

Unemployment with Educational Attainments in Lower Middle Income Countries: 1994-2017



ECO499: Undergraduate Thesis

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Dear Sir/Ma'am:

I am submitting my paper for **ECO499: Undergraduate Thesis** titled *Unemployment with Educational Attainments in Lower Middle Income Countries: 1994-2017* to you for your kind consideration and acknowledgement. Please find the enclosure.

The research was conducted on the impact that educational attainment has on unemployment in the labor force of countries that fall under the low income or lower-middle income category. Data from the World Bank's data bank has been worked as a source for the analysis. The data used includes different level of education attainments and the associated unemployment rate in the labor force from the period of 1994-2017. Panel regression analysis is the mode of estimation for this research.

I am thankful to have the great opportunity to work in this paper under your supervision. I, therefore, hope that your feedback and opinion would further enrich this research and oblige thereby.

Sincerely,

Sifatul Mostafi

ABSTRACT

This paper empirically investigates how the overall unemployment rate in lower middle income countries is augmented by labor forces with different level of educational attainments by focusing on three distinguished level of educational attainments within the labor force, basic education, intermediate education and advanced education. Estimates from a dynamic model for 53 lower middle income countries spanning the period 1994- 2017 indicates that increased labor force with advanced educational attainment tend to be more unemployed and thus causing the overall unemployment rate to be increased in developing countries with lower middle income during the period of analysis.

Keywords: unemployment, education, labor force, developing country

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1. INTRODUCTION

Education is a crucial way for gleaming future for every one of us. We can get whatever appropriate in the ways of life utilizing the power of Education. Higher level of education enables people in gaining respect in every aspect in life and have an extraordinary acknowledgment on the life and its motives. Education helps a person to feel the true standards in the life and prosperity. Education offers potential to prevent any monstrous and harmful act towards social, family oriented issues and even national and worldwide level issues. Nobody of us can inconspicuous the significance of education. Our minds could be directed towards positivity in the pursuit of our life and get rid of all the negativity and problems by applying the learnings of education. One of the main motives of better educational attainment is to have better employment options and thus have a better lifestyle. People are now getting better opportunities and prospects to pursue education than ever before provoking an enormous improvement in the rate of literacy over time throughout the world, particularly in developing countries. More labor force with different level of educational attainments are now entering into the economy and seeking for better jobs associated with their educational attainments and expertise. Unfortunately, the unemployment rate is also increasing rapidly worldwide. This reciprocal relationship between unemployment and labor force with educational attainment raise a vital question “How the overall unemployment is augmented by labor forces with different educational attainment?”. In search for the answer, this paper tries to find a relationship with overall unemployment rate with the participation of educated labor force with different level of educational attainments by distinguishing the total educated labor force into three main portions. These are labor force with basic education, labor force with intermediate education and labor force with advanced education. To conduct the research this paper considers only lower

middle income countries approximately over the last two decades (from 1994- 2017). The reason for choosing middle income countries is that most of them are either developing countries or on the phase of being a developed country from a developing country. Another reason is that most of the lower-middle-income countries are some of the fastest growing countries in GDP. Moreover, their unemployment rate doesn't fluctuate a lot over the period.

2. LITERATURE REVIEW

The relationship of unemployment with education is being studied for a long time and recently it has become an important field of research. A study shows that changes in the educational composition of the labor force affect both the level and the behavior over time of aggregate employment series. Hargreaves, David H. shows the relationship between unemployment, leisure and education. In an article M. Roser and E. Ortiz-Ospina (2017) mentioned education as an elementary resource for both individuals and societies. According to their article, in present days education is a basic right in most countries and governments consider themselves responsible for providing basic level education to every citizen. They conducted a research and their outcome shows that expenses for standardized inputs get increased by policies made by government but the quality of education is not getting developed with relative to that. Using pool panel regression Schofer & Meyer (2005) analyzed worldwide expansion of higher education enrollments. The outcome of their analysis is similar to classic theories because they found higher expansion in economically developed countries. They noticed higher growth in places with high secondary enrollments but low state control over education which relates with conflict and competition theories. Developing countries have higher educational enrollments than European countries used

to have once (Schofer & Meyer, 2005). According to Drori and Moon (1998), understand that this enormous tertiary instructive extension happens in foundations with a lot of isomorphism around the globe. Similar subjects are instructed with similar points of view prompting fundamentally the same as degrees and to certifications that go up against overall importance. According to a survey by O. Magnussen (1979), unemployment rate problem of people under age of 25 years is currently being focused on recent arguments because the unemployment rate is very high in young generation especially in industrialized societies. He studied that the unemployment rate among the people under age of 25 years is three time higher than the adults in the OECD area. Nilakantha Rath talks about the utilization of data on employment, unemployment and education.

