ATTAINMENT OF HIGHER ENROLLMENT RATES IN PAKISTAN: A MACROECONOMIC AND ECONOMETRIC STUDY

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ABSTRACT

Education is always considered as the major determinant for the development of any economy. Enrollment at various levels also shows that how much education is common within the citizens of the country. Considering the importance of enrollment, the current study examines the influence of some macroeconomic variables on various levels i.e. primary, secondary, higher, college, professional and university enrollment in Pakistan. Time series data has been gathered on consumer price index, government revenue, employed labor force, government expenditure, and health expenditure for the period from 1972 to 2010. For long run estimates, Johansen Co integration test is used and short run estimates are taken through error correction model. The results of the study exhibit positive association of employed labor force, government expenditure and health expenditure with primary, secondary, higher, college, professional and university enrollment in Pakistan. On the other side, consumer price index and government revenue have been found to be inversely influencing enrollment at various levels. Short run results are also much favorable for the economy and reveals convergence towards long run equilibrium due to any disturbances in the short run period. At the end study gives some policy implications that government should decrease consumer price index and tax rate and to increase government expenditure in terms of education and health for higher enrollment rates in Pakistan.

Keywords: *Enrollment, Pakistan, Government Expenditure, Consumer Price Index, Employed Labor Force, Government Revenue.*

I. INTRODUCTION

Education is inevitable for to the developmental strategy of an economy. It plays a vital role in human capital formation. Educated human capital has been found to have strong and consistent positive effects on economic growth and productivity of a country. It reflects substantial impact on the degree of social cohesion in a country. Equalization of educational levels reduces the regional disparities. Like many other developing countries, the situation of education sector in Pakistan has not been very encouraging due to poverty and dismal economic conditions in the country. Therefore, it is necessary the proportion of development spending on education must be increased. An extremely high portion of the educational budget is spent on recurrent heads, mainly comprising of salaries in contrast to the meager amount spent on quality improvements, such as teacher's training, curriculum development, supervision, monitoring etc; therefore, additional funds must be allocated for the purpose.

Hurtado et al. (1997) find differences in college expectations, preparation, and application across races and ethnicities. Perna (2000) also finds differences in measures of social and cultural capital, such as educational expectations, parental encouragement, and parental involvement, each of which increases the probability of enrollment. These differences may indicate a college information gap for some minorities. Freeman (1997) gives the example of financing, in particular whether future earnings would offset the cost of college (tuition and opportunity). Lucia and Baumann (2007) find differences between recent black and white high school graduates in the marginal effects of many of the explanatory variables in the college attendance decision. Hanushek (1992) finds evidence that teacher skill positively impacts student performance on standardized tests. Card and Krueger (1996) compare blacks and whites during and after the segregation era and find school quality improvements for blacks after segregation ended led to increases in wages and educational attainment.

The objective of this study is to observe the effectiveness of some macroeconomic variables on enrollment of Pakistan at primary, secondary, higher, college, professional and university levels in the short run as well as in the long run. The study is organized as follows: second section reviews some past studies, data and methodological issues are discussed in section third, long run and short run estimates are discussed in results and discussions section no. four, and last section deals with concluding remarks and also suggests some useful policies for the society.

II. LITERATURE REVIEW

The studies related to determinants of education or determinants of enrollment rates have been discussed several times in the past internationally as well as nationally. Some are conducted at micro level using primary data and some are at macro level using secondary data. We have reviewed few of them in this section.

Burney and Irfan (1995) have argued that less participation in education in developing countries can not be attributed due to insufficiency of schools. Child schooling reflects the parent's decision and capacity to invest in human capital formation. They have also examined the impact of household income, household size, ownership of assets, parent's education, parent's socio economic status, area literacy level and presence of school in the area on schooling of an individual child in Pakistan.

