ANALYSIS OF UNEMPLOYMENT IN GHANA USING DISTRICT LEVEL NATIONAL POPULATION CENSUS DATA

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Abstract

This study analyses unemployment in Ghana using district-level data based on the 2010 and 2000 National Population and Housing Censuses. In line with government's district-focused policies, including the One District One Factory (1D1F), One District One Ambulance (ODOA), and One Village One Dam (OVOD), this study uses district-level data from the only two national population censuses conducted during the Fourth Republican era, in 2000 and 2010, to analyse the factors influencing the unemployment rate at the district level. Based on the 2010 Census, it was established that the level of unemployment rate varied from a low of 0.9% to a high of 10.6% showing a considerable degree of variation that required some analyses to ascertain factors influencing the unemployment rate.

Using panel data regression analysis, it was established that the level of unemployment in a district was significantly influenced by the degree of age-dependency burden with higher burden leading to higher unemployment rates. Further, the unemployment rate declined with the increasing proportion of the adult population of a district considered to be literate defined as those with at least one year of formal schooling attainment. However, beyond a certain level, the unemployment rate actually increased with increasing proportion of the adult population in a district who were literate. It was also established that the unemployment rate increased with increasing proportion of marital status arrangements accounted for by separations. Districts with higher female to male ratios had lower unemployment rates reflecting the greater share of non-paid home-based duties undertaken by women. Finally, Ashanti region was identified as a region marked by higher unemployment rates compared to the rest of the country.



Contents

Sections

Page

Abstract

| 1.0 | Introduction | | | |
|-----|--------------------------------------|--|----|--|
| 2.0 | Litera | 5 | | |
| | 2.1 | Definition of Unemployment | 5 | |
| | 2.2 | Mainstream Economic Theories of Unemployment | 6 | |
| | 2.3 | Political Economic Theories of Unemployment | 8 | |
| 3.0 | Unemployment in the Ghanaian context | | | |
| 4.0 | Methodology | | | |
| 5.0 | Results | | | |
| 6.0 | Conclu | usion and Policy Recommendation | 17 | |
| | 6.1 \$ | Summary of the Study and Conclusions | 17 | |
| | 6.2 F | Policy Implication of the Study | 17 | |
| 7.0 | Apper | ndices | 19 | |
| 8.0 | Refere | ences | 25 | |



Tables

Page

| 1 | Average district-level unemployment ratios based on the 2010 national population census for the country as a whole and for each of the ten regions | 11 |
|---------|--|----------|
| 2 | Results of the panel data regression model analysis of characteristics influencing the district unemployment rate in Ghana based on 2000 and 2010 national population census data. | 16 |
| Figures | The second line and all and the second s | Page |
| 1 | formal schooling literacy rate in a district using 2010 national population census data. | 10 |
| 2 3 | Trends in the Unemployment rate by sex Trends in Youth unemployment rate by sex | 11 12 |



1.0 Introduction

Unemployment, especially youth unemployment, has attracted the attention of many researchers worldwide as indicated by authors such as Balakrishnan and Michelacci 2001; Nunziata 2002; Anaman, 2003; Bassanini and Duval 2006; Gontkovicova et al., 2015. This keen interest in research on unemployment is linked to the socio-economic consequences of unemployment including linkages to medical behavioral disorders of unemployed people as noted by workers such as Hughes et al. (2017).

Unemployment remains a persistent problem in Ghana especially the category of youth unemployment given the rapid growth of the population. The government of Ghana in order to address the youth unemployment problem has proposed the establishment of the National Builders Corp to employ 100,000 graduates of tertiary institutions based on a three- year programme starting in 2018.

Over the last three decades, the overall national unemployment rate has fluctuated from 2.8% to about 11%, while youth unemployment has varied between 5% and 21% (World Bank, 2018). The 2010 National Population Census put the unemployment rate at just 5.8%. The problem of unemployment in Ghana appears to be more of underemployment, insufficient wages for time spent at work (Baah-Boateng, 2013) and the very high degree of informalization of the workforce. The informalization rate jumped from 83.9% in 2000 to 86.2% in 2010 (Ghana Statistical Service, 2013).