Prasad (1979) used multiple regression with dummy variables for examining the effectiveness of different factors on the unemployment of highly qualified manpower. According to S. Nickel (1979), the relationship between education and unemployment has not been usually quantified. According to him schooling and qualifications on the probability of entering unemployment in an expected duration of spells within the state are dominated by some estimates of this relationship. In the end, the prediction of returning to school gets adjusted to take account of unemployment. In a research work, Edle, J. H (1973) shows how the spectra of unemployment is now haunting most countries both rich and poor. Erdem and Tugcu (2012) analyzed both short and long term relationships between the two factors education and unemployment in Turkey for almost 50 years from 1960 to 2007. ARDL co-integration and Granger Causality of Dolado and Lutkepohl (1996) considers unemployment rate as proxy for unemployment and higher education graduates for higher education. The last outcome after co-combination and mistake adjustment investigation was that in Turkey the advanced education was in charge of both short and long haul joblessness. The conclusion of that research was that government should never expense more for higher education

than economic needs. The significance of advanced education for financial matters essentially originates from its ability to make or assemble human capital and furthermore to expand the total efficiency level of economy (Mincer, 1981; Lucas, 1988; Rogetoft et al. 2007; Nunez & Livanos, 2010). In this way the economy becomes able to produce more and more and that is why the level of productivity gets increased. According to M. D. Apte (1975), technical education is decreasing in Kerala because of establishment of science and arts colleges and that is why unemployment rate is getting increased. Van Der Kroef (1963) stated that the unemployment rate among educated generation is leading towards a dreadful situation in Asia specifically among the University graduate generation. Several political and social problems are arising because of this educated unemployment. According to his research Asian students who are studying in U.S. do not tend to return because of such problems and they start applying their knowledge there instead of returning. Maarten (2000) noted that unemployment rate is higher among well-educated people rather than better educated ones because of job competition. The higher educated people grab the jobs of lower educated people and as a result the lower educated ones become jobless. Dell'Anno and Solomon (2016) found that the impact of firing cost on tax rate gets neutralized by tax rate increment on production. They utilized a dynamic general equilibrium model to demonstrate how the motivating force to work in the casual division and the outcomes for joblessness gets influenced by the adjustment in terminating expenses and assessment rate. The outcome uncovers the change segments to augment the exchange off amongst formal and casual area of joblessness. Asao (2014) did a research on the transformation of low and stable unemployment rate of Japan for the time before 1980's and after 1990's. Before 1980's speed of employment adjustment was low because fixed cost was high for long term employment and aggregated firm-specific skills through intensive OJT. During recession labor supply was reduced for effect of demotivated worker among

female. Young generation used to get stable jobs because of easy transition from school to directly at job. Labor market of Japan was going through structural changes for example aging of labor force, irregular workers increment, increase in women employment, increase in long-term unemployment etc. Asao (2014) basically investigated about the structural factors by analysis of mismatch indicators, macro-economic time series analysis, gross flow analysis and every specific possible factors analysis.

3. EMPIRICAL MODEL AND DATA

This area demonstrates the experimental model, depicts every one of the information, and ultimately clarifies the explaining factors that are utilized as a part of the examination. The summed up determination of the exact model is below:

$$U_{it} = \alpha_0 + \alpha_1 LA_{it} + \alpha_2 LI_{it} + \alpha_3 LB_{it} + \theta_t + \gamma_i + \epsilon_{it} \quad [1]$$

Here U_{it} denotes the rate of total unemployment which refers to the percentage of the labor force who are not involved with any work, however are available for and looking for different kind of works in country i in time t . The explanatory variables LA_{it} , LI_{it} and LB_{it} denote the share of the working age population in the labor force with an advanced level of education, with an intermediary level of education and with a basic level of education respectively. Here α_0 represents the constant term. That means, even if there are no changes in labor force with different level of educational attainment the overall unemployment rate will be increased by $\alpha_0\%$. The coefficients of these three explanatory variables α_1 , α_2 and α_3 are expected to be negative, as we can generally anticipate that with the increase of labor force with different education attainment overall unemployment would be reduced. Lastly, θ_t represents time effect, γ_t represents country fixed

effect that is responsible for unobserved time-invariant heterogeneity across different countries, and ϵ_{it} refers to the overall error term where time is indexed by t and individual countries in a cross section is indexed by i .

