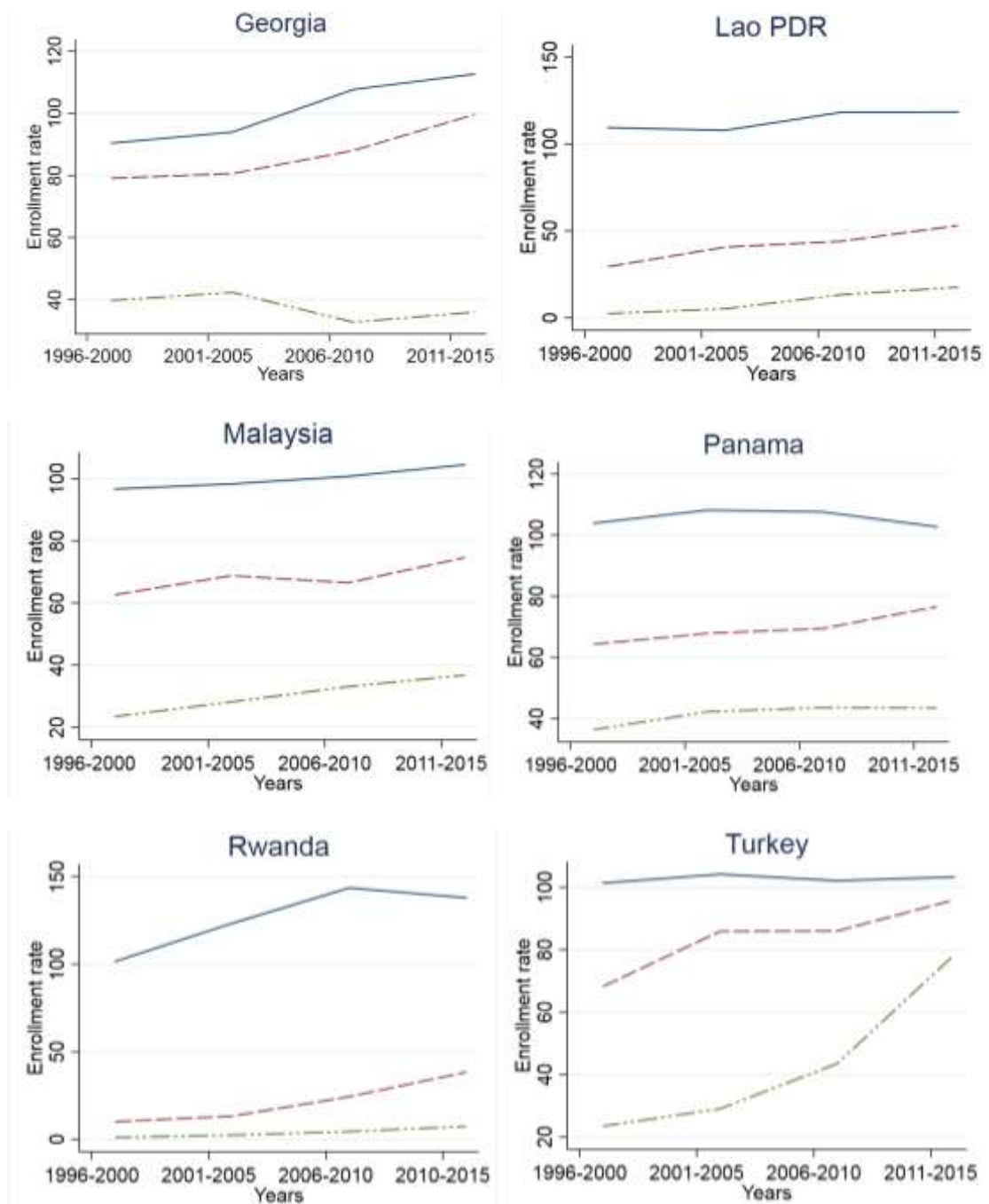
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Birth rate per 1000	1,383	26.62	10.39	7.70	66.80
Industry employment	1,445	16.72	8.13	1.92	40.42
Urban population growth	1,444	2.71	2.80	-2.97	55.78
Tax percent GDP	886	14.80	5.03	0.91	33.58
Gross primary enrollment rate	1,239	102.17	17.55	30.87	148.35
Trade percent GDP	1,419	76.77	35.50	0.17	220.41
Gross secondary enrollment rate	1,040	64.87	27.15	4.01	113.07
Gross tertiary enrollment rate	920	25.88	21.99	0.21	119.78
Real GDP per capita	1,418	3350.8	3080.81	214.14	14975.09
Civil liberty	1,320	50.96	23.23	0	100
Absence of political right	1,188	40.92	16.28	-6.20	76.84
Control of corruption	1,122	38.73	10.98	15.56	75.50

