Impact of Health Status and Education on Labour Force Participation in Botswana: An Empirical Study

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ABSTRACT

Impact of health and education on labour force participation in Botswana has been investigated for the period 1982-2013. The main findings were that; an increase of primary school enrolment increases the overall participation rate. An increase in contemporaneous education expenditure increases the total labour force participation rate in the long-run but reduces their participation in the short-run. The study also shows that an increase in contemporaneous health expenditure increases the overall labour force participation rate increases in the long-run. Finally, given the importance of health and education on labour force participation rate in Botswana, the study assert that it is of paramount importance for government to incorporate strategies that encourage her citizen to recognise the need to maintain good health and education. In absence of such recommendation, Botswana might find it difficult to achieve most of its vision 2016 and MDG's goals.

Key Words: Government expenditure in Education, Government expenditure in Health, and Total Labour Force Participation

INTRODUCTION

Health and Education are two important components of human capital which are positively associated with workers' productivity, since abundant human capital underlines strong incentives for people to engage in paid work (Becker, 1994). According to Botswana Vision 2016 goals related to health and education are consistent with Millennium Development Goals (MDG's). A better understanding of the relationship between health, and education on labour market outcomes is necessary to undertake the impact of their limitations to the economy via its effect on labour force participation (Chirikos, 1993). The health of the workforce is an important factor in sustaining and potentially enhancing labour force participation. Health limitations reduce labour productivity and lead to reduced participation by those with poor health. In addition, health problems impose a cost on the economy in terms of production loss and reduced participation by those with poor health. For this reason, this study has provided an empirical explanation of the impact of health and the role of education

on labor force participation in Botswana. The paper is organized as follows: Section two contains an overview of Botswana's economy, while section three review the theoretical and empirical literature from other related studies from which the paper derived factors having a potential impact on labour force participation. The methodology, econometric specification and estimated results are presented in section four. Empirical results and their interpretations are discussed in section five followed by the concluding section.

OVERVIEW OF BOTSWANA'S ECONOMY

Botswana has developed from a least developed country (LDC) status at the time of independence in 1966 to middle income country (MIC) status within three decades, largely owing to the effective use of revenues from mineral resources following the discovery of large diamond reserves. It has managed to graduate out of the group of poorest and least developed countries, and has now moved into the group of upper middle income countries in the World Bank classification (World Bank, 2010). Its average growth has been quite high compared to its neighbouring countries in the Africa region (Siphambe, 2007). Between 1966 and 2000 Botswana's real per capita economic growth rate was an average 6.9 per cent per year, one of the highest growth rates in the world and even outpacing the "Asian tigers" though it has been surrounded by wars of independence and civil unrest in neighbouring countries (Klaveren *et al*., 2009). Botswana's per capita gross domestic product grew from BP 32,038 in 2006 to BP 66,801 in 2015 (Bank of Botswana, 2016). The main contributor to the growth of Gross domestic product was mainly due to the contribution of the mining sector. Lack of diversification has seen the country depending largely on the mining sector in general and diamonds in particular (Sinha *et al*. 2011). Since the mining sector has been a major source of the growth, whereas its nature of work is capital intensive, it has created limited opportunities for employment creation. Lower inflow of FDI into non-mining sectors has accentuated the problem of diversification and job creation. During 1980-91 the overall employment elasticity was 0.89 which declined to 0.34 during 1991-2005 (Siphambe, 2007), but later it increased to 0.62 during 2006-10 as per our estimates.

Labour Market Policies in Botswana

Botswana's income policy adopted in 1972 to cover areas where the dynamics of market forces in determining prices, wages and incomes may not result in efficient and/or equitable results (Siphambe, 2007). The Revised National Policy on Incomes, Employment, Prices and Profits were reviewed in 2003-04 with a view to aligning Botswana's incomes policy with the best international practices, as well as with the county's vision 2016 and other national policies (Tabengwa and Salkin, 2006). Some of the components of the policy are the introduction of minimum wages for agricultural and domestic service workers. A number of institutions were also developed as part of a tripartite system to bring together workers, employers and government. Some of these institutions are: the National Employment, Manpower and Incomes Council (NEMIC), the Wages policy Committee (WPC) and the Minimum Wages Advisory Board (Siphambe, 2007). Currently, the mandate of the National

Employment Manpower and Incomes Council (NEMIC), which advises the government on the numeration of the public service has ceased.

