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Unemployment in Limpopo Province in South Africa: Searching for Factors

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ABSTRACT Employment is one of the most significant determinants of the welfare of any nation. Any significant changes in employment will subsequently affect the living standard of the household. South Africa has been a victim of high unemployment rates, with the official unemployment rate rising from 15.6 percent in 1995 to a peak of 30.3 percent in 2001 and minimally declining to 26.7 percent recording a differential of 11 percentage-points since 1995. Limpopo tends to have the highest proportion of rural dwellers in South Africa, hence it is expected that conditions in the province are inferior to the national average; implying higher unemployment rate. After the demise of apartheid (post-1994), the supply of labor increased dramatically. The nascent labor entrants characterized as unskilled increased dramatically; but as the economy grew, there was a drastic shift towards a more skill- based economy creating massive lay-offs. This study attempts to find the determinants of unemployment in the Limpopo province using annual census data of 2008 from Global Insight. Regression, Principal Component and Cluster analyses have been employed in this study. Five variables, ethnicity, age, education, gender and GDP were categorized into fifteen as independent variables. The results show that unemployment is concentrated at qualifications below the degree. That GDP, male, matriculation and youth have no significant relationship with unemployment. Rather the model reveals that females, postgraduate studies, middle aged, primary, incomplete secondary schooling and Asian (ethnicity) are predictors of unemployment in the Limpopo province in South Africa.

INTRODUCTION

South Africa has one of the highest unemployment rates in the world, currently standing at 25.2 percent (that is, by the narrow definition of unemployment) based on figures released by StatsSA (2008). Thus, a quarter of economically active people are unemployed. Unemployment is a real matter of concern, as it can yield devastating effects on economic welfare, crime, erosion of human capital, social exclusion, misery and social instability (Kingdon and Knight 2007). Furthermore, the incidence of employment determines the distribution of income and poverty across different groups (Bhorat et al. 2001). Due to these undesirable effects, government has initiated well-meaning programmes such as skill training, job creation and public works programme but their effects have been minimal as high unemployment rates continue unabated (Akinyemi 2010). The Limpopo Province being one of the most under privileged and poorest is a victim of these high rates of unemployment. Therefore, it is essential to investigate the factors causing the prevalence of unemployment in this region so as to positively alter future empowerment strategies.

According to a study conducted by Kingdon and Knight (2004) on race/ethnicity and the incidence of unemployment in South Africa, unemployment varies dramatically by ethnicity. Africans face an unemployment rate of 41 percent compared to 23.3 percent, 17.1 percent, 6 percent of Coloureds, Indians (Asians) and Whites respectively. This indicates that the African-White ethnic gap in unemployment is 35 percentage-points and that Africans are more likely than any other ethnic group to be unemployed. Of the total African-White ethnic gap in unemployment with a probability of 33.7 percentage points, 25.4 percentage points is explained by African-White differences and only 8.3 percent is unexplained. Thus, a large share of this differential in unemployment among the ethnic groups is explained by employment enhancing characteristics such as education and location. Of the Coloured-White unemployment gap, 60 percent is explained by differences in characteristics and 40 percent is unexplained. About 63 percent of the Indian-White unemployment gap is explained by differences in characteristics and 37 percent is unexplained. The probability of unemployment that is attributable to discrimination by employers is 8.3, 6.5, 3.2 percentage points for Africans, Coloureds and Indians respectively (Kingdon and Knight 2004).

Dias (2005) in support of Kingdon and Knight's work, found that with respect to African males, 30.81 percent were unemployed compared to 20.77 percent, 16.22 percent, 4.5 percent of Coloureds, Indians and Whites males respectively. Similarly, 37.68 percent of African females were unemployed compared to 23.53 percent, 19.19 percent, 6.55 percent of Coloured, Indian and White females respectively. This tends to agree with Kingdon and Knight's (2004) work that unemployment is highest among Africans than any other ethnic group and lowest among Whites.