TABLE I
DESCRIPTIVE STATISTICS

Variables	Mean	Std. Dev.	No. of Obs.
Unemployment Rate	6.64	5.03	147
Labor force with Advanced Education	67.55	15.57	150
Labor force with Intermediate Education	44.94	17.90	150
Labor force with Basic Education	36.89	18.76	150

4. RESULTS

Let us first look at the ANOVA section of Table II. In the dependent variable, that is in the overall unemployment rate the sum of squares is 3694.373 showing how much spread out and how much variation it has over different time periods and regions. Out of 3694.373 variations, our model consisting of three explanatory variables (degree of freedom 3) explains 1315.35 variations of the overall unemployment rate. Rest of the variations goes into the residuals.

TABLE II
ANOVA OF MULTIPLE REGRESSION

Source	Sum of Squares	Degree of Freedom	Mean of Squares
Model	1315.35246	3	438.450821
Residual	2379.0202	143	16.6365049

Total	3694.37266	146	25.3039223
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So approximately 35.60% of the variations in the overall unemployment rate is being explained by variations of our three explanatory variables which is mentioned in the Table III as R-squared value. To eliminate the extra effect of degree of freedom for adding three explanatory variables on R-squared value of the model, we have also calculated the adjusted R-squared value which is 34.26 % and very close to the R-squared value of our model. That means the R-squared value of our model is not over rated and each of the three explanatory variables have the ability to explain the dependent variable of the model. From the sum of squares and degrees of freedom we can calculate the mean of squares which is 438.45 and 16.64 for our model and residual components respectively. Using these mean of squares values we can calculate our F-value which is 26.35. This F-value will help us to determine the probability of whether we can reject our null hypothesis or not which is all the coefficient estimates of our regression is equal to 0 in different significance level. The null hypothesis for our model states that labor force with different level of educational attainment has no effect what so ever on the overall unemployment rate over time. Equation (2) shows our null hypothesis.

$$H_0: \alpha_1 = \alpha_2 = \alpha_3 = 0 \quad [2]$$

From the P-value of our model which is 0 (in Table III), we can reject the null hypothesis at 10%, 5% and even at 1% significance level. That means there are 0% probability that the estimates of our three explanatory variable model is due to random choice alone and there are at least one explanatory variable among all the explanatory variables which has meaningful implication towards the overall unemployment rate. Now Root MSE in Table II is referring to the root of mean

squared error which is also called the standard error of the regression (SER). This value tells us on average how much each observation of unemployment rate is missing from the prediction of our model which is 4.08%.

TABLE III
STASTICAL PROPERTIES

No. of observations	147
F(3, 143)	26.35
P-Value	0.000
R-squared	0.3560
Adjusted R-squared	0.3425
Root MSE	4.0788

The results for equation (1) is represented in Table I. From the estimates mentioned in Table I we can reform the equation (1) as such in equation (3).

$$U_{it} = 4.94 + 0.17 LA_{it} - 0.08 LI_{it} - 0.16 LB_{it} + \theta_t + \gamma_i + \epsilon_{it} \quad [3]$$

Here in the equation (3), the constant is 4.94 which says that if there's no change in the labor forces with different educational attainment the overall unemployment rate will be increased by 4.94%. If we compare equation (1) with equation (3) we can see that the value of the coefficients α_1 , α_2 and α_3 are 0.17, -0.08 and -0.16 which are associated with the explanatory variables LA_{it} , LI_{it} and LB_{it} respectively.