Education in Botswana

Botswana has recorded remarkable progress in the provision of educational services to its people since independence. Consequently, the government used its revenues to expand schooling both in terms of physical facilities and an increase in enrolment (Siphambe, 2007). The primary school gross enrolment has risen significantly in 2010 compared with a level of *98.3 per cent* in 1999. Adult literacy has risen from *69 per cent* to *84 per cent* between 1991 and 2009 (World Bank, 2010). Total public spending on education as a percentage of GDP has risen from 8 per cent in 2007 to 8.9 per cent in 2009 (Bank of Botswana, 2016). This shows that there has been a significant increase of about 0.9 percentage point between the two periods.

The Botswana Revised National Policy on Education (RNPE) of April 1994 has guided the programme activities of the Ministry of Education in terms of curriculum reforms and on-going improvements in the education system since National Development Plan 8. The implementation of the RNPE was intended to cover a timeframe of 25 years given that its recommendations had been classified for implementation in the short, medium and long term, respectively (Botswana Federation of Trade Unions, 2007). Despite an improvement in the accessibility and quality of Education in Botswana, it has been observed that education system in Botswana is academically oriented schooling system that does not encourage diversity of career opportunities (Ministry of Labour and Home Affairs, 2004). The education sector has always received the lion's share of both the development and recurrent budgets of government, and as a result of this effort, there has been a large increase in the number of graduates from all levels of schooling, some of whom are unable to find jobs in the labour market (Siphambe, 2007). The mismatch between the supply of tertiary graduates and market demand for labour lead to an escalation of the minimum requirements, therefore, jobs that were previously the preserve of illiterates, and primary school graduates now compete for secondary school graduates.

Health in Botswana

In the health sector, the government of Botswana has provided relatively good health infrastructure since the independence. The investment in health grew at an annual average of *13 per cent* from 1976 to 1994 (Thobogang, 2006). The last decade has seen a *50 per cent* increase in the number of beds available in hospitals and clinics, and provision of health posts and mobile stops in rural areas, improvements in the number of doctors (2.3 per thousand in 1994 compared with less than one in 20, 000 in 1966) and nurses (22.6 per thousand in 1994 compared with less than one in 1966 (Government of Botswana, Vision 2016). As outlined in Botswana's Vision 2016, health services are well above average developing country standards, reaching some *90 per cent* of the population. Life expectancy at birth currently stood at about 55 years compared to 52 years in 2006 (United Nations Population Division, 2009). Improved sanitation facilities as a percentage of population with the access to facilities stood at 60 percent (World Bank, 2010).

Despite the improvement in health services, HIV/AIDS and other related diseases remain a challenge to economic growth and labour force participation in Sub-Saharan Africa and particularly in Botswana (Klaveren et al., 2009). Total expenditure on health in Botswana as percentage of GDP stood at 10.3 per cent from 4.2 per cent in 1995, while health share of domestically funded government estimated at 12.9 from 7.7 in 1998 (World Health Organization, 2011). Due to increased expenditure on healthcare, training and sick pay, investments as well as savings will be significantly reduced; loss of educated and trained people in the most productive years of their lives, yearly growth over the period 2001-2021 has been predicted that it would fall by 1.5-2.0 per cent, resulting in an economy 25-35 per cent smaller as a result of HIV/AIDS than it would have been otherwise (Klaveren, *et al* 2009). The crude birth rate per 1000 declined from 39.3 in 1991 to 25 in 2007. Life expectancy also decreased from 65 years in 1991 to 50 years in 2007 (CSO, 2007). The prevalence and incidence of non-communicable diseases also are on the increase such as cardiovascular diseases, diabetes and cancers. The Ministry of Health (MoH) is responsible for the formulation of Policies, norms, standards and guidelines for health services delivery as well as the provision of secondary and tertiary care whiles the Ministry of Local Government (MLG) is responsible for the delivery of Primary Healthcare services through District Health Teams.