As measured by annual changes in real gross domestic product (GDP), the economy of Ghana has grown positively over the 25-year period from 1984 to 2008, with growth rates ranging from 3.2% to 14.0%. This annual growth rate has always been higher than the annual population growth rate implying positive per capita real GDP every year over this period. Despite the positive annual economic growth rates in Ghana over the last 25 years, during the Fourth Republican era of political stability, formalization of the workforce has declined with more and more workers employed in the informal unregistered sectors. Appendix Table 1 shows the estimated total number of people employed in Ghana from 1992 to 2017, which covers the period of this study. The informalization rate jumped from 83.9% in 2000 to 86.2% in 2010. Recent estimates suggest that the informalization rate may be close to 88%.

Informalization of the workforce can be explained with structuralism political economy theories. One such theory, the creative destruction theory, first proposed by Joseph Schumpeter (1942), suggests that in times of fast economic growth, new industries emerge with the rapid destruction of old industries which replace many workers and push others into lower paying job opportunities. In Ghana and elsewhere, new services such as information and communication technologies based on computer-based modules have appeared at a faster rate while office work opportunities involving typewriters have increasingly disappeared. The concept of an employee being employed for life is also largely outdated replaced with newer concepts of flexible fixed-term contracts where the employer guarantees the employee a job for a certain period based on mutually-agreed conditions.

A major reason for the relatively high unemployment among some Ghanaian university and senior high school graduates is the inadequate appreciation of this phenomenon as many such graduates continuously search for the so-called permanent work positions rather than accepting relatively lower-paid fixed-term employment contracts and self-employment opportunities. A motivation of this current study is that unemployment in Ghana has been studied often using survey data and nationally representative data (see for example, Ghana Statistical Service, 2014; Baah-Boateng, 2013; Sackey and Osei, 2006). These studies indicate conflicting results and conclusions with regards to the effect of education and schooling on unemployment. For example, Sackey and Osei (2006) indicated a negative effect of basic and secondary education on unemployment in Ghana. However, African Development Bank (2012), in its study that included Ghana, found a positive relationship between education and unemployment among the middle-income economies as compared to their lower income counterparts.

While many unemployment studies in Ghana and other parts of the world have often focused on selected survey data, this study utilizes full census data for 2010 and 2000 to analyse factors influencing the unemployment rate in Ghana based on district-level analysis. There are some districts in Ghana which have very low unemployment rates and some with very high unemployment rates by international standards. It is important to ascertain the factors that influence unemployment at the district level to allow policy makers to more precisely tune their prescriptions and actions.

In line with government's district-focused policies, including 1D1F, ODOA and OVOD, this study uses data from censuses that encompass variables for an entire population in districts to analyse the unemployment problem. This study appears to be the first in Ghana to examine the unemployment problem using panel data regression analysis involving the 110 administrative districts created by the Local Government Act of 1988. The use of district- level data analysis could help to clarify the knowledge related to the conflicting results of various unemployment studies concerning Ghana.

The major objective of this paper is to establish the district-level factors and characteristics which influence the district-level unemployment rate using National Population Census data for 2010 and 2000 using statistical analysis. The rest of this paper is organized as follows: the next section is a brief review of the literature on unemployment with emphasis on empirical works and specific unemployment studies in Ghana. This literature review is followed by the methodology employed in the study, the results of the analysis and the conclusions and policy implications of the study. The cited references are listed at the end of the paper.

2.0 Literature Review

2.1 Definition of Unemployment

The International Labour Organization (ILO) provides a nearly universal definition of unemployment. According to the ILO, a person is only unemployed if he/she simultaneously satisfies three conditions as follows: the person is without work; he/she is available for work and is making efforts to look for work opportunities. An individual is considered unemployed if during a reference period he/she is simultaneously without work but currently available and has been looking for work. Work is defined to include paid employment and self- employment. If a person is without work and available but does not seek for any particular work within a reference period, then such an individual is said to be a discouraged worker.

Ghana and many other nations have generally adopted this conceptual definition. In the case of Ghana, the unemployed group constitutes all persons aged 15 years or more who in a reference

period are without work but are both available and seeking for work (Ghana Statistical Service, 2008, 2014). In this context, work refers to any type of economic activity cutting across all paid work and unpaid ones (unpaid family work), self-employment (own- account and employers), domestic work and apprenticeship. Given this definition, the many Ghanaians engaged in various informal work activities are employed, although under- employed.