TABLE IV
ESTIMATES FOR MULTIPLE REGRESSION ANALYSIS

Dependent Variables:	Coeff.	Std.	t- stat	P> t
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Unemployment Rate		Err.		
Labor force with Advanced Education	0.173	0.036	4.82	0.000
Labor force with Intermediate Education	-0.085	0.040	-2.09	0.038
Labor force with Basic Education	-0.164	0.031	-5.30	0.000

In Table IV, the standard errors, the t-values and the p-values are also mentioned along with the corresponding coefficients of three explanatory variables. We can evaluate the p-values associated with the coefficients in order to decide whether we can reject null hypothesis for that particular coefficient in a certain level of significance. Here, we can reject both the null hypothesis $H_0^{\alpha_1}: \alpha_1 = 0$ and $H_0^{\alpha_2}: \alpha_2 = 0$ at 1% significance level. That means there are 0% probability for both the labor force with advanced education and basic education not to have any effect on the overall unemployment rate. However, we cannot reject the null hypothesis $H_0^{\alpha_2}: \alpha_2 = 0$ at the 1% significance level since there are 3.8% probability for the labor force with intermediate education not to have any effect on the overall unemployment rate. We can only reject the null hypothesis for α_1 at any significance level higher than 3.8%. Looking at the estimates we can see that the only explanatory variable that is not only positively but also most strongly related with unemployment rate is the percentage of labor force with advanced education. For every 1% increase in labor force with advanced education, the unemployment rate increases by 17.3% keeping all other variables constant. However, labor force with intermediate education and labor force with basic education has negative impact on the overall unemployment rate as 1% increase in the labor force with intermediate education will actually decrease overall unemployment rate by 8.5% and 1% increase in the labor force with basic education will decrease overall unemployment rate by 16.4% keeping all other variable constant. The negative effect of labor force with intermediate education is smaller than the negative effect of labor force with basic education on overall unemployment rate. In Table

V, upper bounds and lower bounds for estimates is mentioned for 95% confidence interval. For instance, 95% of the time the coefficient associated with the labor force with advanced education falls between .24 and .10 meaning for every 1% increase in labor force with advanced education 95% of the time the unemployment rate will be increased from 10% to 24%. Likewise, 95% of the time for every 1% increase in the labor force with intermediate education the unemployment rate will be decreased by .4% to 16% and for every 1% increase in the labor force with basic education the unemployment will be decreased by 10% to 22%.

TABLE V
RANGES OF COEFFICIENTS WITH 95% CONFIDENCE INTERVAL

Dependent Variables: Unemployment Rate	95% Confidence Interval	
	Lower Bound	Upper Bound
Labor force with Advanced Education	.1018104	.2435463
Labor force with Intermediate Education	-.1645733	-.0046747
Labor force with Basic Education	-.2254755	-.1029458

From the estimates we can say that, increasing labor force with advanced education increases the unemployment rate whereas labor force with basic education decreases it, both by a significant amount. It could be generally anticipated that, labor force with advanced education are not getting their preferred jobs or any job in extreme case. As a result most of the labor force with advanced education are being unemployed and causing the unemployment rate to be high by a significant amount. In the contrary, labor force with basic education have jobs since most of the people fall under this category are poor people who don't have much work preferences. They try to be employed as soon as possible as they depend on their marginal income per day and without any job won't be able to survive for long. Therefore, an increase in labor force with basic education will eventually lower the unemployment rate. Finally, very insignificant effect of labor force with

intermediate education on overall unemployment rate could be interpreted as such. The intermediate education level is a transitional education level between basic education and advanced education. Labor force who falls under this level of education can either stick to the work category done by labor force with basic education or their job expectation may rise with their improved education level keeping some of them waited for a better job and thus unemployed. Both the positive effect of basic education and negative effect of advanced education cancel out each other resulting in a very small effect of labor force with intermediate education on overall unemployment rate.

To have a deeper look into the situation, we have plotted overall unemployment rate in respect to labor forces with each level of educational attainment and found a graph showed in figure 1. The graph of figure 1 represents three different graphs, unemployment vs. labor force with advanced education, unemployment vs. labor force with intermediate education and unemployment vs. labor force with basic education that are merged together into one single graph to compare the trends among them. The y-axis is representing the overall unemployment rate and is scaled into logarithmic scale with a base of 2. We have used logarithmic scale for unemployment rate to squeeze the scattered unemployment rate into our graph so that we can visually relate different trends with each other without much effort. On the other hand x axis representing labor force with advanced education, intermediate education and basic education in percentage. Recall that from our multiple regression model we found that with increase of labor force with advanced education overall unemployment rate increases at a significant level. We can relate this with our new graph as well. In logarithmic scale the trend of overall unemployment rate vs labor force with advanced education is much higher than other two trends. Both the trends of unemployment rate vs. labor

force with intermediate education and unemployment rate vs. labor force with basic education is downward compared to the trend of unemployment rate vs. labor force with advanced education since with an increase of labor force with intermediate or basic education overall unemployment rate tend to fall.