LITERATURE REVIEW

In an attempt to understand the dynamics attendant to education and health and how they impact on labour force, the current study uses "Human Capital Theory" as its theoretical framework. The theoretical underpinnings of human capital investment go back to the work by Becker (1964). The theory states that education or training raises the productivity of workers by imparting useful knowledge and skills, hence raising workers' future income by increasing their lifetime earnings. It is on this basis that education increases the likelihood of participating in the labour force. Contrary to Human Capital Theory, the screening and signal theory as a possible frame work further explain the dynamics associated with the labour force participation. The theory asserts that employers generally use education as a screening device to get the most likely productive workforce. Therefore, an individual with a higher level of education are more likely to be employed in the labour force compared to an individual with lower levels of education. Those with primary and middle school qualifications have a higher likelihood of participation than those with no schooling. Individuals with higher levels of education have necessary skills demanded in the market; they are not vulnerable to layoffs and are more likely to put more effort into job search. Prevalence of screening in Botswana suggests that people engage in schooling to earn more rather than to be productive in the workplace (Siphambe 2007).

Human capital theory postulates that health status and labour force participation are positively related. Both employees and employers value health like they value education because good health facilitates an individual to perform a job adequately. Hence, poor health is likely to have an adverse effect on work performance and leads to lower productivity, hence low productivity associated with poor health decreases individual's earnings potential, the opportunity costs of leisure and therefore their willingness to participate in the labour force (Grossman, 1972). Poor health may cause individuals to value time out of the labour market

more since the time needed to care one's health increases with poor health (Cai and Kalb, 2004). Poor health may also make the withdrawal from the labour market more attractive by influencing the time horizon over which economic decisions are made, hence, lowering the probability of participating in the labour force (Chirikos, 1993). Poor health may also imply that individuals may need more health services, and in order to meet increased demand for health services, individuals may need to be active in the labour force (Cai and Kalb, 2004).

Education and Labour Force Participation

The amount of labour supplied by individuals tends to increase with education because higher educational attainment is associated with better wages, more enjoyable jobs and with tasks that involve a lower risk of acquiring a disability (Laplagne, *et al*., 2007 citing Productivity Commission 2005). The effects of greater educational attainment of the population would not necessarily raise individual job prospects to participate, because employers' hiring decisions are based on candidate's relative, not absolute qualifications (Lattimore, 2007). Younger people, who are in the lowest quarter of school achievers, are more likely to experience multiple periods out of the labour force (Hillman 2005) and qualifications gained later in life have as strong an influence on participation as qualifications earned earlier in life (Karmel and Wood, 2004). The persons with high literacy and numeracy levels had lower unemployment rates than persons with low levels of literacy and numeracy. Those with low literacy and numeracy skills have unemployment rates around 10 percentage points' greater than high achievers. Marks (2006) investigated the transition to full-time employment of young people who did not go to university. People's labour market experience, immediately after leaving school, that is, whether they obtained full-time employment or remained unemployed, was a good predictor of their subsequent labour market experiences. Hillman (2005) confirms that young people who are in the lowest quarter of school achievers, are more likely to experience multiple periods out of the labour force and not in full-time education. Karmel and Wood (2004) found that the relationship between education and labour force participation is positive for older workers, especially women. Qualifications gained later in life had as strong an influence on participation as qualifications earned earlier in life.

Health and Labour Force Participation

Several studies have found that health status influences the labour force participation of individuals (Ogawa and Hodge, 1994, Boskin, 1977, Adams *et al.*, 2003 and Smith, 2004). It was found that the impact of health on labour force participation is larger for older people than for younger ones. For example, for an older man a deterioration of health from good to fair reduces the probability of labour force participation by nearly 7 percent while for a younger man, the same change in health reduces the probability of labour force participation by less than 1 percent (Cai and Kalb, 2004:21). Study by Jones et al., (2004) using data from the Household, Income and Labour Dynamics in Australia (HILDA) survey found only modest differences between the participation rates of those with excellent, very good or good health while those with fair or poor health have far lower rates of participation. Deteriorating health is probably a better predictor of labour force participation at older ages than poor health *per se*