2.2 Mainstream Economic Theories of Unemployment

Different theories provide different reasons to unemployment. They include classical, Keynesian, two-sector and efficiency wage theories or models (Shapiro and Stiglitz, 1984; Oniore et al., 2015). According to the classical theory, the labour market will always clear through a price or wage mechanism and perfect information to achieve full employment. Therefore, for excess or shortage of labour supply, the market wage will quickly adjust to achieve equilibrium between demand and supply. Hence, classical economists view unemployment a temporary phenomenon, often termed voluntary or frictional unemployment. However, if government intervenes in the market through minimum wage laws and other restrictions, the intervention leads to market distortions which consequently create involuntary unemployment.

Proponents of Keynesian theory suggest that markets do not always clear particularly in periods of recession. During recessions, the economy is said to face the problem of involuntary and cyclical unemployment. This theory postulates unemployment to be a demand deficient problem. Therefore, to address unemployment, government can boost aggregate demand which will consequently increase national income and job creation.

On the other hand, the two-sector theory explains the movement of people from the traditional sector to the more industrialized sector (see for instance, Lewis 1964; Harris and Todaro 1970). This theory explains a major motivation behind rural-urban migration. Generally, the rural economy is noted for agricultural activities while the urban economy is characterized by industrial and manufacturing activities. Though labour is argued to be in abundance in the rural economy, the relatively higher expected wage in the industrialized sector motivates rural-urban migration. As a result, unemployment falls in the rural economy but rises in the urban economy. Since rural workers have relatively lower education, these migrants are most likely to be unemployed or pushed into the informal urban economy.

Another form of unemployment is structural unemployment. This type of unemployment is the result of skills and locational mismatch. It occurs when the skills required by an employer are not met by a potential job seeker. There could also be a locational space problem between the employer and job seeker at a given period of time. This gap is however minimized with low or zero transportation cost. These arguments are also supported by existing job search models which underscore expected duration between the time a job applicant searches for a job and when he/she receives a job offer. During the search period, key factors including education, skills, experience, networks and location influence the outcome of the job offer.

Theoretically, the unemployment problem can be explained using the concepts of aggregate demand for labour and the natural rate of unemployment. The aggregate labour demand in any economy is related to the equilibrium price level and the total economy output (aggregate supply). The economy is in balance when the total output demanded and supplied are equal.



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The full-employment level of real output is regarded as the natural level of real output and national income. The natural rate of unemployment is defined as the total unemployment level at the full-employment level of real output (McConnell et al., 2016). The relationship between the rate of inflation and the level of unemployment is known as the Philips curve. In the long-run period, the Philips curve is a straight line at the economy's full-employment level of real output. In the short-term period, the Philips curve is a non-linear relationship between the inflation rate and unemployment (McConnell et al., 2016).

The natural rate of unemployment, which remains unchanged in the short-term period, but can decline or increase in the longer-term period, is directly linked to the factors influencing the aggregate demand of labour. The unemployment rate at a point in time is made of two components as established by Lilien (1982) and later by other workers such as Groenewold and Hagger (1998), Debelle and Lowe (1999). The first component is linked to the level of aggregate demand; and the second component deals with the natural rate of unemployment. Shocks to the aggregate demand such as recessions induced by worsening terms of trade or changes in government expenditures create temporary changes in the unemployment rate.

Anaman (2003) indicates that the factors that affect the natural rate of unemployment can be classified into three main groups: (1) factors influencing new entry into the labor force (2) factors influencing rate of job destruction, and (3) factors that shape the rate of finding jobs. In Ghana, new entrants into the workforce are largely relatively young people who tend to lack the skills required by the industrial and services sectors; these two sectors now account for about 80% of GDP. These people are also not generally enthusiastic about jobs in the largely labor-intensive agricultural sector. The rate of job destruction is due among others to the relative decline of the manufacturing industry and the emergence of the services sector as the largest economic sector since 2006. The rate of finding jobs depends on the level of job vacancies, job search intensity of unemployed workers, and the level of mismatch between available jobs and the characteristics of potential workers (mismatch index).

In Ghana, the economic growth of recent years has proportionally shifted to the oil and gas industry which is capital-intensive but does not employ many people. The intensity of job search of educated young people appears to be related to the extended family support system. It is well known that many unemployed Ghanaian university graduates from the middle and upper classes of society choose to stay with their parents until they find suitable jobs which are full-time and permanent in nature. Many highly-educated people also come from relatively wealthy families who can support them for some time before they find their ideal jobs partly explaining the relatively high level of unemployment rates among educated young people in Ghana. The mismatch index among relatively young educated people is also related to their lack of preferences for jobs in the labor-intensive agricultural and forestry industries.