Deolalikar (1997) has attempted to estimate the joint demand for primary school enrollment and schooling expenditures per pupil using data from Kenya. He has estimated the differing impacts of additional school facilities and teacher pupil ratios on the household demand for primary schooling and also has explored the possibility of systematic income differences in the parameters of the schooling demand relations. He has gathered information about 59193 households (Aug 1994) using WMS-2 (Second Welfare Monitoring Survey) arranged by central bureau of Statistics (CBS). Parameters are estimated using Logistic regression analysis. The study concludes negative influence of number of younger male siblings in household, number of younger female siblings in household, household head has primary schooling, distance to water source on child aged (7-14) years being enrolled in primary school. In the same way, number of older female siblings in household, age of spouse of head, household head has post primary schoolings, household head's spouse has primary or post primary educated, and urban are significant cause of increase in primary school enrollment of child aged (7-14) years..

Ridker (1997) has presented an overview and discussion for nine studies and attempted to explain educational achievement, attainment and participation in different African countries. The study uses socioeconomic factors for educational outcomes, effect of quality improvements on enrollment, importance of hardware versus software, text books versus class size, professional versus para professional teachers, role of parent participation and has found that most of the variables are found to have positive impact on enrollment.

Acevedo and Salinas (2000) have analyzed the link between the governments' educational policy and the households' decision making with regards to its educational expenditure and schooling enrollment. They have used National Household income and expenditure survey (ENIGH) for the years 1984, 1989, 1992, 1994 and 1996 including Mexico, Compeche, Coahuila, Guanajuto, Hidalgo, Jalisco, Oaxaca and Tabasco. Probit model has been used for reliable estimation of parameters. Per capita income, years of schooling of head, rural area, age, age squared, number of rooms, finished floor, and sewage are contributing for more private school attendance while female gender and number of children are having inverse affect on private school attendance.

Connelly and Zhang (2003) have provided an analysis of school enrollment and graduation rates in China using 1990 Chinese census. Study concludes high correlation of location of residence and sex with enrollment and graduation. Rural girls have disadvantages in terms of enrollment and graduation rates. Enrollment and graduation milestone are also affected by parental education, presence of siblings, country level income and village level in school rates.

Bedi et al. (2004) have assessed the plausibility of various factors that may be responsible for the decline in primary school enrollment and identified the most cost effective policy interventions that may be used to influence enrollment. Welfare Monitoring Survey II (WMS) has been used for collection of information about more than 50000 individuals from all districts of Kenya. Estimates are calculated by using probit model. The study reveals that age, male, father's schooling, mother's schooling, number of rooms in house, teacher – skill level 1 (S1), teacher – skill level 2 (P1) and urban are positively affecting primary school enrollment. Primary school enrollment is dependent negatively on age squared and school costs.

Baumann (2007) has estimated a student choice model with three options no college, public college, and private college to investigate the differences in the college attendance decision between White, Blacks and Hispanics. The author has used Geo-codel National Longitudinal Surveys of Youth 1997 for information of 8984 people. He uses binary probit model for estimation of results. The study has found positive relationship of black, female, ASVAB (Armed Services vocational aptitude battery percentile scores on math and verbal sections), mother attended college, father attended college, grades, household income 25-50 thousands (2^{nd} Quartile), household income 50-100 thousands or more (3^{rd} or 4^{th} Quartile), college preparation program and tuition with public and private college enrollment. Similarly Public and Private College enrollment is found to be negatively related with Hispanic, and student – teacher ratio.

Tenikue (2007) has investigated the nature of school progression at primary, secondary and post secondary levels in Peru and also examined both school enrollment and school attainment. Survey on 11000 urban and rural Cameroonian households has been conducted and estimates are drawn using Probit regression analysis. Children of ages 11-12, 13-15, household head has primary, age of head, head or spouse (non wage) in agriculture sector, distance to private primary school, local participation rate to informal sector of adults (25-50), and number of 0-5 years give positive influence while estimated expenditure per head squared has negative impact on primary school enrollment. Secondary school enrollment increase due to child of ages 11-12, 13-15, estimated expenditure per head, son/ daughter of head, and number of female of 6-10 or 11-17 years. On the other side, head or spouse non wage worker and distance to public secondary school are reducing secondary school enrollment.

Mike et al. (2008) have described the socioeconomic determinants of primary school dropout in Uganda with the aid of a logistic model analysis using the 2004 national service delivery survey data. They have collected sample size of 17681 households and have used logistic regression model as an estimation technique. Results of the study show that gender household head, gender of pupil, orphanage due to death of mother, orphanage due to death of father, age of pupil, married household head, divorced household head, distance to school, annual school fees, economic active persons in household are enhancing primary school dropouts. On the other side, rural urban, age of head of household, widowed household head, age of pupil, academic attainment of father, academic attainment of mother and household size are decreasing primary school dropouts.