Profile of Limpopo Province

The Limpopo province is located in the northern most part of the country neighboring Botswana, Mozambique and Zimbabwe (see Fig. 1). The province covers aland size of 123910km²; accounting for 10.2 percent of South Africa's total land area

(StatsSA 2003). Majority of the population resides in rural areas in comparison to the national average of 50 percent. However, due to its rural make-up, conditions are substandard compared to the rest of the country with the exception of the Eastern Cape Province (Gyekye and Akinboade 2001).

Limpopo is characterized as a developing economy, portraying positive growth patterns. For instance, it experienced its highest growth of 3.8 percent between 1995 and 2001. Furthermore, its gross geographic/domestic product was quantified at 63,646 million rand signifying a 6 percent contribution to national Gross Domestic Product (that is, 3rd smallest provincial contribution). The most significant contributors to its economy are community, social and personal service, agriculture, forestry and hunting, wholesale and retail trade. The province is endowed with variety of minerals such as gold, platinum, etc.; hence mining is one of the mainstays of its economy. However, these minerals are exported in their raw state and in return manufactured goods and services are imported (Limpopo City Guide 2006).



Fig. 1. Limpopo province is the link between South Africa and other countries in Africa Source: Limpopo Province government.

Population Structure

The total population of the Limpopo province is 5,277,432 representing 11.7 percent of South Africa's total population. More than half of its population (52 percent) is female, with female dominance noticeable in the adult categories. This may be explained by the high migration rates of adult males in search of jobs, and in the old age category due to higher survival rate of women. The 2001 census shows that 54.6 percent of the population is female. A little over 40 percent of the total population in Limpopo is less than 15 years and 4 percent were aged 65 years and above depicting a tendency of high dependency ratio. The total population is mainly Africans with a share of 97.2 percent whereas 0.2 percent, 0.2 percent and 2.4 percent are Coloureds, Indians and Whites respectively (Limpopo City Guide 2006, 2009).

Economic Conditions

The 2001 Census recorded that 33.4 percent aged 20 years and above had no formal education (that is, 1 in every 3 people had no literacy skills). Nearly half (49 percent) of the economically active people are unemployed and 33 percent of the employed were in the informal sector. Poverty prevalence was very high, as 6 in every 10 persons fell below the poverty line in 2002 (ILO 1996). A little over 70 percent of the population lived in formal dwellings, 20 percent and 7 percent lived in traditional and informal dwellings respectively. Majority (78 percent) of households had access to clean drinking water. Approximately one in every 4 households had no access to toilet facilities and only 14 percent had refuse removal service. Majority (60 percent) of households still uses wood as their main source of energy for cooking, 25 percent and 11 percent of household use electricity and paraffin respectively (StatsSA 2003).

Mortality

In 2000, 53,815 deaths were recorded for the Limpopo province representing about 20 percent of the national deaths. A slightly higher proportion were male (50.9 percent) compared to 49.1 percent for females. Half of the deaths were due to communicable diseases such as HIV/AIDS while 40 percent and 10 percent were due to non-

communicable diseases and injuries respectively. The province suffered from high infant mortality (57 per 1000 live births) compared to the national average of 42. This was usually due to communicable diseases, maternal and prenatal diseases and also HIV/AIDS. Life expectancy was also low.

Unemployment and Ethnicity in the Country

Ethnicity plays a crucial role in determining access to employment in South Africa. Frijters (1999) conducted a study on the employment criteria for a large clothing firm and conclude that the firm was more likely to employ Indians than Africans based on their relative expected productivity. Although productivity defined as the number of faultless garments were lower for the firm's Africans than for its Indian employees (Standing et al. 2000).

METHODOLOGY

Secondary data, that is, annual census data from Global Insight have been used in this study. Statistical Analyses using Regression, Principal Component and Cluster have been employed. In determining the impact of ethnicity, gender, education, GDP, etc. on unemployment, regression analysis was first used. The primary essence of regression analysis is to find the relationship between the dependent and independent variable(s). This technique of analysis then exploits this association between these two variables to predict the values of the dependent variable from the independent variables. The dependent variable is expressed as a function of the independent variable and its corresponding parameters plus a stochastic error term. This stochastic error term accounts for all unobserved independent variables that would have had a significant impact on the dependent variable. This study employed the ordinary least square method due to its primary purpose to evaluate the relationship between a set of independent variables and a dependent variable.