2.3 Political Economy Theories of Unemployment

The previous discussion of the theories of unemployment largely falls in the area known as the neoclassical economic theories which emphasise the nature of efficiency and productivity in labour markets in explaining observed characteristics. A major variant of political economy

theories, known as structuralism, suggests that dominant social groups and structures determine major economic outcomes including the many observed features of labour markets (Stanback, 1980; Balaam and Veseth, 2008; Sackrey et al., 2008). Political economy theories recognize the common occurrence of marginalisation and societal exclusion of minority and relatively small groups in many markets including labour markets.

Structuralism political economy theories have been tested in the labour markets in several countries using the so-called core-peripheral workforce hypothesis (Atkinson, 1984, 1985). Distinguishing features of the core workforce include the permanency and/or long-lived employment contracts, highly-skilled employees with clear and excellent internal career paths, increased job security and resources available for continuous work-related training to improve skills (Protector et al., 1994). Invoking structuralism theory, the core workforce or the lucrative subsector of the labour markets is likely to be dominated by people from influential classes and/or major and powerful ethnic or social groups in the nation state. The peripheral workforce is characterised by relatively shorter-term employment contracts with less job security and low level of availability of work-based training programmes.

The peripheral or the non-lucrative sectors of labour markets are the areas where people from minority and less powerful social/ethnic groups are commonly found. Social group identification markers that are important in the analysis of labour markets in developing countries include ethnicity, religious preferences, sex, migrant status, and minority group status. Waenerlund et al. (2011) established that continuous exposure to peripheral employment positions has an effect on the mental health condition of an individual partly as a result of the over-representation of other unfavourable social and employment conditions.

Pfeifer (2009) using German panel data established that the use of peripheral workforce related to fixed-term contracts is undertaken by companies to adjust the level of employment to the profit-maximizing levels due to possible fluctuations in the demand of their products. However, both studies cited do not often analyse in detail the types of people employed in the peripheral workforce with regards to their social identification markers such as religious preferences and membership of minority social groups.

Political economy theories of unemployment also suggest that certain groups of people may be particularly vulnerable to short-term unemployment such as frictional unemployment which is related to people moving from one job to another or people moving from one location to another in search of new employment opportunities as a result of temporary or permanent separations in married life or long-term relationships. Following the discussion of Elias (2003), the two people engaged in a marriage are made up of a partner who specialises in market activity, and the spouse who specialises in household activity. Separation of the partners in a marriage could be due to a number of factors. When economic conditions worsen in a given geographical area, the partner engaged in market activity is likely to change residence and search for jobs in another location resulting in temporary unemployment. Elias (2003) also suggests that the feedback from the marriage market to the labour market can lead to an increase in the unemployment rate. Mohammed and Anaman (2003), in their study involving Brunei Darussalam, established that increased labour force participation of women did not increase the aggregate divorce rate. Rather, it was the increasing divorce rate which led to more women choosing to work partly as a result of their resultant increased vulnerability and the need to take care of their children.



3.0 Unemployment in the Ghanaian Context

Using district-level data based on the more recent 2010 Census, nationally, the unemployment rate is defined as the proportion of the people in a district aged 15 and above who are unemployed. This unemployment rate is curvilinearly-related to the proportion of the population with at least one year of formal schooling attainment (refer to Figure 1). The unemployment rate declines with increasing proportion of the adult population that is literate up to a point (with at least one year of formal schooling attainment). The unemployment then increases gradually with increasing proportion of the adult population that is literate.

Figure 1: The curvilinear relationship between the district unemployment rate and formal schooling literacy rate in a district using 2010 national population census data.



Based on the 2010 district census data set, Sekondi-Takoradi Metropolitan Area in the Western Region singularly had the highest unemployment rate in Ghana in 2010 of 10.6%. This is followed by Obuasi Municipal in the Ashanti Region (9.9%) and Tema East in the Greater Accra Region (9.6%); all three are highly urbanised districts. The districts with the lowest unemployment rate in Ghana (of 0.9%) in 2010 were Bunkpurugu in the Northern Region, Binduri in the Upper East Region, Nkwanta North in the Volta Region. For the Northern Region, the districts with the highest unemployment rates were Sagnarigu and Tamale with unemployment rates of 7.7% and 7.4% respectively. Both districts are predominantly urban in the Tamale Area. For the Upper East Region, the district with the highest unemployment rate in 2010 was Bawku Central, a predominantly urban district with a rate of 5.2%. However, for the Volta Region, the district with the highest unemployment rate of 89.2%.