Carlson et al. (2011) have analyzed the factors that affect the aggregate number of students entering and leaving a district under open enrollment and also have investigated the determinants of each district level open enrolment transactions. Data of Colorado and Minnesota states have been accumulated from department of education from U.S census bureau and common core of data (CCD). In the study, test scores, free lunch, number of adjacent charters, median income, residential enrollment, residential per pupil spending are positively contributing towards students entering in Minnesota while free lunch squared, number of charter schools, mid size city, suburb, town and rural are caused to decrease in students entering in Minnesota state. On the other side, number of charter schools and residential enrollment are tended to have direct effect on students entering

in Colorado. Free lunch, median income, mid size city, suburb, town and rural are declining student entrance in Colorado.

III. DATA AND METHODOLOGY

Operational Models and Variables

The objective of the study is to analyze the factors affecting higher enrollment rates in Pakistan. For that purpose, we have incorporated few macroeconomic variables in our study to attain higher enrollment at macro level and operational models are specified as follows;

$$\Pr ien = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$
$$Secen = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$
$$Highen = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$
$$Collen = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$
$$\Pr ofen = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$
$$Univen = f(CPI, Employ, Govrev, Healthex, Gov\exp)$$

In the above models, Prien, Secen, Highen, Collen, Profen, and Univen are dependent variables and are respectively Primary Enrollment, Secondary Enrollment, Higher Enrollment, College Enrollment, Professional Enrollment, and University Enrollment. While CPI, Employ, Govrev, Healthex, and Govexp are explanatory variables respectively Consumer Price Index, Employed labor force, Government Revenue, Health Expenditures, and Government Expenditures (excluding health expenditures). The study uses Pakistan Economic Survey (2010 - 11), Handbook of Statistics on Pakistan 2010, Statistical year book 2011 and 50 years of Pakistan in Statistics as data sources. Time series data is carried out in the present analysis for the period from 1972 to 2010.

Estimation Procedures

Most of the studies conducted at macro level incorporate time series data. Estimation for time data analysis needs more clarification about appropriate estimation technique. Authors may use several types of time series techniques like Ordinary least square method, Maximum Likelihood Method, Autoregressive models, Johansen Co-integration technique, Autoregressive and Distributive lag models, Generalized Method of Movements etc. These all techniques may be applicable after examining characteristics of time series data. Time series data is having major problem of Stationarity from the last two or three decades. So we need to choose an appropriate technique to examine reliable relationships among variables. At first step, Dickey Fuller – GLS (ERS) (Unit root test) is to be conducted on all the variables to see stationary levels. If all the variables are stationary at 1st difference, it enables us to apply Johansen Co-integration test for long run relationships and also Error Correction model for short run results at second step. For Co-integration test, we need to choose specific lag length at which values of Akaike, Schwarz and Hannan – Quinn Information Criterion are minimized.

IV. RESULTS AND DISCUSSIONS

Unit Root Test

In order to check the order of integration of dependent and explanatory variables, the study organizes Dickey Fuller GLS (ERS) unit root test with intercept and intercept and trend in table 1 and 2 respectively. Final conclusion is drawn after comparing calculated value with critical values and study comes to the point that all included variables in the study are having order of integration 1 or stationary at 1st difference. This indication leads to conclusive decision about estimation technique that technique should be the Johansen Co integration and Error correction model.