since many of those that have suffered poor health over extended periods have already adjusted their lives and careers accordingly (Bound and Burkhauser, 1999) also depends in part on the worker's skills and occupation. For example, high-stress occupations are more likely to lead to those with ill health leaving the workforce. However workers with well-developed and portable skills may more easily move into jobs that are more accommodative of their health issues than those with few skills or with job-specific skills only (Jose et al., 2004). Causality between health status and participation is not necessarily one-way; there will be a feedback effect from labour force participation to health if working affects a person's health (Adam and Flatau, 2005). To improve or maintain health status, individuals need to invest in their health, which requires both time and material resources, and the availability of resources may depend on the individual's labour force status (Cai and Kalb, 2004). The relationship between health and work can also work in the opposite direction whereby participation in work can impact on health outcomes particularly in working environments that are stressful in a physical or mental sense, where jobs are less secure and where there is an expectation of long working hours. Alternatively, participation in the workforce can have psychological benefits in terms of improving self-worth and confidence through social interaction and achieving greater material self-sufficiency (Gilfillan and Andrews, 2010: 96). Laplagne *et al.,* (2007) indicated that working might increase a person's general activity level, thus improving physical health. On the other hand, the nature of one's work may lead to deterioration in health, either because of the effects of working long hours or, at the opposite extreme, because too few hours of work may be associated with job insecurity. Laplagne, *et al.,* (2007) further argued that poor mental health is associated with a much lower probability of labour force participation than are physical illnesses or major injury.

Labour force participation can, in turn, influence a person's mental health, that is, working may have a positive or negative impact on mental health. Waghorn and Lloyd (2005) cited studies showing that positive and meaningful employment experiences may lead to: improved self-concept; higher ratings of subjective wellbeing; improved self-esteem; and increased personal empowerment. According to Doyle *et al.* (2005), employment benefited mental health by the provision of structured time, social contacts and satisfaction arising from involvement in a collective effort, hence job loss or the threat of losing a job is detrimental to health. Employment can have negative consequences for some people, especially those with a pre-existing mental health condition. The stress of work can lead to not only physical illness but also to psychological problems such as depression, burnout and breakdowns that can ultimately lead to workers being downsized, due to increased costs to the organisation (Dockery, 2006). Empirical analysis shows mixed findings with regard to the relationship between health status and labour force participation (Dwyer and Mitchell, 1999). This was attributed mainly to due to problems with data, measurement and methodological difficulties including the issue of enodogeneity (Pandey, 2009; Cai and Kalb, 2004).

METHODOLOGY

Model Specification

For the empirical analysis we have explained the labour force participation in terms of health and education. For the purpose of health we have considered life expectancy at birth (EXB) and expenditure on health(EXPH) as proportion of total government expenditure, similarly share of expenditure on education in total government expenditure (EXPedu), education has been considered in terms of primary school enrolment(PRIM), total number of paid employment (PEMPL) and average monthly earnings of employees (EARNING). The model has been estimated for total labour force. LFP = Labour force participation in Botswana, the model is expressed as follows into the linear equation of the form:

$$LFP_t = a_1 + \beta_1 LEXB_t + \beta_2 PRIM_t + \beta_3 EXPH_t + \beta_4 EXPedu_t + \beta_5 EARNINGS_t + \beta_6 PEMPL_t$$

Types and Sources of Data

Secondary annual data were used in the study. The data used in this study were sourced from World Bank Development indicators database and Bank of Botswana annual reports. The period considered for the study is 1982-2013 .The choice of the period of study has been dictated by the nature and availability of data at the time of the study.

Empirical Results and Discussions

Labour force participation rate was modelled in three forms namely the female labour force participation rate, male labour force participation rate and the total labour force participation rate. Eight models were estimated and four for each sub-period. For the detailed econometric results see Basuti (2012). In the present model we have considered the determinants of total labour force participation during 1982-2013. For the purpose of analysis, the period has been decomposed into two sub-periods -1982-96 and 1991-2013.

