

Estimating Employment Elasticity of Growth for Pakistan

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Abstract

The main objective of present paper is to investigate quantitatively the effect of economic growth on employment in Pakistan for 2015 through 1981. The study carries out Engle-Granger co-integration Approach and employment elasticity formula to capture the impact of economic growth on employment. The results of the study show that overall employment elasticity of growth in Pakistan for the study period is 0.45 which suggests that economic growth in Pakistan is employment creating. Co integration results are also consistent with results calculated through former method. The study concludes that economic growth in Pakistan between 1981 and 2015 acted as catalyst to create labor market at large. The study suggests that not only sustained and balance economic growth but process of economic growth, which generates new jobs, is extremely vital to increase the employment elasticity of growth.

Keywords: Economic Growth, Employment Elasticity, Co integration

Introduction

Jobless economic growth asserted the enormous attention of development economists since the advent of technology (Khan, 2007). Rapid economic growth is only possible in modern era through technological progress that however, might lessen the employment opportunities in the country (Choi, 2007). Despite this fact it is worth mentioning that some economies of the world not only succeeded in keeping the pace of technological progress but also maintained full employment level. Over past two decades many countries like Taiwan, Korea and Hong Kong have experienced enormous economic growth with sustained employment and technological progress. The interesting feature of this robust growth is its output in terms of elasticity of demand for labor force which ultimately led to an impressive wage increase at almost same rate as capita output. According to (Schmid, 2008, p88-90), the type of economic growth (extensive and intensive), is important variable that determines the rhythm of job creation in relation to economic growth.

If employment growth is in excess of the growth of output it leads to decline in productivity of employees. It is consensus among economists that economic growth needs to be employment integrated (Aziz- ur- Rehman 2001, Nayyar, 2002, Luis and Choque, 2003, Mullah et al). In some developing countries employment has usually been expanded at a substantially faster rate than output. The objective of such expansion in employment is

apparently to protect workers rather than to make growth endowed resources based development. Producing employment as a method of social security is not instrumental. It does not guarantee rapid economic growth. Using employment merely as an instrument for guaranteeing livelihood irrespective of the employee's contribution to output has never been a prudent policy (Chakarvarty, 2012). High growth rate is necessary but not the sufficient condition for creating remunerative, productive and decent employment (Rashid Amjad, 2007).

The main objective of present study is to test the inverse form of Okun's postulation. This theory analyses relationship between economic growth and unemployment. It is fact that the capital augmenting technology inhibits the further demand for labor in the manufacturing sector of Pakistan and employment elasticities tend to fall as capital intensities increase (Shiekh and Iqbal 1992). But evidence (Haider, 2010) showed that employment in Pakistan is exorbitantly determined by economic growth

Literature Review

Literature is replete with studies on employment - growth nexus with strong empirical evidence. This exigency arises because majority of the countries are experiencing jobless growth- growth in which economy grows but employment does not grow proportionately (Choi, 2007, Khan, 2008). Recent studies (Kapsos, 2005, Dopke, 2001) on European Union show that there is positive and strong relationship economic growth and employment implying that economic growth generates new jobs, but intensity differs from country to country and from period to period. Kapsos (2005) found that for every one percent of additional GDP growth, total employment has grown between 0.3 and 0.38 percent point during three periods between 1991 and 2003.

It is worth mentioning that contemporary researches lay more emphasis on the total factor productivity effect on economic growth (Mehmood 2009). China's high and impressive economic growth since the initiation of economic reforms in 1978 can rightly be attributed export- oriented, labor – intensive manufacturing activities (Yan 2009).

Seyfried (2005) examined the relationship between employment and economic growth for ten largest states of United States employing simple regression technique on the data collected from the Bureau of Economic Analysis for the period 1990 -2003. The results were also compared with those generated through pooled regression. The findings of the study suggested that economic growth influences employment positively but insignificantly.

Choi (2007) examined the employment elasticity of growth for the Korea for 2005 through 1971. The paper identified structural determinants of employment elasticity for the Korean economy. The paper pointed out that superficially labor saving technology alone might not be responsible for slow increase in employment but other side of the labor market, labor supply to wage is an important determinant of employment of economic growth.

Herman (2011) investigated the impact of economic growth on employment in European Union countries between 2000 and 2010. The findings of the study suggested that low employment elasticity of economic growth In European Union existed. The study concluded that it is process of economic growth which in deed creates new jobs.

Various studies on employment – economic growth in Pakistan reflect that there exists a close relationship between economic growth and employment. (Baqai, 1979, Haider, 2010, Majid, 2000)¹.