Table 1: Dickey Fuller GLS (ERS) Unit root test with Intercept:

Variables	Order of Integration	Critical Values	Calculated Value	Conclusion
Collen	Level	-1.95*	0.83	
	1st Difference	-1.95*	-8.61	I(1)
CPI	Level	-1.95*	1.80	
	1st Difference	-1.95*	-0.59	
Employ	Level	-1.95*	0.38	
	1st Difference	-1.95*	-3.43	
Govexp	Level	-1.95*	-0.12	
	1st Difference	-1.95*	-1.97	

Govrev	Level	-1.95*	1.30	
	1st Difference	-1.95*	0.22	
Healthex	Level	-1.95*	3.45	
	1st Difference	-1.95*	-4.12	I(1)
Highen	Level	-1.95*	0.83	
	1st Difference	-1.95*	-3.08	I(1)
Prien	Level	-1.95*	0.54	
	1st Difference	-1.95*	-4.86	I(1)
Profen	Level	-1.95*	0.99	
	1st Difference	-1.95*	-6.58	I(1)
Secen	Level	-1.95*	1.44	
	1st Difference	-1.95*	-5.00	I(1)
Unien	Level	-1.95*	0.91	
	1st Difference	-1.95*	0.11	

Table 2: Dickey Fuller GLS (ERS) Unit root test with Intercept and Trend:

Variables	Order of Integration	Critical Values	Calculated Value	Conclusion
Collen	Level	-3.19*	-2.61	
CPI	Level	-3.19*	-0.66	
	1st Difference	-3.19*	-3.33	I(1)
Employ	Level	-3.19*	-1.59	
Govexp	Level	-3.19*	-2.92	I(1)
Govrev	Level	-3.19*	-0.81	
	1st Difference	-2.89**	-2.98	I(1)
Healthex	Level	-3.19*	0.18	
Highen	Level	-3.19*	-1.13	
Prien	Level	-3.19*	-2.67	
Profen	Level	-3.19*	-1.89	
Secen	Level	-3.19*	-2.03	
Unien	Level	-3.19*	-0.59	
	1st Difference	-3.19*	-4.65	I(1)

Note: * and ** shows critical values taken at 5 and 10 percent level respectively.

Johansen Co integration test entails lag length of the models to be ensured primarily. Appropriate lag length for all the models is selected as 2 on the basis of minimum values of Akaike, Schwarz and Hannan - Quinn Information Criterion as in table 3.

Table 3: Lag Length Selection Criteria

Lag	Akaike Information Criterion	Schwarz information Criterion	Hannan - Quinn Information Criterion
Primary Enrollment			
0	102.7980	103.0593	102.8901
1	90.91399	92.74260	91.55866
2	88.30034*	91.69633*	89.49758*
Secondary Enrollment			
0	100.7107	100.9720	100.8028
1	86.19494	88.02355	86.83961
2	83.93995*	87.33594*	85.13719*
Higher Enrollment			
0	98.79420	99.05543	98.88630
1	85.03926	86.86787	85.68393
2	82.73285*	86.12884*	83.93009*
College Enrollment			
0	98.46511	98.72634	98.55720

1	86.86677	88.69538	87.51144
2	83.80392*	87.19991*	85.00117*
Professional Enrollment			
0	96.62584	96.88707	96.71794
1	84.38407	86.21268	85.02874
2	80.93519*	84.33118*	82.13244*
University Enrollment			
0	95.64545	95.90668	95.73755
1	81.85245	83.68106	82.49712
2	79.26249*	82.65848*	80.45973*

Note: * shows minimum values of information criterions

After applying Johansen Co integration test, long run relationships are found for all of our included models on the basis of trace statistics and maximum Eigen value. Tables of trace statistics and maximum Eigen value are attached with the appendix A.

Long Run Estimates

The results of long run relationships are reported in table 4 and 5. Names of the variables are specified in rows. In columns, various models are regressed with their dependent variables. In round brackets, standard errors are given and similarly t – ratios are in square brackets. Long run coefficients are written in front of each variable without brackets. T – Ratios having absolute value greater than 2 show significance of variable at 5 percent level of significance.

With regards with consumer price index, co-integration results reveal that it is inversely affecting enrollment rates at primary, secondary, higher, college, professional and university level. Consumer price index indices higher price levels within the economy. As consumer goods are becoming costly, the cost of living is continuously rising but income level of the economy is more or less same. Studies at primary, secondary, higher, college, professional or university levels need more finances to complete it in better way. Due to this, for households, it will not be possible to carry on when cost of living has increased too much. Hence, inflation may have adverse effects on the enrollment level of the economy. Due to 1 unit increase in the value of CPI will be cause of 48.74, 24.53, 6.45, 9.89, and 4.93 millions lower enrollments at primary, secondary, higher, professional and university levels in the long run on the average respectively.