Model Specification: Regression

The model constructed below is to assess the efficacy of unemployment determinants in the Limpopo province.

Unemployment = $\hat{a}_0 + \hat{a}_1GDP + \hat{a}_2African + \hat{a}_3White$ + â₄Coloured + â₅Asian + â₅Male + â₄Female + â₈No schooling + â, Primary + â, Incomplete school + â, Matric $+ \hat{a}_{12}$ degree $+ \hat{a}_{13}$ postgraduate $+ \hat{a}_{14}$ youth $+ \hat{a}_{15}$ Middle age $+ \hat{a}_{16}Old age + \hat{i}$

Where: GDP- Gross Domestic Product

â, - parameter î - Error term

Operational Definitions of Variables

Age The age variable is categorized into three: youth, middle and old age.

Indicator: The youth comprises all economically active people within the ages

of 15-29.

The middle age cohort comprised all economically active people within

age of 30-49 years.

The old age cohort comprised all economically active people within

age of 50-64 years.

Education Education is any act or experience that has a formative effect on the mind, character or physical ability of an individual. Education variable is divided into six categories.

Indicator:

No schooling is characterized by people with non access to formal education.

Primary education consists of people with the first six years of education Incomplete secondary consists of people who have had access to secondary education but dropped

Matric represents those who completed secondary school.

Tertiary education (post-secondary) is made up of undergraduate and postgraduate.

Ethnicity is the fact of belonging to a particular race (Hornby 2010).

Principal Component Analysis

The principal component analysis (PCA) is a variable reduction procedure. It explains the correlation structure of a set of predictor variables using a smaller set of linear combinations of these variables. Thus, they are used primarily as dimensionality reduction techniques in situations where a large number of closely related variables are used and where the purpose is to allow for the most important influences from all these variables at the same time. PCA is a useful technique where explanatory variables are closely related (that is, multicollinearity is present). If there are kexplanatory variables in the regression model, PCA will transform them into k uncorrelated variables.

It is useful when one has obtained data on a number of variables and believes that there is some redundancy in those variables. It is appropriate when one wishes to develop a smaller number of artificial variables that will account for most of the variables in the observed variables. It may then be used as a predictor or criterion variables in a subsequent analyses.

Cluster Analysis identifies and classifies objects, individuals or variables on the basis of the similarity of the characteristics they possess (Sclove 2001). These groups in which the variables are classified are not known in advance. Moreover, it seeks to minimize within-group variance and maximize between-group variance (Sclove 2001). In simple terms, cluster analysis partitions the set of observations into mutually exclusive groupings in order to best represent distinct set of observations within the sample. The main objectives of cluster analysis are congruent with principal component analysis; most commonly used cluster analysis procedure is hierarchical. Hierarchical cluster analysis is a way to investigate grouping data by creating a cluster tree. The tree is a multi-level hierarchy, where clusters at one level are joined as clusters at the next high level

RESULTS AND DISCUSSION

The Figure 2 shows the "relationship" that unemployment has with gender and ethnicity. It is quite obvious that unemployment is relatively higher for Africans than any other ethnic group. Moreover, there is a significant difference between unemployment figures for African males and females. Coloured unemployment rates are also very high; however it seems there is a minimal difference between unemployment rates for males and females of Coloureds, Indians (Asians) and Whites respectively.

Table 1 shows the distribution of the levels of education by ethnicity and chart (Fig. 2) reveals deficiencies in education levels for Africans and

Coloureds. Over 70 percent of education is concentrated at incomplete schooling and below for Africans and Coloureds while the reverse is true for Whites and Asians. These deficiencies might be related to poverty among the ethnic groups' cohorts, forcing them to terminate their schooling for the job market (Kingdon and Knight 2004). The figures suggest that about 60 percent of Asians and Whites have matric qualifications or more. Only 4 percent of whites have not gone past primary schooling, placing them in a better position to find employment. This might explain high unemployment rates amongst Africans and Coloureds as compared to Whites and Indians.