Following below graphs indicates enrollment rate trends of tertiary, secondary and primary, secondary in some of the developing countries.



Primary — Secondary - - - - - Tertiary - . - . - .

Source: Prepared by the Researchers



Primary ——— Secondary - - - - - Tertiary - . - . - .

Source: Prepared by the Researchers

Average of Five years’ enrollment rate of tertiary, secondary and primary has been taken on y-axis. Although primary, secondary and tertiary rates of enrollment show fluctuation in all selected developing nations in this study but they are in

increasing trend. It is common in all selected developing countries in this study that tertiary and secondary rate of enrollment rate is lower than primary rates of enrollment rates and tertiary rate enrollment rate is lowest among these three

enrollment rates. Panama and Argentina have five years' average rate of enrollment of tertiary, secondary and primary higher than the overall average rate of enrollments (i.e. 25.88, 64.87 and 102.17 respectively) of developing nations. Djibouti, Bhutan

and Eritrea have lower average rates of enrollment than the average rates of enrollment rates of overall all developing nations. In all developing countries, Turkey has highest tertiary rate of enrollment.

Table 4.4 Scores of Institutional (Control of Corruption) Indicator of Developing Countries

Countries	1996-2000	2001-2005	2006-2010	2011-2015
Argentina	-0.14	-0.44	-0.38	-0.47
Armenia	-0.7	-0.65	-0.69	-0.57
Bhutan	0.52	0.67	0.76	0.94
Malaysia	0.39	0.29	0.08	0.25
Turkey	-0.21	-0.23	0.07	0

Source: Data is extracted from World Bank. Researchers have calculated average of five years' control of corruption points. Points lies between -2.5 to 2.5.

Only few developing countries situation of institutional indicator (control of corruption) are given in Table 4.4. because almost all developing show negative scores except few. Only Botswana, Bhutan, Mauritius and Malaysia show relatively better control of corruption situation among developing countries. Control of corruption is getting improved in Turkey.

5. Results and Discussion of

Developing Countries

Criteria of International Monetary Fund to classify developing countries have been selected. Appendix A includes names of all these developing nations. Following are the findings of developing countries that are given in Table 5.1, 5.2 and 5.3. In this study, random effects are preferred over Ordinary Least Square in all estimated models.

Table 5.1 comprise of the findings of equation (i). Control of corruption is the proxy for institution and primary, secondary and tertiary rate of enrollment are used for educations.

Table 5.1 Effect of Education on Institution (Control of Corruption)

Dependent variable:	5.1.1	5.1.2	5.1.3
Control of Corruption	EC2SLS	RE	EC2SLS
Tertiary enrollment rate	0.0197 (0.0483)		
Tax percent GDP	0.457*** (0.0805)	0.411*** (0.0762)	0.507*** (0.0743)
Absence of political right	-0.0814*** (0.0156)	-0.0701*** (0.0143)	-0.0697*** (0.0161)
Trade percent GDP	-0.00640 (0.0130)	-0.0156 (0.0123)	0.00733 (0.0122)
Secondary enrollment rate		0.0646*** (0.0236)	

Primary enrollment rate			0.0895 (0.0872)
Constant	36.84*** (2.164)	36.13*** (2.467)	27.94*** (9.277)
Breusch & Pagan LM test Probability	0	0	0
Hausman Test probability (FEIV vs. EC2SLS)	1.000	0.9996	1.00
Hausman Test probability (FE vs. RE)	0.9994	0.9987	0.9997
Hausman Test probability (EC2SLS vs. RE)	0.0000	0.9999	0.0000
Observations	474	514	590
Number of countries	51	52	52

Standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1

Time dummies are included in all models of Table 5.1. Industry employment and urban population growth are used as instruments in model 5.1.1. Industry employment, birth rate and urban population growth are used as instruments in model 5.1.2. In model 5.1.3, urban population growth and industry employment are used as instruments.