Table 4: Co-integration Test

Variables	Primary Enrollment	Secondary Enrollment	Higher Enrollment
CPI	-48.74816 (22.5306) [-2.16364]	-24.53470 (10.1871) [-2.40840]	-6.451176 (2.86416) [-2.25238]
Employ	934.4281 (79.7952) [11.7103]	245.0394 (46.0511) [5.32104]	128.9271 (10.0051) [12.8861]
Govrev	-0.158329 (0.00990) [-15.9916]	-0.037155 (0.00452) [-8.22693]	-0.014121 (0.00120) [-11.7279]
Healthex	0.445550 (0.09481) [4.69951]	0.412069 (0.04409) [9.34564]	0.117343 (0.01233) [9.51470]
Govexp	0.142180 (0.00847) [16.7818]	0.052207 (0.00390) [13.3844]	0.016605 (0.00110) [15.0414]
Constant	-16797.32 (1643.78) [-10.2187]	-3904.109 (937.749) [-4.16328]	-2343.299 (202.089) [-11.5954]

Coming towards employed labor force of the Pakistan, it demonstrates that there will be more enrollment at all levels due to more employed labor force. As people will be working in their work places, they will be earning more income level. At higher income, they will be able to finance their children at every level. This will lead to higher literacy rates in Pakistan. Employ variable is significant in case of primary, secondary, higher, college,

and professional level with positive sign. It may be interpreted as if employed labor force will increase by 1 million, on the average primary, secondary, higher, college and professional enrollment will enhance in the long run by 934, 245, 128, 62 and 37 millions annually respectively.

Table 5: Co-integration Test

Variables	College Enrollment	Professional Enrollment	University Enrollment
CPI	-1.681757 (1.48789) [-1.13030]	-9.892826 (1.17997) [-8.38398]	-4.931589 (1.33647) [-3.69000]
Employ	62.96084 (4.74966) [13.2559]	37.58672 (3.81576) [9.85038]	4.847809 (3.23721) [1.49753]
Govrev	-0.008669 (0.00070) [-12.3652]	-0.004234 (0.00059) [-7.19799]	-0.004658 (0.00042) [-11.0448]
Healthex	0.082850 (0.00691) [11.9848]	0.048249 (0.00587) [8.21781]	0.004742 (0.00473) [1.00239]
Govexp	0.009237 (0.00058) [15.8921]	0.005548 (0.00048) [11.6799]	0.002989 (0.00037) [7.98197]
Constant	-1192.733 (97.3347) [-12.2539]	-738.7296 (78.1871) [-9.44822]	-236.2009 (64.3514) [-3.67048]

Government revenue is also considered as major element influencing enrollment at primary, secondary, higher, college, professional and university levels. It is expected to be inversely related with enrollment in Pakistan. The study confirms negative impact on enrollment at all levels with significant coefficient values. Basically, government revenue is generated through taxes or other sides. If we consider here taxes as the source of government revenue, so it is directly collected through consumers and it is cause of declining disposable income level of the economy. When income will decrease, ultimately, people will not have much capacity to support their children to study at schools, colleges or universities. The coefficients suggest that due to 10 millions rise in government revenue, primary enrollment will decline by 1.5 millions, secondary enrollment by 0.37 millions, higher enrollment by 0.14 millions, college enrollment by 0.087 millions, professional enrollment by 0.042 millions and university enrollment by 0.046 millions on the average in the long run.

In addition to other variables, health expenditures may also be great cause of higher enrollment in the economy. Healthy people of the economy are assets for any nation. More expenditure on health leads to more health facilities in small towns, villages as well. Healthy nation will be able to attend schools, colleges and universities in better way. The coefficient of health expenditure is significant in case of primary, secondary, higher, college and professional enrollment. The coefficients propose that due to more health expenditure of one millions, primary, secondary, higher, college and professional enrollment rises by 0.44, 0.41, 0.11, 0.08 and 0.04 millions on the average in the long run respectively.