METHODOLOGY

The methodology is based on Cobb - Douglas Production function (Choi, 2006). This function provides the framework to establish the relationship between growth and employment. The configuration of the model is specified as follow:

$$Y = f (A, K, N)$$

Where Y, A, K, N are output, technology, capital stock, and employment respectively at given period of time. It is further assumed that that production function exhibits constants returns to scales.

Inverse form of this production function is postulated as:

$$N = f(Y)$$

Estimation of Employment Elasticity

A handy device to investigate the effect of economic growth on employment is to compute employment elasticity of economic growth (Jiun, 2012). A high value of elasticity points the capacity of growth to generate higher employment.

Two methods have gained currency for the estimation of employment elasticity of growth:

A simple method measure the arc elasticity, that is, elasticity is computed between two different in points, rather than at a point in time. Arc elasticity is given by;

$$E = \Delta N/N \div \Delta Y/Y$$

Where N= Employment

Y = GDP at factor cost (1999-2000)

Other is econometric estimation;

$$\text{Log}(N) = \alpha_0 + \alpha_1 \text{Log}(Y)$$

α_1 = Employment elasticity

Where

$$\alpha_1 = d \text{Log}(N) / d \text{log}(Y)$$

Arc employment elasticity does not lonely determine whether a sector is experiencing a rising or falling productivity over time, and does not accurately measure how much employment growth is associated with a particular level of output growth over time.

Econometrics Model: Engle-Granger Co-integration technique is employed to analyze the long run equilibrium between employment and economic growth.

Co-integration Test: Granger (1981) was first to introduce the concept of co-integration, which was further developed by Engel and Granger (1987) AND Phillips and Ouliaris (1990). Engle Granger Test postulates that; for given regression;

$$Y_t + \alpha + \beta X_t + \mu t$$

- Time series Y_t and X_t are non – stationary at level but stationary at first difference.
- There exists linear relationship between these two series if their residuals are found stationary at level.

3.3.2 Error Correction Model: To determine the short run dynamics of the regression model an error correction model can be built as follow:

$$\Delta N_t = \omega_1 + \omega_2 \Delta(GDP)_t - \rho \theta^{\wedge} t - 1 + v_t$$

Estimation Results

Based on the methodology described in previous section estimation results have been presented in this section. Results have been also compared with some other studies carried out for different time periods using different methodologies.

Empirical Results of Employment Elasticity¹: Employment elasticity is a handy statistic for assessing the employment intensity of economic growth. Higher employment elasticity means a higher rate of growth of employment for a given increase in product of an economy. Elasticities are computed using simple method as well as econometrics estimations Extent to which economic growth in Pakistan for 1981 through 2011 is employment friendly, this section serves the results.

Arc Elasticity by Formula: Employment elasticity is calculated by employing simple algebra. The formula is given as:

$$\text{Employment Elasticity} = \text{Employment Growth} \div \text{GDP Growth Rate}^2.$$

It is worth mentioning that elasticity exceeding one with positive growth is associated with positive employment growth but negative productivity growth. So economists are usually observe caution while interpreting employment elasticity

Table 4.1: Employment Elasticity of Growth (1970-2010)

Year	GDP (Growth rate)	Employment (Growth)	Employment Elasticity
FY1970	4.8	2.1	0.44
Fy1980	6.66	2.2	0.2
FY1990	4.70	3.1	0.66
Fy2000	3.64	-1.3	-0.33
FY2010	3.1	3.2	0.84

Source: Author’s own calculation own calculation

Elasticity by Econometric Technique :In this section employment elasticity of output are computed using simple econometrics technique. The study period is divided into three sub period and for each period elasticity is computed by using formula, $\text{Log}(N) = a_0 + a_1 \log(Y) + \varepsilon$

Table 4.2: Empirical Results of Overall Elasticity and for Sub-Periods

Year	1970-80	1981-90	1991-2000	2001-2010	1970-15
Elasticity	0.34	0.36	0.51	0.435	0.45

Source: Economic Survey of Pakistan and Author’s own calculations

Comparison of Results: The results calculated for employment elasticity in the present study are compared with the results of earlier studies. The employment elasticity calculated for sub period 1980-90, 1990-2000, 2000-04 and 2005-07 have been shown in table (4.3).

Employment – Economic Growth linkage: Following the Engle and Granger methodology for co-integration, to capture the impact of economic growth on the employment unit root test has been performed to decide about the order of the integration of both the time series variables as a first step. Augmented Dickey – Fuller test has been employed for conclusion. Suppose one of the variables, GDP, is required to make stationary, it can be done by following equation;

$$D(GDP_t) = \alpha + \beta[2D\{GDP(-1)\}] + \varepsilon_t$$

In this way employment can be made stationary. ADF without trend and intercept is worked out. ADF results are presented in the following diagram.