Table 1 shows the mean unemployment rates for Ghana as a whole and for each of the ten regions of the country in 2010. The Greater Accra Region had the highest average unemployment rate of 7.69% followed by Ashanti Region with 5.02%, both predominantly urbanised regions. These observations may suggest that unemployment in Ghana could be a predominantly urban phenomenon. The region with the lowest unemployment rate was Upper East followed by Northern and Upper West Regions, considered to be the poorest in Ghana.

Table 1: Average district-level unemployment ratios based on the 2010 national population census for the country as a whole and for each of the ten regions.

| Variable | Number of districts | Mean (%) | Standard deviation | Coefficient of variation | Range (%) |
|-------------------|------------------------|----------|--------------------|--------------------------|-------------|
| Ghana National | 216 | 5.30 | | | 0.9 to 10.6 |
| Ashanti | 30 | 5.03 | 2.00 | 0.397 | 1.3 to 8.6 |
| Brong Ahafo | 27 | 3.56 | 1.80 | 0.507 | 1.3 to 7.7 |
| Central | 20 | 4.92 | 1.93 | 0.392 | 2.2 to 9.3 |
| Eastern | 26 | 4.88 | 1.96 | 0.402 | 1.2 to 8.5 |
| Greater Accra | 16 | 7.59 | 1.48 | 0.194 | 4.2 to 9.6 |
| Northern | 26 | 2.64 | 1.88 | 0.713 | 0.9 to 7.9 |
| Upper East | 13 | 2.46 | 1.13 | 0.459 | 0.9 to 5.1 |
| Upper West | 11 | 3.05 | 2.01 | 0.657 | 1.6 to 8.5 |
| Volta | 25 | 3.62 | 1.82 | 0.503 | 0.9 to 7.5 |
| Western | 22 | 4.25 | 2.21 | 0.518 | 1.0 to 10.6 |

Notes: Computed by the author from district data produced by the Ghana Statistical Service (2013) for the 2010 National Population Census.

Unemployment can also be analysed using per capita real GDP, labour productivity and employment ratio. Labour productivity is measured in two ways: (a) as real GDP measured in Ghana cedi (GHS) divided by the total workforce and as real GDP measured in United States dollar (USD) divided by the total civilian workforce (refer to Appendix Tables 1 and 2). Employment ratio is derived as the total number of people employed divided by the total population. Per capita real GDP can be envisioned simply as labour productivity multiplied by employment ratio. The growth rate of per capita real GDP is the sum of the growth rate of labour productivity plus growth of the employment ratio (Lim and Lee, 2002, pp. 270-271).

From 1992 to 2000, the employment ratio gradually declined from 0.421 in 1992 to 0.393 in 2000 while at the same time both real GDP per capita and labour productivity, based on both the Ghana Cedi and US dollar, increased. Yet from 2000 to 2017, real GDP, labour productivity and employment ratio in Ghana steadily increased with increasing employment ratios. This steady increase of real GDP and labour productivity and employment ratio was reflected in the decline of the overall unemployment rate in Ghana from 10.4% in 2000 to 5.3% in 2010 as reported by the Ghana Statistical Service (2013, p.269).

However, the observations recorded for the 1992 to 2000 period suggested that the employment ratio is not always directly linked to increases in real GDP per capita and labour productivity. The national unemployment rate was a low 2.8% in 1984 (Ghana Statistical Service, 2013, p.269). As shown in Figure 2, the unemployment level increased steadily from 1992 to 2000 while the employment ratio actually increased over this period.



A possible explanation for this observation could be due to the large downsizing of the government workforce related to the large-scale disinvestment and closure of many government-owned factories and industries due to the structural adjustment programmes of the government.

Figure 2 shows the trend in the unemployment rate in Ghana from 1991 to 2017. The unemployment rate in Ghana has generally fluctuated over the period with peaks registered around the years, 1998 to 2000. Over the period from 2001 to 2006, the unemployment rate dropped steadily in line with the increasing economic growth over that period in the country achieved partly through large donor inflows to support the government's budget and the freeing of the government's fiscal space arising from the cancellation of two-thirds of the country's external debts in 2006. The decline in the unemployment rate over this period is consistent with the increasing employment-population ratios.