Enrollment of any country is dependent on many other factors like development and non developmental expenditure, general administration, defense expenditure, law and order, community services, social services, and economic services etc. These all are included in government expenditure of any country. Considering important variable, the study includes government expenditure as major determinant of higher enrollment rate in Pakistan. Luckily, we have found this variable as highly significant with positive coefficient values for all of our models. These suggest that government expenditure of Pakistan with an addition of 1 millions rupees is significant cause of 0.14, 0.05, 0.02, 0.01, 0.005, 0.002 millions more enrollment at primary, secondary, higher, college, professional and university level respectively on the average in the long run. More government expenditure leads to more expenditure on education, defense, law and order situation, social services and these all variables are helpful in attaining higher enrollment levels. Intercept term exhibits negative correlation with primary, secondary, higher, college, professional and university enrollment in the long run on the average.

Short Run Estimates

With the intention of studying impact on enrollment in the short run, we have pertained error correction model. Short run estimates are offered in table 6 with speed of adjustment as an additional term showing dynamic changes in short run. Speed of adjustment terms given for primary, secondary and higher enrollment advocate

that long run equilibrium will be restored by 13, 2 and 3 percent annual adjustments respectively due to short term disturbances.

Table 6: Error Correction Model

Variables	Primary Enrollment	Secondary Enrollment	Higher Enrollment
Speed of Adjustment	-0.139470 (0.12964) [-1.07582]	-0.023167 (0.05400) [-0.42899]	-0.035034 (0.07132) [-0.49122]
D(Prien(-1))	-0.500779 (0.16335) [-3.06570]		
D(Prien(-2))	-0.316591 (0.16061) [-1.97122]		
D(Secen(-1))		0.118012 (0.27878) [0.42332]	
D(Secen(-2))		0.063282 (0.24093) [0.26266]	
D(Highen(-1))			0.231784 (0.18828) [1.23106]
D(Highen(-2))			0.035391 (0.11534) [0.30684]
D(CPI(-1))	90.85949 (95.1203) [0.95521]	4.772629 (26.4226) [0.18063]	1.107542 (8.63386) [0.12828]
D(CPI(-2))	-48.65833 (206.218) [-0.23596]	13.89421 (37.2760) [0.37274]	7.709277 (17.9195) [0.43022]
D(Employ(-1))	206.2490 (118.782) [1.73637]	19.03145 (22.9265) [0.83011]	6.235847 (8.82805) [0.70637]
D(Employ(-2))	271.3742 (126.957) [2.13753]	14.56141 (22.5178) [0.64666]	-0.231497 (8.95574) [-0.02585]
D(Govrev(-1))	-0.020022 (0.01147) [-1.74550]	0.000960 (0.00217) [0.44262]	0.001066 (0.00068) [1.56506]
D(Govrev(-2))	-0.019217 (0.01355) [-1.41801]	0.001808 (0.00253) [0.71585]	0.000860 (0.00095) [0.90495]
D(Healthex(-1))	-0.058571 (0.08423) [-0.69539]	-0.018335 (0.02285) [-0.80250]	-0.005716 (0.00860) [-0.66470]
D(Healthex(-2))	0.027690 (0.07413) [0.37353]	0.023619 (0.02180) [1.08320]	0.010531 (0.00810) [1.29935]
D(Govexp(-1))	0.018212 (0.01594) [1.14256]	-0.001310 (0.00235) [-0.55723]	-0.000486 (0.00085) [-0.57210]
D(Govexp(-2))	0.010115 (0.01035) [0.97718]	-0.002342 (0.00243) [-0.96407]	-0.001624 (0.00065) [-2.51674]
R-squared	0.361244	0.512631	0.698763
Adj. R-squared	0.027981	0.258352	0.541596
F-statistic	1.083959	2.016016	4.445988

Short run results provided in table 7 describe that if there will be any disturbances in the short period, it will take time that long run equilibrium will be restored. Equilibrium will be reinstated by taking 11, 15 and 9 percent annual adjustments in college, professional and university enrollment on the average.