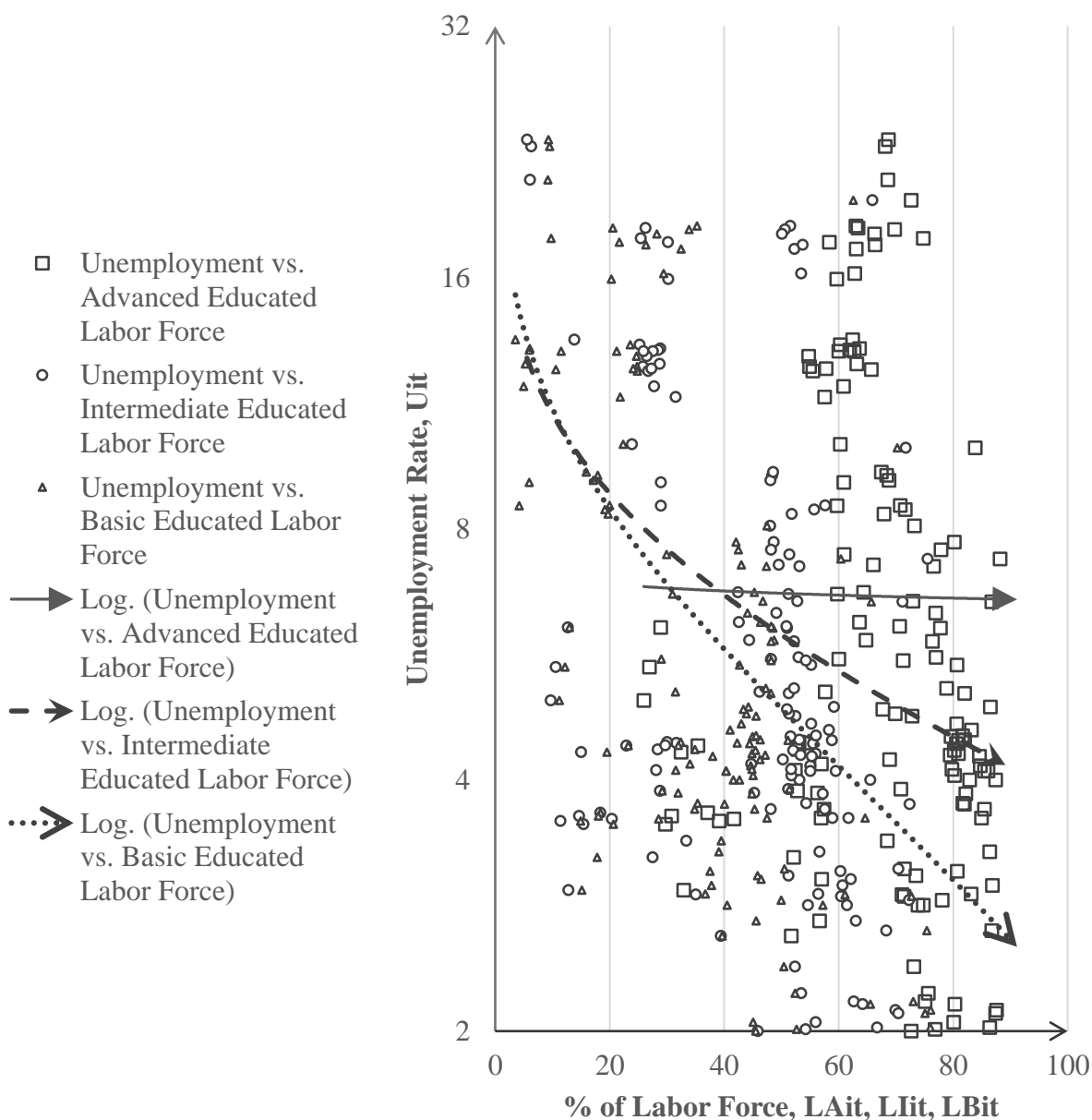


Figure I: Unemployment Rate vs. % of Labor Force with Educational Attainment

We can also interpret our graph using different trend equation as shown in the Table VI. In the log equations representing trends between unemployment rate and labor force with different educational attainment, the coefficients associated with $\ln LA_{it}$, $\ln LI_{it}$ and $\ln LB_{it}$ are -0.189, -3.11 and -3.903 respectively.