Figure 2: Trends in the unemployment rate by sex (%)

Source: World Bank (2018) World Development Indicators for 2017.

The unemployment rate rose from 2007 to 2011 and has declined steadily from 2012 to 2017 generally flattening around 2.4% over the 2014 to 2017 period back to where we were in 1984, 30 years earlier. The trends in sex-based unemployment rate and the overall unemployment rates are similar over the period revealing closely-identical fluctuating trends. However, the unemployment rates among the female population were higher than those of the male population. For example, between 1991 to 2000, the unemployment rate for males increased from 4.3% to 10.1% while that of the females increased from 5.2% to 10.7%.

Figure 3 depicts the trend in the youth unemployment rate from 1991 to 2017. The unemployment rate was higher for the youth (defined as those aged 15 to 24) when compared to the older generation. The proportion of the youth labour force classified as unemployed increased from 9.1% in 1991 to as high as 19.9% in 1999 and later declined to 7.2% in 2006. Comparatively, a higher fraction of the female youth labour force is unemployed relative to their male counterparts and the total national figures. In 2017, the year with the latest data, the unemployment rate for Ghanaian youth was reported to be 4.9%, 4.5% and 5.3% for the total, male and female youth respectively. The youth unemployment reflects the limited human capital stock of the youth related to their low educational qualifications and past work experiences. The 1987 educational reform in public schools which reduced the numbers of years young people spend in schools is a contributory factor to the youth unemployment problem.



Many young people leave secondary schools early with little employable skills and weak broad-based academic training to enter the workforce in the industrial and services sectors but are also not enthusiastic in working in the agricultural sector.



Figure 3: Trends in youth unemployment rate by sex (%)

Source: World Bank (2018) World Development Indicators for 2017.

4.0 Methodology

The methodology used in this study was to develop a panel data regression model using the district-level unemployment rate as a dependent variable, and a number of factors as the independent variables. According to the Ghana Statistical Service (2013), an unemployed person is a person of working age who during the previous seven days before the interview was without work and was available for work and who had looked for work during the week prior to the interview. The unemployed also included people without jobs and were currently available for work and who had made arrangements to start new jobs on a date following the interviews. People who were waiting for training were also considered to be unemployed.

A graphical analysis was conducted by plotting the district unemployment rate in 2010 against several variables including the proportion of the adult population of a district considered to be literate, defined as those with at least one year of formal schooling attainment which is shown in Figure 1. This analysis was also undertaken for other district- level variables as follows: (1) the proportion of adult population temporary separated from their partners, (2) the proportion of the population considered to be urban, (3) age- dependency ratio and (4) sex ratio. Appendix Figures 1 to 4 represent this graphical analysis which showed a linear relationship between unemployment rate and each of the four variables. Guided by the economic theories discussed earlier, and the graphical analysis, the econometric model used is specified below in Equation 1

$$\begin{array}{rll} \text{UNEMPLOYMENTRATE}_{it} &= B_0 + B_1 & \text{SEPARATEDPROP}_{it} + B_2 & \text{LITERACYPROP}_{it} + B_3 \\ \text{LITERACYPROPSQ}_{it} + B_4 & \text{URBANPROP}_{it} + B_5 & \text{AGEDR}_{it} + B_6 & \text{SEXRATIO}_{it} + B_7 & \text{ASHANTI}_{it} + U_{it} \\ & \text{Equation 1} \end{array}$$

where UNEMPLOYMENTRATE it is the unemployment rate for district i during census year t; defined as the proportion of the population aged 11 and over who are unemployed..

SEPARATEDPROP_{it} is the proportion of the total household marital status arrangements accounted for by separated marital status in district i for year t. Guided by political economy theories based on the works of authors such as Becker et al. (1977) and Elias (2003), it is postulated that districts with higher proportions of total marital status arrangements accounted for by separated marriages will have higher unemployment ratios.

LITERACYPROP_{it} refers to the proportion of the adult population considered to be literate defined as those with at least one year of formal schooling attainment for district i and year t. It is postulated that districts with higher proportions of their adult people being literate have lower unemployment ratios due to higher human capital capacity engendered by education which allows for employment in many labour markets.