Table 7: Error Correction Model

Variables	College Enrollment	Professional Enrollment	University Enrollment
Speed of Adjustment	-0.110709 (0.19877) [-0.55696]	-0.152326 (0.14858) [-1.02518]	-0.096550 (0.11967) [-0.80678]
D(Collen(-1))	-0.461728 (0.26425) [-1.74732]		
D(Collen(-2))	-0.270133 (0.22956) [-1.17675]		
D(Profen(-1))		-0.081427 (0.26272) [-0.30993]	
D(Profen(-2))		0.121070 (0.31999) [0.37836]	
D(Univen(-1))			0.504275 (0.24655) [2.04531]
D(Univen(-2))			0.001767 (0.40010) [0.00442]
D(CPI(-1))	9.563721 (15.0872) [0.63390]	9.268104 (5.91861) [1.56593]	-2.007521 (3.00001) [-0.66917]
D(CPI(-2))	3.253687 (20.7427) [0.15686]	-13.42273 (8.93565) [-1.50215]	-0.165255 (4.55338) [-0.03629]
D(Employ(-1))	-12.82631 (13.8474) [-0.92626]	7.922337 (5.60463) [1.41354]	0.491036 (4.32181) [0.11362]
D(Employ(-2))	-16.50751 (16.4396) [-1.00413]	3.773696 (6.07849) [0.62083]	4.098226 (3.25948) [1.25732]
D(Govrev(-1))	0.002318 (0.00149) [1.55380]	-0.000450 (0.00052) [-0.86835]	0.000118 (0.00057) [0.20590]
D(Govrev(-2))	0.001856 (0.00185) [1.00401]	0.000140 (0.00073) [0.19160]	-0.000991 (0.00058) [-1.69601]
D(Healthex(-1))	0.007760 (0.01558) [0.49807]	-0.003727 (0.00644) [-0.57869]	-0.002671 (0.00207) [-1.29094]
D(Healthex(-2))	0.008906 (0.01311) [0.67954]	-0.006420 (0.00554) [-1.15894]	-0.001089 (0.00206) [-0.52888]
D(Govexp(-1))	-0.001232 (0.00132) [-0.93613]	0.000691 (0.00056) [1.22431]	0.000622 (0.00035) [1.79631]
D(Govexp(-2))	-0.002191 (0.00116) [-1.89500]	0.000208 (0.00047) [0.44214]	0.000252 (0.00038) [0.66062]
R-squared	0.390680	0.348167	0.798496
Adj. R-squared	0.072774	0.008080	0.693363
F-statistic	1.228917	1.023760	7.595133

V. CONCLUDING REMARKS AND POLICY SUGGESTIONS

The present study focuses on macroeconomic determinants of enrollment in Pakistan at primary, secondary, higher, college, professional and university levels. Johansen Co integration approach has been used for that purpose. Dickey Fuller GLS (ERS) unit root test is conducted and finalized that all variables are stationary at 1st difference fulfils preliminary condition of Johansen Co integration test and error correction model. Using Akaike, Schwarz and Hannan – Quinn Information Criterions, we have selected 2 as an appropriate lag length.

Long run results of the study suggests that primary, secondary, higher, college, professional and university enrollment may increase due to increase in employed labor force, health expenditure, and government expenditure of Pakistan. While, in Pakistan enrollments at all levels are inversely related to consumer price index, and government revenue. Short run results are different from long run, but these are much important with the point of speed of adjustment term and suggests that if there will be any disturbance in the short run, long run equilibrium will be restored after taking 13, 2, 3, 11, 15 and 9 percents annually adjustment on the average.

On the basis on results of the study, a fruitful conclusion may be drawn with effective policy making that increase in price of consumer goods and changes in tax rate may have adverse effects on enrollment at all levels. Both the factors are big cause of affecting purchasing power of consumer and it also disturbs disposable personal income. Government should have good control on these factors concerning such severe drawbacks. On the other side, Government should also do significant increase in employment, government expenditure, health expenditures, and educational expenditure to enhance enrollment at all levels.