In all estimated models of Table 5.1, Breusch & Pagan LM test Probability show that random effects are preferred over Ordinary Least Square. In Table 5.1, Hausman test shows that random effects are preferred over fix effects, EC2SLS is preferred over random effects and FEIV. So EC2SLS has been chosen to estimate models 5.1.1. and 5.1.3 in Table 5.1. but in model 5.1.2 random effects has been chosen.

There is a significant and positive effect of secondary enrollment rate on control of corruption. This result is in-line

with Beets (2005), Truex (2011), Uslander and Rothstein (2016).

It is found that in Table 5.1, taxes percent GDP have positive and significant effect control of corruption in all three models. Moore (2004), Mcdonald and Jumu (2008), Brautigam et al. (2008) and Altunbas and Thornton (2011) investigate that government will be considered more accountable to their citizens if it makes revenue through taxes then they consider more answerable to their national. This leads to improvement in institutional quality (i.e. less corruption).

It is found that absence of political rights have negative relationship with control of corruption in all models in Table 5.1. This result is in-line with Badinger and Nindl (2014); Larrain and Tavares (2007).

In Table 5.2, equation (ii) have been estimated using three proxies of education.

Table 5.2. *Effect of Institution (control of corruption) on Education*

VARIABLES	5.2.1 FEIV Tertiary enrollment rate	5.2.2 EC2SLS Secondary enrollment rate	5.2.3 EC2SLS Primary enrollment rate
Control of corruption	1.035* (0.591)	0.527*** (0.187)	0.442*** (0.142)
Industry employment rate	-0.521** (0.204)	0.500*** (0.158)	-0.163 (0.133)
Birth rate	0.317* (0.174)	-1.084*** (0.190)	0.356** (0.156)
Urban population	0.481 (0.656)	-2.144*** (0.493)	-0.221 (0.524)
Constant	-27.78 (23.19)	59.30*** (9.600)	73.64*** (8.319)
Hausman test probability (FEIV vs. EC2SLS)	0.00	0.9980	0.9433
Breusch & Pagan LM test Probability	0	0	0
Hausman Test probability (FE vs. RE)	0.00	0.0362	0.9989
Hausman Test probability EC2SLS vs. RE	–	0.0000	0.0212
Hausman Test probability FEIV vs. FE	0.0008	0.0297	–
Observations	735	515	590
Number of Countries	65	52	52

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Time dummies are in all models estimated in Table 5.2. In model 5.2.1, trade percent GDP and Civil liberty are used as instruments. In model 5.2.2., tax percent GDP and political rights are used as instruments. In model 5.2.3, tax percent GDP, trade percent GDP and absence political right are used as instruments.

In all estimated models of Table 5.2, Breusch & Pagan LM test Probability

show that random effects are preferred over Ordinary Least Square. In case of estimated model 5.2.1, Hausman test shows that fix effects are preferred over random effects, FEIV is preferred over EC2SLS as well as fix effects. So FEIV has been chosen to estimate model 5.2.1. In case of estimated model 5.2.2, EC2SLS has been chosen to estimate models 5.2.2. In case of estimated model 5.2.3, Hausman test shows that

random effects are preferred over fixed effects, FEIV are not preferred over EC2SLS and EC2SLS is preferred over random effects. So EC2SLS has been chosen to estimate model 5.2.3.

Rontos et al. (2015) finds that civil liberty is one of the reasons of the difference in institutional quality across nations. Benyishay and Betancourt (2010) investigates that improvement in level of civil liberty enhances the chances to develop even in non-democratic governments.