¹The present study follows the method for calculating elasticity adopted by Huong et al (2003) for Vietnam for 1986 through 2001

² $\Delta \text{Employment} / \Delta \text{GDP} \div \text{GDP} / \text{Employment}$

Table 4.5: ADF Test on GDP and Employment

Variable	Level/Difference	ADF with intercept	99%	95%	90%	Conclusion
GDP	level	-3.8	-3.67	-2.97	-2.62	I(0)
	1 st Difference	-5.8	-3.68	-2.97	-2.62	I(1)
Employment	level	-3.20	-3.67	-2.97	-2.62	I(0)
	1 st Difference	-6.31	-3.68	-2.97	-2.62	I(1)

Source Author’s own calculation

Calculations are based on statistical package E.View (5.1)

95 % critical value for both variables without trend and intercept is -1.96

ADF results reported in the table (4.5) signal that both variables of the study are stationary at level as well as at first difference. This set the stage to employ the co-integration. So the next step is to run the regression on the level to generate the residuals and then to carry out the ADF on residuals which need to be stationary on level.

Testing the Long Run Relationship: As a first step estimate relationship between employment and economic growth employment is regressed on GDP and residuals are saved. OLS results are presented in Table (4.6)

Table 4.6: Estimation result of Long-Run Relation Employment-GDP Model

Variable	Coefficient	S.E	t-Stat	p-value
C	48.21*	4.537	10.625	0.0000
GDP	-1.63**	0.63	-2.587	0.0451
R-Squared 0.96		D.W 1.08	Prob(F) 0.000	

Calculations are based on statistical package E.View

* Indicates Statistically Significant at 95% level

**Indicate Statistically Significant at 10% level

Table: 4.7: ADF Test for Residuals

ADF	99%	95%	90%	D-W	P-value
-3.457*	-3.67	-2.97	-2.92	1.85	0.005

Calculations are based on Statistical Package E,View (5.1),

*Indicates the 1 percent level of significance

The test results reported in the table (4.7) suggest that residuals have no unit root. This infers that long run relationship between employment and economic growth holds.

Error- Correction Model: To determine the short run dynamics of the regression model an error correction model can be built as follow:

$$\Delta Nt = \omega_1 + \omega_2 \Delta(GDP)t - \rho \hat{\theta}^t - 1 + vt$$

Table 4.8: Error-Correction Estimation

Variable	Co-efficient	St.Error	t-Value	p-Value
C	0.025	1.22	0.020	0.98
Δ (GDP)	-1.40*	0.52	-2.67	0.01
Residual (-1)	-1.15*	0.21	-5.41	0.0000
R-Squared	0.545	D.W 1.78		Prob (F) .009

Calculation are based on Statistical Package E.View

*indicates significance level at 99 percent

Results of ECM reported in table (4.8) suggest that value of equilibrium error term is not zero but has negative value. Negative value of error correction is indicative of existence of short run equilibrium. However, non-zero value of coefficient of ρ signals that equilibrium is not restored within the same period. One time lagged employment is below its equilibrium value. Value -1.15 of error- correction coefficient reveals that less than one percent of the disequilibrium in employment produced by GDP would be adjusted in every year.

Conclusion

This study is based on employment elasticity formula in conjecturing the elasticity of employment with respect to economic growth. The main objective of the study is to determine the causal link between employment and economic growth for the period 1981 to 2015. The employment elasticity for the study period is 0.45 implying that one percent increase in GDP of the country results in 0.45 percent proportionate change in employment asserting that economic growth for the study period was not altogether jobless.

The study also examines the relationship between employment and economic growth through regression estimation. Engle Granger co integration technique is employed to gauge the impact of economic growth on the employment in Pakistan. The empirical results suggest that economic growth is powerful and significant determinant of employment.

On the basis of findings of the study it can be suggested that sustained balanced and resilient economic growth ensures productive, remunerative and employment. A nominal, wavering and untenable economic growth by every standard cannot be termed as pro-employed. A tottering growth of economy appears to just guarantee a mere pittance to its workers. Hence Pakistan under present circumstances needs to follow and implement Global Employment Agenda of ILO which stresses to address the twine issues of promoting higher productivity and creating employment opportunities in order to raise the standard of living of its masses and secure long-period sustainable growth. There is a pressing need for sustaining the rapid labor-absorbing growth which ensures the provision of productive and remunerative employment to the poor.

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