World Applied Sciences Journal 17 (10): 1298-1302, 2012
ISSN 1818-4952

Impact of Vocational Training and Skill Development on Economic Growth in Pakistan

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Abstract: Human Capital is an essential determinant of economic growth. It comprise of different factors like education, health, migration, vocational training, IT development. Vocational training and skill development is among one of them. Vocation training improves the productivity and enhances the efficiency of the labour for better participation in economic development. The objective of this study is to determine the impact of vocational training on economic growth of Pakistan for the period 1980-2010. Johnson co-integration and error correction methods are used to determine the nature of relationship and granger causality with in error correction framework is used to determine the direction of relationship between the variables.

Key words: Human Capital · Vocational Training · Economic Growth · Pakistan

INTRODUCTION

The term Human Capital is an integrated part of Human Resource Development, however practically both the terms are considered as synonyms. Different economists and institutions have defined the concept of human resource development in various ways. For example ILO (1998) "the total skills of population in relation to countries development are called human capital formation" [1]. Human capital formation can take a variety of forms, formal Schooling, on the Job training, job market information, Health and Sanitation and Migration. According to Schultz (1961) an improvement in human activities due to which a person proves himself more productive and more beneficial according to the changes in the economy is called human capital formation [2].

Among the others, Vocational training and skill development is one very important component of HRD. The level of technological capacity in a society is linked with its system of mass education and technical/vocational training. Economic development and technological advancement cannot be attained without the general status of technical and vocational competency embodied in its workforce. A developing country like Pakistan must seek to create a system of technical and vocational training for its youth to match the requirement for trained manpower in an expanding modern sector. Absence of sufficient skilled labor needs market adjustment, which involves less efficient methods and lower quality.

It is essential to visualize the need for vocational training not as meeting to immediate market demand but responding to the underlying need for a long-run structural change in the production technology of Pakistan. About three quarters of the industrial labor force is illiterate.

Technical training in South Asia is neither supporting a high economic growth nor increasing employment opportunities due to some reasons. Technical education needs to be refocused on the skills demanded by domestic and global markets.

The objective of this paper is to determine the impact of Vocational training and skill development in Pakistan for the period 1980-2010.

Literature Review: Becker and Mincer [3, 4] stated that, education, vocational training and skill development have been considered main factor of human capital from which life time earning and indirect positive benefits are found for an individual.

According to Booth and Snower [5] professional training and skill development enable the human more productive and increase their earnings which help in expansion of the economy.

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According to Amjad [6] the skill development and vocational training impacts on national products and competitiveness. He conclude that educated and skilled labor force assists countries in transformation of the economy's from the labor intensive to skill intensive.

Tripathi [7] stated that, Training in general and skills development in particular, play a vital role in individual, organizational and overall national economic growth. Skill development can be defined as a process to acquiring and sharpening capabilities to perform various functions associated with their present and future roles. Haq [8] also suggested that human capabilities can be improved through better education and training.

The research of Kurosaki and Khan [9] in the context of rural Pakistan reveals that the wages and productivity in nonfarm activities rise with greater emphasis on higher education and training while the effects of primary education on crop productivity are positive. The trend of getting higher education in farm sector is small. The researcher's emphasis on implementing a policy to give a priority to primary education so to raise the level of productivity in farm sector and to give higher education to individuals engaged in nonfarm sectors to keep the private returns.

Kazmi [10] in his study pointed out that vocational training and skill development are the tools to improve the productivity of the labor force of any country. Both the vocational training and skill development are the most important factors of human capital development of the country. The study stated that the public expenditure on vocational education must be increased from its current level in order to improve the human capital in the country.

Anders Nilsson [11] in his study stated that the vocational education and training are the most important factors for economic growth as well as social inclusion in the country. He concluded his study by pointing out the need of determining the period where the company based skill development training actually starts to affect the productivity and the long run economic and social growth.

Jusoff, *et al.* [12] estimated the impact of the implementation of vocational subjects at secondary school level in Malaysia. The study was based on primary data collected through questioners and interviews. The study concluded the ICT is one of the very important element of vocational subjects introduced at secondary school level.

MATERIALS AND METHODS

Solow (10) proposed a growth model by assuming that the economy grows with the expansion in stock of labor and capital.

$$Y = AK^{a}L^{1-\alpha} \quad (1)$$

Where Y indicates the economic growth, A is technological progress, K is capital stock and L represents the stock of labour.

The model was further expended by Romer, Mankiw and Weil [11] to include the Human Capital in the model as input factor. Assuming that the economy grows with the increase in the stock of Labor, Physical capital and Human capital.

$$Y = AK^{\alpha} H^{\beta} L^{1-\alpha-\beta} \quad (2)$$

Where, H is used to represent the stock of human capital. The Human capital is defined as the investment in stock of labor force in increase their productivity and efficiency.