Table 1: The distribution of levels of education by ethnic group

Education	African	Colourea	l Asian	White
level	Percent		Percent	
No Schooling	19.1	6	3	1.7
Primary	12.6	7	10.6	1.7
Incomplete Secondary	50.4	51.7	31.4	33.8
Matric	16.0	32.1	40.5	50.9
Degree	1.5	1.7	10.2	8.02
Post- graduate	0.4	1.3	4	3.8

Source: Global Insight Census 2008

Results from Regression

Table 2 shows the model summary from the regression analysis. R represents the multiple correlation coefficient which measures the efficacy of regression by establishing the Pearson correlation between the true values of the target variable y and the estimates y obtained by substituting the corresponding values of x into the regre-

Table 2: Model summary from regression analysis

Equation parameters and variables	Value	
Dependent variable	Unemployment	
Independent variable	15	
R	.985	
R-squared	.971	
Adjusted R-squared	.964	
Std. Error of the Estimate	1965.691	

Predictors: White, Asian, Coloured, Male, Female, No schooling, Primary, Incomplete Secondary, degree, Postgraduate, youth, middle age, old age.

Source: Global Insight Census 2008

ssion equation. The correlation between y and y is known as the multiple correlation coefficients R. The multiple correlations can only take values within the range 0 to +1.that is 0d" R d"1.

A multiple correlation coefficient of zero represents no correlation between y and y while a coefficient of closer to 1 or 1 represents a (strong) perfect correlation. Therefore the multiple R is 0.985 which represents a strong correlation between y and y'.

Coefficient of determination (R²) is the proportion of the variance of the dependent variable that is accounted for by the linear regression of the independent variables. Thus, it is an indication of the goodness of fit of the model. The R-square is positively biased, however in order to correct the biasedness an Adjusted R-square is applied which is obviously less than R. The Adjusted R-square for this multiple regression is 0.971 indicating that the fitted regression line explains 97.1 percent of the variation in the dependent variable and only 2.9 percent is explained by the error term. This implies that the model is very good.

The regression ANOVA tests for a linear relationship between the variables (see Table 3). The F statistic is the ratio of the mean square for regression to the residual mean square. In this multiple regression the value of F is significantly smaller than 0.01.

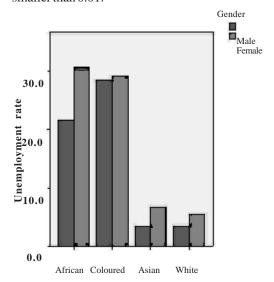


Fig. 2. Official unemployment by gender and ethnic group

Source: Global Insight Census 2008

Table 3: Results from ANOVA analysis

Mode	1	Sum of squares	Df	Mean square	F	Sig.
1	Regression Residual Total	8012912469.510 239564321.786 8252476791.295	15 62 77	534194164.634 3863940.674	138.251	.000(a)

Predictors: Age50_64, GDP, White, Asian, No_schooling, Coloured, Primary, Female, degree, Male, age30_49,

Incomplete_secondary, matric, youth, postgraduate

Dependent Variable: Unemployment Source: Global Insight Census 2008

Table 4: Coefficients of the independent variables - standardised and unstandardised

Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		В	Std. Error	Beta		
1	(Constant)	-1358.679	616.742		-2.203	.031
	GDP	-24.352	91.907	007	265	.792*
	White	701	.341	224	-2.053	.044
	Coloured	-12.969	4.465	332	-2.905	.005
	Asian	-34.444	9.196	974	-3.745	.000
	Male	087	.160	160	541	.590*
	Female	.782	.118	1.505	6.596	.000
	No schooling	.143	.064	.254	2.224	.030
	Primary	465	.146	478	-3.190	.002
	Incomplete secondary	.217	.074	1.009	2.936	.005
	Matric	.227	.178	.458	1.272	.208*
	Degree	-4.739	1.327	-1.102	-3.571	.001
	Postgraduate	24.576	5.983	1.952	4.107	.000
	Youth	.049	.070	.256	.705	.483*
	Middle age	623	.096	-1.934	-6.462	.000
	Old age	.503	.172	.571	2.934	.005