TABLE VI
UNEMPLOYMENT RATE VS. LABOR FORCE WITH INDIVIDUAL
EDUCATIONAL
ATTAINMENT (TREND EQUATION)

Trend	Equation	R^2
Log. (U_{it} vs. LA_{it})	$U_{it} = -0.189 \ln LA_{it} + 7.4356$	0.0001
Log. (U_{it} vs. LI_{it})	$U_{it} = -3.11 \ln LI_{it} + 18.135$	0.1199
Log. (U_{it} vs. LB_{it})	$U_{it} = -3.903 \ln LB_{it} + 20.137$	0.2588

The highest coefficient among them is -0.189 which is associated with natural log of labor force with advanced education whereas the lowest coefficient -3.903 is with the natural log of labor force with basic education.

5. CONCLUSION

In our empirical analysis we have found that overall unemployment rate could be explained by labor force with advanced education, intermediate education and basic education. Our estimates suggests us that with the increase of labor force with advanced education and basic education, the overall unemployment rate increases by an significant amount. However, labor force with intermediate education has a detrimental impact on the overall unemployment rate as any increase in labor force with intermediate education will eventually decrease overall unemployment rate,

although by a very insignificant amount. Our conclusion lead us to another research as change in labor force with any particular level of educational attainment only can't have the explanatory ability to explain overall unemployment. It is important to see how many labor force are actually unemployed in any labor force with a particular level of educational attainment. Because unemployment in labor force with different educational attainment can have direct co-relation with the overall unemployment rate of a country.

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7. APENDICES

Appendix 1: Educational Attainments

TABLE 1
EDUCATIONAL ATTAINMENTS

Educational Attainment	ISCED 2011 Levels	Code
Basic Education	Primary Education	ISCED 1
	Lower Secondary Education	ISCED 2
Intermediate Education	Upper Secondary Education	ISCED 3
	Post-Secondary non-Territory Education	ISCED 4
Advanced	Short Cycle Territory Education	ISCED 5

Education	Bachelor's Degree or Equivalent Territory Education Level	ISCED 6
	Bachelor's Degree or Equivalent Territory Education Level	ISCED 7
	Doctoral Degree or Equivalent Territory Education Level	ISCED 8

Appendix 2: World Development Indicators

TABLE 2
WORLD DEVELOPMENT INDICATORS

Indicator Name	Code
Unemployment (modeled ILO estimate)	SL.UEM.TOTL.ZS
Labor force with basic education	SL.TLF.BASC.ZS
Labor force with intermediate education	SL.TLF.INTM.ZS
Labor force with advanced education	SL.TLF.ADVN.ZS

Appendix 3: Low Middle Income Country Lists

TABLE 3
LIST OF LOWER MIDDLE INCOME COUNTRIES (53)

Angola	Micronesia, Fed. Sts.
Armenia	Moldova
Bangladesh	Mongolia
Bhutan	Morocco
Bolivia	Myanmar
Cabo Verde	Nicaragua
Cambodia	Nigeria
Cameroon	Pakistan
Congo, Rep.	Papua New Guinea
Cote d'Ivoire	Philippines
Djibouti	Sao Tome and Principe
Egypt, Arab Rep.	Solomon Islands
El Salvador	Sri Lanka
Georgia	Sudan
Ghana	Swaziland

Guatemala
Honduras
India
Indonesia
Jordan
Kenya
Kiribati
Kosovo
Kyrgyz Republic
Lao PDR
Lesotho
Mauritania

Syrian Arab Republic
Tajikistan
Timor-Leste
Tunisia
Ukraine
Uzbekistan
Vanuatu
Vietnam
West Bank and Gaza
Yemen, Rep.
Zambia