Control of corruption has positive and significant effect on tertiary, secondary and primary enrollment rate. Improvement in control of corruption leads to increase more tertiary enrollment rate than secondary and primary enrollment rate. Corruption harm nation's educational development. There are high chances that corruption brings down educational progress (Huang, 2008). Corruption in education can be in the form of ghost instructors, blackmailing, favoritism, biasness, cheating, research misconduct and illegal private tuition (Osipian, 2009).

It is found that there is negative and significant relationship between industry employment and tertiary enrollment rate but positive relationship with secondary enrollment rate. The reason of this negative relationship can be perceived that supply of industry opportunities are not enough for the workforce having tertiary education. Tertiary enrollment rate is increasing but employment opportunities for these educated people are not increasing adequately or due to skills mismatch or due to skilled labour immigration to developed countries.

It is found that birth rate has positive and significant effect on primary and tertiary enrollment rate but have negative and significant relationship with secondary enrollment rate. This negative

relationship between birth rate and secondary enrollment rate can be due high drop out from primary schools in low income countries (Sebates et al., 2013). Low quality of education, high dropout rate and high cost of education can be a reason of decreasing secondary enrollment rate as birth rate rises.

Findings of model 5.2.2 show that urban population have negative relationship with secondary enrollment rate. Possible reasons of this negative relationship can be inadequate educational amenities and high sacrificing cost of going school. It is usually seen that urban areas have more facilities than rural areas but in case of developing countries findings reveals that even urban areas have insufficient facilities of schooling.

6. Conclusion, Suggestions and Limitations of the Study

6.1. Conclusion

In late 1960s and the early 1970s, the conventional economics did not consider role of institution in the economic expansion. Institutional economics has given importance to the role of institution in economic expansion. This study finds the empirical interconnection between institutions and education in case developing countries. Secondary enrollment rate positively and significantly affects control of corruption. Control of corruption has positive and significant effect on primary, secondary and tertiary enrollment rates. If less developed economies mend their institutional quality (i.e. control of corruption), then it will aid to improve enrollments rates at all levels and secondary enrollment rate will further improve institutional indicator. In other words, institution and education strengthen each other.

6.2. Suggestions

- Government should plan and monitor corruption. Government should confirm accountability of public officials or put their penalty verdicts in the hand of voters by exposing them in media.
- Transparency, freedom of press and open access to all facts and figures. Availability and transparency of information enhances the public participation and increase the receptiveness of government organizations.
- High dropout rate and loss of teachers are common in numerous developing countries. It is the duty of government to deliver the quality primary schooling to the citizen. Secondary enrollment is a key connection between primary and higher education. This bridge should not be ignored. Government should take a responsibility to put efforts on education.
- Restructuring of institution should be according to country. In this study, findings suggest that curbing corruption means government is investing on education and investing on secondary enrollment rate means attacking on corruption.
- There is a need to improve amenities even in urban areas.

6.3. Limitations of the Study

It is very challenging to find a strong and valid instruments. This is time taking task but not very worthwhile. Future research can be done to determine more valid instruments.

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Appendix A

Developing Countries Included for Data Analysis

Argentina	Brazil	Djibouti	Guinea	Kazakhstan	Mauritania
Armenia	Botswana	Dominican Republic	Guinea-Bissau	Kenya	Mongolia
Azerbaijan	Burundi	Eritrea	Haiti	Lao PDR	Mozambique
Belarus	Cambodia	Gabon	Honduras	Lebanon	Myanmar
Belize	Cameroon	Gambia	India	Malawi	Namibia
Bhutan	Chad	Georgia	Indonesia	Maldives	Nepal
Bolivia	Colombia	Ghana	Jamaica	Malaysia	Nicaragua
Bulgaria	Cuba	Guatemala	Jordan	Mauritius	Nigeria
Philippines	Paraguay	Samoa	Thailand	Zambia	Ukraine
Peru	Rwanda	Sri Lanka	Turkey	Venezuela	Uzbekistan
Panama	Romania	Tajikistan	Zimbabwe	Uganda	