Dependent Variable: Unemployment Source: Global Insight Census 2008

As seen from the equation, the negative sign for GDP growth {in equation (1), with unstandardized coefficients), shows that there is an inverse relationship between GDP growth and unemployment (see Table 4). An increase in GDP growth will consequently lead to a fall in unemployment, although the t-statistic shows that the variable is not statistically significant at all levels of significance. All the ethnic variables (White, Coloured and Indian) have an inverse relationship with unemployment and the t-statistic for all the ethnic variables is significant. An increase in the number of each ethnic group will consequently reduce unemployment in the Limpopo province, although the impact of the ethnic variables on unemployment varies significantly. Being Asian (Indian) drastically reduces unemployment compared to Coloureds

and Whites. The coefficient (unstandardized) of Asian is -34.44 (see Table 4) indicating that when the Asian population increases by a person unemployment will drop by 34.4. This is relatively high to a drop in unemployment of 12.969 and 0.701 for Coloured's and White's respectively. This scenario might occur due to the relatively small number of the Asian population in the Limpopo province.

Estimated Linear Model (Unstandardized)

As seen from Table 4, the linear model (unstandardized) is given by:

Unemployment = -1358.679 -24.352GDP - 0.701White - 12.969Coloured - 34.444Asian

 $\begin{array}{l} -0.87 Male + 0.782 Female + 0.143 No \ schooling - \\ 0.465 Primary \end{array}$

Component Plot in Rotated Space

White coloured

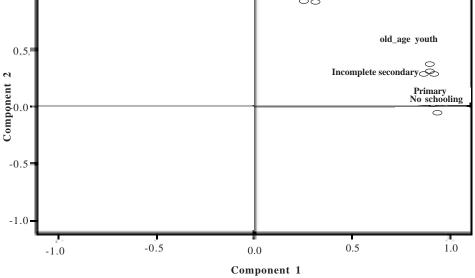


Fig. 3. Principal components analysis showing the two components

+0.217Incomplete Secondary + 0.227Matric -4.739Degree +

24.576Postgraduate + 0.049Youth - 0.623Middle $age+0.503Old\,age.....(1)$

Estimated Linear Model (Standardized)

0.5

Unemployment = -0.007 GDP - 0.224 White -0.332 Coloured - 0.974 Asian

-0.160 Male + 1.505 Female + 0.254 No schooling 0.478 Primary

+1.009 Incomplete Secondary + 0.458 Matric -1.102 Degree +

1.952 Postgraduate + 0.256 Youth - 1.934 Middle age + 0.573Old age.....(2)

From Table 4, the model (standardized, which is the predictive model), explains that unemployment is concentrated at qualifications below the degree level. Unemployment in Limpopo is structural in nature. The people's skills are substandard to job requirements. Matriculants were negative predictors of employment as employers were sceptical about the future productivity of these potential employees (Standing et al. 2000, Dias 2005). Secondly, the matriculants are likely to have no work experience whilst schooling and also might have higher wage reservation since they might not be knowledgeable about the skills they possess. Therefore, they intend to remain as long as they find a job of choice in which most often, is a mirage. The model shows that post-graduate studies is the most predictor of unemployment with a standardized coefficient of 1.952, followed by middle aged with -1.934, females with 1.505, degree with -1.102, Incomplete secondary with 1.009 and Asian with -0.974. unemployment and post-graduate studies move in the same direction and this is questionable [see O Akinyemi (2010) for better understanding of the phenomenon]. Because one expects postgraduate candidates to find job easily and therefore post-graduates studies be negatively related to unemployment. The reason for this seeming anomaly may be due to the fact that the sample size for those doing post-graduate studies is very small, less than 4 percent. Unemployment in Limpopo is concentrated among the following categories: middle age, females, degree, incomplete secondary education and old age and ethnicity (Indian).

Results from the Principal Component Analysis (PCA)

In this study, as can be seen from the plot (Fig. 3), the principal component analysis reduced the initial fifteen independent categories (variables) into seven presented in two principal components, namely: ethnicity and "illiterate youth"; where the ethnicity comprised White and Coloured; and the "illiterate youth" comprised no schooling, primary, incomplete secondary school, youth and old age (Tables 5 and 6). Thus, the seven reduced variables were: White, Coloured, no schooling, primary, incomplete secondary school, youth and old age.