Our results for the period 1982-2006 are presented in Table 1 below and indicate that at the aggregate level, the effect of life expectancy is positive and significant. However, as the total life expectancy increases by a per cent, contemporaneous total labour force participation reduces by 0.11 per cent in model 1. It also shown that a per cent increase in total life expectancy in Botswana in the short-run increases the total labour force participation rate by 0.27 per cent and reduces by 0.71 per cent in the long-run in model 2. Most of the variables are statistically significant.

Table 1: Dynamic Ordinary Least Square Estimates (1982-2006)

Independent Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
PRIM		-0.03 (0.364)		0.17* (0.009)
EXPH	0.002 (0.107)	0.001 (0.629)	0.002 (0.371)	-0.004 (0.413)
EXPedu				0.02** (0.018)
EARNINGS	0.03* (0.000)	0.01* (0.004)	0.02* (0.008)	
LEBtotal		-0.11* (0.004)	-0.07*** (0.059)	
PEMPL	-0.02* (0.001)		-0.01 (0.160)	
D(EARNINGS(1))	0.012** (0.011)			
D(EARNINGS(-1))	-0.01** (0.017)		-0.01** (0.045)	
D(EXPH (1))	0.01** (0.029)			0.02** (0.026)
D(PEMPL l(-2))	-0.03* (0.001)			
D(PEMPL (2))	-0.03*** (0.084)		-0.02** (0.03)	
D(LEBtotal(2))		0.17** (0.021)	-0.12** (0.047)	
D(LEBtotal(-2))		0.27** (0.016)	0.19*** (0.072)	
D(EXPEDU (-1))				-0.06* (0.002)
C	4.41	4.82	4.63	3.45
R-squared	0.998	0.998	0.999	0.900
Adjusted R-squared	0.997	0.996	0.998	0.853
F-statistic	722.45* (0.000)	511.77* (0.000)	689.27* (0.000)	19.29* (0.000)

Figures within parentheses are the standard errors. ****Significant at 1 per cent, ** Significant at 5 per cent, *** Significant at 10 per cent. .***

A healthy nation constitutes of healthy people and which will translate to a health labour force and an increase in output. The findings indicated that one per cent increase in health expenditure in Botswana increases the total labour force participation (model 4) by 0.02 per cent in the short run, and by 0.01 per cent long-run (model 1). The findings were all statistically significant.

Impact of education on labour force participation is positive and significant. The findings of our study show that one per cent increase in contemporaneous gross primary school enrolment increases total labour force participation by 17 per cent (model 4). As discussed earlier, the male are more in the labour force in Botswana and government has over the years increase their health expenditure after the advent of HIV/Aids pandemic. Education has been seen as global need and every country is advice to make it affordable for citizen to acquire. Botswana government has made it as one of it priority and has incorporated it in her vision 2016. An informed nation is an education nation as stated in Botswana vision 2016. The study also shows that an increase in contemporaneous government expenditure on education

increases total labour force participation by 0.02 per cent and reduction of 0.06 units of total labour force participation in the short-run (see model 4).

The argument between wage and working is ambiguous and relative to the objective to an individual. Some might seems to work more as their earnings increases while others will work less as their earnings increases. The study reported that a per cent increase of the contemporaneous average yearly earnings increases the contemporaneous total labour force participation rate by 0.03 per cent in model 1. In the short-run, the same increase reduces the total labour force participation rate by 0.01 per cent and increases approximately to 0.01 per cent in the long-run from model 1.

Government of Botswana has been the largest player in the economy. This is evidence from yearly budget expenditure of government. In as much that autonomous consumption exists, consumption plays a very large role on gross domestic product of the economy. Simple economy theory indicated that if consumption increases living any other variable constant, the output will also increases which are equated to an increase in employment. However, the current study findings view is on the premise that consumption is a form of leisure and they are substitute, which is they cannot be done simultaneously. One per cent increase in public expenditure on health, which could be interpreted as government contribution to human capital, reduces total labour force participation rate by 0.004 per cent, whereas one per cent increase in each of the total expenditure on education, which could be interpreted as government contribution to human capital, increases total labour force participation rate by 0.02 per cent.