Human capital can be decomposed into two major factors, i.e. Education and Health. Where education is assumed to improve the productivity and skills and Health is assumed to improve the efficiency of the labor.

As the objective of this study is to determine the impact of Education and vocational training on economic growth in Pakistan, so the Equation (2) can be reframed as:

$$Y = AK^{\alpha} E^{\beta} L^{1-\alpha-\beta} \quad (3)$$

Where, E represents the education factor of human capital. Equation (3) is used to develop the empirical model for the analysis. Data used in this study is taken from the state Bank of Pakistan and world development indicators. Real GDP growth rate is used to indicate the economic growth, government expenditure on education as a percentage of GDP is used to show the government spending on education, Labor force participation rate is used to indicate the participation of active labor in the economy, gross fixed capital formation is used as a indicator of Physical capital, enrolment rate in vocational training institutes is used as measure of vocational training and skill development and adult literacy rate is used to indicate the literacy situation in Pakistan. Natural logarithm has been taken on the both sides of the model.

$LnY = \alpha + \beta 1Ln(GFCF) + \beta 2Ln(LFPR) + \beta 3Ln(EGDP) + \beta 4Ln(VOC) + \beta 5Ln(LITR) + \mu i$

Where:

Ln = Natural Logarithm
Y = Real GDP
EDUEXP = Government Expenditure on Education on Education as % of GDP
LFPR = Labor Force Participation Rate
GFCF = Gross Fixed Capital Formation
VOC = Enrolment Rate in Vocational Training Institutes
LITR = Adult Literacy Rate
μi = Error Term

Methodology: In a time series analysis the first step is to determine the order of integration of all the variables, ADF unit root test is used for this purpose. After determining the order of integration co-integration test and error correction model are used to determine the long run and short run relationship between the variables. Finally, granger causality with in error correction framework is used to determine the direction of causality between all the variables.

RESULTS AND DISCUSSION

ADF is used to determine the order of integration in all the series. The test is conducted at level and at first difference. The results given in Table 1 indicate that the

Table 1: Unit Root Test

	ADF Level		ADF First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
LNY	0.81	-5.09	-1.39	-7.92*
LNEDUEXP	-1.29	-4.25	-2.29	-4.49*
LNGFCF		-4.92*	-0.46	-5.91*
LNLFPR	-0.10	-6.32*	-2.30	-7.97*
LNVOC	-0.43	-5.24	-1.87	-5.36*
LNLITR	-0.89	-3.12	1.45	-5.58*
LNGFCF	-0.67	-5.71	2.03	-4.79*

Table 2: Co-integration test (A) Trace Statistics

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.974794	203.8754	107.3466	0.0000
At most 1 *	0.866525	108.1777	79.34145	0.0001
At most 2 *	0.653660	55.81789	55.24578	0.0445
At most 3	0.497483	28.24918	35.01090	0.2197
At most 4	0.275617	10.35790	18.39771	0.4466
At most 5	0.073134	1.974596	3.841466	0.1600

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

(B) Max-Eigen Statistics

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.974794	95.69772	43.41977	0.0000
At most 1 *	0.866525	52.35981	37.16359	0.0005
At most 2	0.653660	27.56871	30.81507	0.1186
At most 3	0.497483	17.89128	24.25202	0.2766
At most 4	0.275617	8.383302	17.14769	0.5610
At most 5	0.073134	1.974596	3.841466	0.1600