Results from the Hierarchical Cluster Analysis

The hierarchical cluster analysis shows that unemployment is in the same cluster with no schooling, old age, primary, female and matric and closely adjacent to incomplete secondary school.

Table 5: Communalities from the extraction method: PCA

	Initial	Extraction
White	1.000	.932
Coloured	1.000	.942
No schooling	1.000	.963
Primary	1.000	.958
Incomplete secondary	1.000	.989
Youth	1.000	.984
Old age	1.000	.966

Extraction Method: Principal Component Analysis. Source: Global Insight Census 2008

Table 6: Principal components with variance explained

Compo- nent	Total	% of Varia- nce	Total	compo-	Rotated compo- nent 2
1 2	5.394 1.340	77.054 19.146		.208 .249	.943 .938
3	.134	1.911		.980	045
4	.071	1.019		.916	.344
5	.037	.532		.922	.373
6	.022	.311		.932	.341
7	.002	.027		.892	.414

Source: Global Insight Census 2008

DISCUSSION

It can be deduced from the three different analyses that GDP has little or nothing to do with unemployment in our analysis in Limpopo. Rather unemployment is influenced by female, old age, ethnicity, no schooling, primary, and/or incomplete secondary education.

South Africa has a unique situation in contrast with trends usually observed in developing countries where graduate unemployment is extremely high. For example, higher education holders experience an unemployment rate of close to 6 percent compared to 41 percent for those with primary education or less. Secondary schooling and possessing a matric qualification did not enhance the probability of finding employment in South Africa (Altman 2004). The study also establishes that higher education (post-graduate studies) positively contributes to unemployment considerably across all ethnic groups. This observation is striking because one expects postgraduate studies to have a negative impact on unemployment. This unexpected observation may result from the fact that the proportion of post-graduate students in the sample is insignificant, less than 4 percent.

Our model shows that males do not have significant relationship with unemployment but females have. Dias (2005) observes that women were victims of high unemployment rates than men. The unemployment rate for men in his study was 25.7 percent in comparison to 32 percent of women. Thus, there was a significant difference between the unemployment rates, and this was related to less intensive job search by unemployed females in harmony with many other countries. Banerjee et al. (2008) support the general argument that unemployment is prevalent among females than males. In 2005, 22.6 percent of males were unemployed while the figure for females was 31.7 percent, but the participation of females has increased drastically; narrowing the gender gap. In addition, Kingdon and Knight (2007) show that unemployment among males and females were 17.3 percent and 25.3 percent respectively. Casale and Posel (2002) conduct a study on "the continued feminization of the labor force in South Africa" using the October Household survey (1995-99); it was observed that there was a disproportionate increase in the labor supply with respect to gender. Thus both gender experienced a positive growth in labor supply but women had a greater proportion.

CONCLUSION

This study has tried to find the determinants of unemployment in the Limpopo province in

South Africa using annual census data of 2008 by Global Insight and applying three different methods of analysis. It has been established that GDP does not have significant relationship with unemployment. Meaning that irrespective of how much Limpopo economy grows, it will not be able to turn around the unemployment situation in the province which is already worrying. Equally striking is the fact that the male population and the youth do not have significant relationships with unemployment in Limpopo. Rather our analysis shows that Unemployment in Limpopo is predicted strongly and positively by female, old age and incomplete secondary schooling. Furthermore, the model shows that unemployment has strong negative relationships with middle age, degree holders and ethnicity (non-Africans). Thus unless the current secondary school students/learners study hard and complete their studies successfully, they will always add to the pool of high unemployed population in the province.

RECOMMENDATIONS

Since unemployment in Limpopo is mostly predicted by "illiteracy", incomplete secondary education and below, it will therefore be necessary for the provincial government to make sure that all school children have free access to schooling up to post-secondary level. It is only when learners successfully complete their secondary education that the prospects of getting job and reducing unemployment will look brighter. Private sectors should be encouraged to support this task of offering financial assistance to learners and even old age people to study. Discrimination against women in job provision should stop. Women with competence should be given jobs equally as men.

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