Four models (Models 5,6,7 and 8) have been estimated for the period 1991-2013, and results are presented in Table 2 .The effects of most of the variables on labour force participation remain unchanged for example average earning, life expectancy health expenditure, primary school enrolment and expenditure on education. In some cases the effect is not significant. We have experimented with two additional variables namely economic growth and prevalence rate of HIV, the effect of former is negative and not significant, and this may be because of a higher contribution of mining income in the total income. Effect of HIV prevalence is similar to that of expectation of life at birth.

Table 2: Ordinary Least Square (OLS) Estimates (1991-2013)

Independent Variables	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Intercept	83.48793* (0.0000)	55.14662* (0.0000)	91.95698* (0.0000)	80.70319* (0.0000)
PRIM			-0.03961 (0.030321)	
Earning				0.000314* (0.0000)
Lifeexp	-0.22526* (0.0000)		-0.23907* (0.0000)	-0.12269* (0.0000)
HIV-Prev, total (% of population ages 15-49)	-0.06628* (0.001424)	0.040002 (0.070246)	-0.09069* (0.0000)	-0.02306 (0.017477)
EXPH (% of government expenditure)	-0.05353 (0.212872)	0.165565* (0.014733)	-0.0248 (0.345583)	-0.00347 (0.849582)
PEMPL, 15+,Total (%) (ILO estimate)	0.085343* (0.043333)	0.319588 (0.0000)	0.014758 (0.563104)	0.010529 (0.570949)
EXPedu, total (% of government expenditure)	0.005937 (0.60186)	-0.04362 (0.032552)	0.006644 (0.332704)	0.001377 (0.770959)
GDP growth (annual %)	-0.00259 (0.826827)	-0.03383 (0.152858)	-0.01147 (0.136746)	-0.00086 (0.860041)
R-squared	0.975612	0.888342	0.991767	0.996087
Adjusted R-squared	0.966466	0.855502	0.986528	0.99426

Figures within parentheses are the standard errors

CONCLUSION

The main purpose of this study was to assess the impact of health and education on labour force participation in Botswana. The period study was from 1982-2013 and secondary data used for this study were taken from the World Bank and Bank of Botswana. Long-run relationship was found to exist except in instances where only three variables were included in the model. The main objective of the study was to assess the impact of health status and role of education on labour force participation in Botswana. The specific objectives are to examine the impact of education and health on the labour participation in Botswana. The main findings are that an increase of primary school enrolment does not affect the labour force participating. Expenditure on education has contemporaneous impact on the total labour force participation rate in Botswana. In the short-run, an increase in education expenditure in Botswana reduces the total labour force participation rate in the long-run.

Health is important and government should provide accessibility to the citizen to subsidised medical care. The study shows that an increase in health expenditure increases the overall labour force participation rate in Botswana in both short-run and long-run .As the annual earnings increases, contemporaneous labour force participation increases in Botswana in the long-run. Life expectancy is an important factor in determining the well-being or health status of a nation. Finally, an increase in total life expectancy in Botswana reduces total labour force participation in both short-run and long-run.

The findings show that education is an important factor that increases the labour force participation rate in Botswana. According to the study, both in the long-run and

contemporaneous education expenditure increases labour force participation rate. Based on the results, the study suggested that, government of Botswana should encourage her policies in work and education to be flexible. That is, policies which allows people who are full time students to have a part-time employment and as well as encourage its citizen to study in Botswana rather than outsize the country.

The backbone of Botswana Vision 2016 is based on the premise that a healthy nation is an informed nation. The expectation is that as more health one has, the more the individual is expected to live and as well as the more active the person becomes, keeping other condition constant. The study recommends that government should encourage some policies that reward individual contributions to his/her organization, especially in public sectors. Finally, relying on the current findings, there is an evident government crowding out private employment which was deduced from the relationship between the total labour force participation and number of paid employees. One is expected that an increase in number of paid jobs is a sign of expansion of economy and if such change is driving by private sector, such is expected to have a positive effect on total labour force participation and opposite is true for the economy that is driven by government.

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