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 3: Error Correction Model

Error Correction:	D(LNGDPGR)	D(LNGFCF)	D(LNLFPR)	D(LNVOCI)	D(LNLITR)	D(LNEDUGDP)
CointEq1	0.174029	2821.191	0.061728	54.34658	-0.123995	-0.001385
	(0.10084)	(1483.94)	(0.02693)	(19.1260)	(0.05557)	(0.01162)
	[1.72572]	[1.90115]	[2.29247]	[2.84150]	[-2.23132]	[-0.11924]
D(LNGDPGR(-1))	-0.699081	2427.616	-0.019927	-56.78556	0.012084	-0.015873
	(0.25422)	(3740.96)	(0.06788)	(48.2159)	(0.14009)	(0.02929)
	[-2.74985]	[0.64893]	[-0.29357]	[-1.17773]	[0.08626]	[-0.54189]
D(LNGFCF(-1))	-3.60E-05	0.431729	-1.86E-07	-0.005520	1.74E-05	-9.40E-07
	(1.6E-05)	(0.23742)	(4.3E-06)	(0.00306)	(8.9E-06)	(1.9E-06)
	[-2.23020]	[1.81840]	[-0.04307]	[-1.80387]	[1.95383]	[-0.50579]
D(LNLFPR(-1))	-1.611805	-12821.91	-0.739620	-496.3741	0.935290	-0.030112
	(1.22667)	(18050.7)	(0.32753)	(232.649)	(0.67596)	(0.14133)
	[-1.31396]	[-0.71033]	[-2.25816]	[-2.13357]	[1.38365]	[-0.21306]
D(LNVOCI(-1))	-0.000621	15.87899	-0.000112	-0.241968	0.000517	1.80E-05
	(0.00133)	(19.5893)	(0.00036)	(0.25248)	(0.00073)	(0.00015)
	[-0.46636]	[0.81060]	[-0.31533]	[-0.95837]	[0.70450]	[0.11768]
D(LNLITR(-1))	-0.159669	-6160.585	0.029088	-79.74978	0.000553	-0.000600
	(0.38628)	(5684.21)	(0.10314)	(73.2617)	(0.21286)	(0.04451)
	[-0.41335]	[-1.08381]	[0.28202]	[-1.08856]	[0.00260]	[-0.01349]
D(LNEDUGDP(-1))	-1.584447	-54799.75	0.180043	342.2615	1.359744	-0.044363
	(2.42066)	(35620.3)	(0.64634)	(459.098)	(1.33390)	(0.27890)
	[-0.65455]	[-1.53844]	[0.27856]	[0.74551]	[1.01937]	[-0.15906]
C	1.490913	30481.00	0.079261	405.7747	0.399586	0.067791
	(0.97602)	(14362.3)	(0.26060)	(185.110)	(0.53783)	(0.11245)
	[1.52755]	[2.12230]	[0.30414]	[2.19207]	[0.74295]	[0.60284]

Table 4: Causality Based On Vector Error Correction Model

	Independent					
Dependent	LNY	LNGFCF	LNLFPR	LNVOC	LNLITR	LNEDUGDP
LNY	----	4.97*	1.72*	0.21	0.17	0.42
LNGFCF	0.42	----	0.50	0.66	1.17*	2.36*
LNLFPR	0.86	0.20	----	0.09	0.07	0.07
LNVOC	1.38*	3.25*	4.55*	----	1.18*	0.55
LNLITR	0.00	3.81*	1.91*	0.49	---	1.09*
LNEDUGDP	0.29	0.25	0.17	0.45	0.31	---

variable possess non stationery properties when test at level, however all the variables become stationery at first difference.

To determine the long run relationship between the variables, johansen co-integration test is used. Optimal lag length determined by The "FPE, AIC AND SC" criterion is 1. Table 2 presents the result of Johansen co-integration test. The trace test indicates 3 and maximum eigenvalue indicate 2 co-integrating equations at 5% level of significance, which indicate that the model do possess a long run relationship.

The results of co-integration test indicate the possible presence of error correction model. Thus, the vector error correction model is tested.

Table 3 indicates the results of error correction model. The results indicate that only Literacy rate seems to have significant error correction term, which indicates that only literacy rate has short run effect in the model.

Table 4 shows granger causality with in error correction framework. The results indicate that unidirectional causality runs from GFCF to GDP and LFPR to GDP. Bidirectional causality exists between GFCF and Literacy rate. Unidirectional casualty runs from GDP to VOC, GFCF to VOC, LFPR to VOC and LIRT to VOC. Bidirectional causality exist between LITR and GFCF and unidirectional causality runs from LFPR to LITR. Similarly, unidirectional causality running from EDUGDP to LITR.

CONCLUSION

This study aims to determine the impact of vocational training on economic growth of Pakistan for the period 1980-2010. Results indicate that spending on education sector by the government helps in increasing the literacy rate and the stock on capital in country. The increasing literacy rate in turn improves the capital stock further. Literacy rate also improve the rate of vocational training in the country. Increase in labour force participation rate found to be helping in increasing the GDP growth rate, vocation training and literacy rate in the country. It is because increasing participation of labour in economic activity motivates them to improve their own skill and efficiency so they can participate more and earn more.

Even though the importance of vocation training in recognized and a lot of improvement has been observed in quality of education and vocation training, there is still a room for improvement. Next section presents the policy measure to improve the vocational training and skill development in Pakistan.

Strategy for Vocational Training and Skill Development: Directory of occupations be prepared. Must be provided complete information about each profession. This information can be obtained from various agencies.

- The formal apprenticeship programmes have not yielded the desired result due to many reasons. There has been considerable resistance on the part of employers to such schemes; it is recommended that employers should be induced for this purpose.
- The informal sector has made tremendous contribution to skill training in Pakistan. A scheme should be devised to train this manpower in their relevant fields in a more systematic and scientific manner.
- To cope with the future challenges of technical advancement, the existing vocational and technical training system needs to be improved and marked with the needs of the economy. The role of private sector needs to be enhanced and industrial associations may be supported and encouraged. There is need for providing computer training facility and introduction of in-service training and vocational skills to prepare the materials for private sector skilled manpower, a necessary requirement for the socio-economic development of the country.

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