LITERACYPROPSQ_{it} is the square of LITERACYPROP_{it} and allows for a curvilinear-shaped relationship between unemployment rate and the level of literacy rate in district i for year t to be analysed. Districts with higher proportions of their adult people being literate could also have higher unemployment rates. This might occur, for example, if the literate people in a district are less willing to accept jobs in lower-paying economic sectors. For example, jobs may be available in the agricultural sector. However, some educated people may find it demeaning to take those jobs. The 2010 census report showed that the unemployment rate for people with no formal schooling attainment dropped sharply from 2000 to 2010 while the unemployment rate increased for most other formal schooling attainment category groups from 2000 to 2010.

URBANPROP_{it} refers to the proportion of the population who live in areas considered to be urban for district i and year t. The Ghana Statistical Service classifies any human settlement with a population of 5,000 or more as urban. In line with the empirical literature, it is postulated that the greater the level of urbanisation, the higher the level of unemployment. This is largely due to the increased migration to urban areas by people with different levels of skills that do not often match the employment opportunities in urban areas.

AGEDR_{it} refers to the number of people, between the age 15 to 64, divided by the number of people who are between zero and 14 years and 65 years and above, for district i and year t. Assuming that people in the age group, 15 to 64 represent the working population or the potential working population, the age dependency ratio measures the level of dependency on the working population by those who are not capable of working.

SEXRATIO_{it} is the number of females divided by the number of males in district i for year t. The exact relationship with the dependent variable is not clear.

ASHANTI_{it} is a dummy variable with 1 referring to a district i that is located in the Ashanti Region and zero if the district i is not located in the Ashanti Region. It is suggested that unemployment rate would be higher in the Ashanti Region due to its central location that attracted many migrants from all regions of Ghana.

 U_{t} is the equation error term initially assumed to be normally distributed with zero mean and constant variance.

The model was estimated as a panel data equation using both 2000 and 2010 census data involving the original 110 districts first created in 1988. Hence there were 220 data points made up of 110 for 2000 and 110 for 2010. The estimated model was corrected for heteroscedasticity through transformation of all the variables in the model. Given the two time periods (2000 and 2010), the equation was estimated as a fixed-effects model implying the existence of an additional intercept which could be interpreted as a dummy variable.

5.0 Results

The results of the panel data fixed-effects regression model analysis of the unemployment rate are reported in Table 2. The power of the model reported was strong given the high values for the R2 (0.856), and the adjusted R2 (0.850). The model was correctly specified based on the Ramsey Reset Test. It had no significant heteroscedasticity problem. Further, at the 5% significance level, all the variables had their parameters statistically significant including the YEAR EFFECT variable; the significance of the parameter of the latter variable suggested the appropriateness of the fixed-effects panel data model (Gujarati, 2003, p. 642).

Based on the standardised regression estimates, the most important four independent variables affecting the unemployment were in order of importance, AGEDR, LITERACYPROP, ASHANTI and LITERACYPROPSQ. Increased age-dependency ratios increased the unemployment rate in a district possibly due to the higher burden effects on the working people who might be more inactive or unemployed during selected times of a year to take care of home-based duties, the young, the sick, the old and the weak. Such important home-based duties are not considered as employment in the technical usage of GSS.

The linkage between the proportion of the district population with formal schooling attainment and the unemployment rate vividly illustrated in Figure 1 by the curvilinear relationship is confirmed by the panel data regression analysis. While formal schooling attainment improves human capital formation, its mere acquisition does not necessarily lead to improved employment opportunities unless the recipients with formal schooling qualifications have skills that particular industries need, and/or the recipients are willing to work in non-lucrative sectors of the economy.

The strongly statistically significant parameter for the URBANPROP variable was consistent with a priori expectation. Based on the two-sector theoretical model outline earlier, a greater level of urbanization would lead to greater unemployment rates largely due to increased migration to urban areas by people with different levels of skills that did not match the employment opportunities in urban areas. The variable SEXRATIO had a negative relationship with the unemployment rate. Districts with more females than males had lower unemployment rates possibly due to the relatively large numbers of females who did not enter labour markets due to home work and household duties.

The parameter estimate of the SEPARATEDPROP variable was strongly statistically significant with a positive magnitude. This observation suggested that districts with higher proportions of individuals separated in their marital relationships had higher unemployment rates. Incidentally, the other marital relationship variables such as widowed, divorced and single status did not have any significant effect on the dependent variable, the unemployment rate. Hence these variables were dropped from the model after the initial evaluation.