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APPENDIX A

Primary Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.915004	208.1198	103.8473	0.0000
At most 1 *	0.664602	119.3744	76.97277	0.0000
At most 2 *	0.599716	80.04663	54.07904	0.0001
At most 3 *	0.514844	47.08575	35.19275	0.0017
At most 4 *	0.329747	21.04746	20.26184	0.0389
At most 5	0.168523	6.643844	9.164546	0.1465
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.915004	88.74541	40.95680	0.0000
At most 1 *	0.664602	39.32777	34.80587	0.0135
At most 2 *	0.599716	32.96088	28.58808	0.0129
At most 3 *	0.514844	26.03829	22.29962	0.0143
At most 4	0.329747	14.40362	15.89210	0.0844
At most 5	0.168523	6.643844	9.164546	0.1465

Secondary Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.915972	234.6950	103.8473	0.0000
At most 1 *	0.778461	145.5374	76.97277	0.0000
At most 2 *	0.648399	91.27980	54.07904	0.0000
At most 3 *	0.552319	53.65047	35.19275	0.0002
At most 4 *	0.361990	24.71823	20.26184	0.0113
At most 5	0.211179	8.539769	9.164546	0.0656
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.915972	89.15758	40.95680	0.0000
At most 1 *	0.778461	54.25762	34.80587	0.0001
At most 2 *	0.648399	37.62933	28.58808	0.0027

At most 3 *	0.552319	28.93224	22.29962	0.0051
At most 4 *	0.361990	16.17846	15.89210	0.0451
At most 5	0.211179	8.539769	9.164546	0.0656

Higher Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.916365	205.9413	103.8473	0.0000
At most 1 *	0.695758	116.6147	76.97277	0.0000
At most 2 *	0.617264	73.77717	54.07904	0.0004
At most 3 *	0.453450	39.20240	35.19275	0.0175
At most 4	0.293593	17.45373	20.26184	0.1165
At most 5	0.128258	4.941408	9.164546	0.2899
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.916365	89.32664	40.95680	0.0000
At most 1 *	0.695758	42.83752	34.80587	0.0045
At most 2 *	0.617264	34.57477	28.58808	0.0076
At most 3	0.453450	21.74867	22.29962	0.0595
At most 4	0.293593	12.51232	15.89210	0.1582
At most 5	0.128258	4.941408	9.164546	0.2899

College Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.957580	285.8774	103.8473	0.0000
At most 1 *	0.863755	172.1123	76.97277	0.0000
At most 2 *	0.664119	100.3534	54.07904	0.0000
At most 3 *	0.510587	61.07745	35.19275	0.0000
At most 4 *	0.477970	35.35371	20.26184	0.0002
At most 5 *	0.282524	11.95259	9.164546	0.0144
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.957580	113.7652	40.95680	0.0000
At most 1 *	0.863755	71.75887	34.80587	0.0000
At most 2 *	0.664119	39.27596	28.58808	0.0015
At most 3 *	0.510587	25.72374	22.29962	0.0160
At most 4 *	0.477970	23.40112	15.89210	0.0027
At most 5 *	0.282524	11.95259	9.164546	0.0144

Professional Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.903798	233.3103	103.8473	0.0000
At most 1 *	0.807400	149.0233	76.97277	0.0000
At most 2 *	0.612061	89.72625	54.07904	0.0000
At most 3 *	0.494285	55.63756	35.19275	0.0001
At most 4 *	0.421616	31.09344	20.26184	0.0011
At most 5 *	0.271078	11.38280	9.164546	0.0187
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.903798	84.28706	40.95680	0.0000
At most 1 *	0.807400	59.29702	34.80587	0.0000
At most 2 *	0.612061	34.08868	28.58808	0.0089
At most 3 *	0.494285	24.54412	22.29962	0.0239
At most 4 *	0.421616	19.71064	15.89210	0.0119
At most 5 *	0.271078	11.38280	9.164546	0.0187

University Enrollment:

Unrestricted Co integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.869586	201.6537	103.8473	0.0000
At most 1 *	0.827911	128.3201	76.97277	0.0000
At most 2 *	0.539757	64.96935	54.07904	0.0040
At most 3 *	0.436403	37.03332	35.19275	0.0313
At most 4	0.268474	16.39032	20.26184	0.1569
At most 5	0.132955	5.135924	9.164546	0.2689
Unrestricted Co integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.869586	73.33358	40.95680	0.0000
At most 1 *	0.827911	63.35074	34.80587	0.0000
At most 2	0.539757	27.93603	28.58808	0.0604
At most 3	0.436403	20.64300	22.29962	0.0837
At most 4	0.268474	11.25439	15.89210	0.2336
At most 5	0.132955	5.135924	9.164546	0.2689