Finally, Ashanti was a region marked by relatively higher unemployment rates compared to the rest of the country. The high unemployment rate for districts in the Ashanti Region reflected the region's central location in Ghana which attracted many migrants. The results of the separate models for 2000 and 2010 are reported in Appendix Tables 3 and 4 respectively. These results tended to be similar to those reported for the analysis with the combined yearly data reported in this section.

Occasional Paper No. 16

Table 2: Results of the panel data regression model analysis of characteristics influencing the district unemployment rate in Ghana based on 2000 and 2010 national population census data.

Dependent Variable is UNEMPLOYMENTRATE: Proportion of the total workforce that is unemployed in a district.

| Explanatory Variable | Unstandardized Parameter Estimate | Standardised Parameter Estimate | T- statistic | P Value |
|----------------------|---|---------------------------------------|-----------------|----------|
| INTERCEPT | 109.549 | 0.000 | 1.370 | 0.172 |
| YEAR EFFECT | 0.068 | 0.164 | 2.081 | 0.039** |
| SEPARATEDPROP | 1.999 | 0.425 | 10.203 | 0.000*** |
| LITERACYPROP | -0.782 | -1.219 | -3.643 | 0.000*** |
| LITERACYPROPSQ | 0.004 | 0.469 | 2.060 | 0.041** |
| URBANPROP | 0.259 | 0.315 | 6.458 | 0.000*** |
| AGEDR | 0.458 | 1.334 | 7.610 | 0.000*** |
| SEXRATIO | -0.289 | -0.781 | 5.695 | 0.000*** |
| ASHANTI | 19.954 | 0.549 | 6.903 | 0.000*** |

| Notes | |
|---|------------|
| Sample size | 220 |
| R2 | 0.856*** |
| Adjusted R2 | 0.850*** |
| Fvalue | |
| 153.980*** | |
| Probability level of significance of correct specification of the model using the | |
| Ramsey Reset test with null hypothesis of correct specification | 153.980*** |
| Probability level of significance of the LM test for heteroscedasticity | |
| with the null hypothesis of homoscedasticity (or no heteroscedasticity) | 0.154 |

- *** denotes 1 percent statistical significance,
- ** denotes 5 percent statistical significance
- * denotes 10% significance.

6.0 Conclusions and Policy Recommendations

6.1 Summary of the Study and Conclusions

The study analyses unemployment in Ghana using district-level census data based on the 2010 and 2000 National Population Censuses. The district average was considered to be a person whose level of employment or unemployment is influenced by selected district-level characteristics. Based on the panel data regression analysis, it was established that the level of unemployment in a district was significantly influenced by the degree of age-dependency burden with higher burden leading to higher unemployment. The unemployment rate declined with the increasing proportion of the adult population of a district considered to be literate defined as those with at least one year of formal schooling attainment. However, beyond a certain level, the unemployment rate actually increased with increasing proportion of the adult population in a district who were literate.

The unemployment rate also increased with increasing proportion of marital status arrangements accounted for by separations. Greater urbanization of a district was associated with higher unemployment rates while districts with higher female to male ratios had lower unemployment rates reflecting the greater share of non-paid home-based duties undertaken by women not considered to be formal employment. Finally, Ashanti region was marked by higher unemployment rates compared to the rest of the country.

6.2 Policy Implications of the Study

A policy implication arising from this study deals with the relationship between the unemployment rate and the proportion of the district adult population considered to be literate based on having at least one year of formal schooling attainment. In the coming years, the free SHS system will lead to millions of graduates from the system who will not get admission to universities and other tertiary institutions. About 500,000 senior high school graduates come out each year, many without formal job skills. The universities and other tertiary institutions absorb only about 20% of these numbers. The challenge of the national government is to devise strategies for the employment of many of these young people in the economy through short and long-term skills development. These strategies need to deal with unemployment problem of thousands of young people who have been trained in a system of entitlements, who lack basic employment skills in manufacturing and service industries, and who may not necessarily be eager to move to job areas such as agriculture.

Another policy implication related to formal schooling attainment is the need for government authorities to emphasise more career counselling and advice to prospective graduates and students including information on the nature and understanding of evolving labour markets in Ghana and the rest of the world. The reality of the peripheral labour markets with fixed- term contracts rather permanent and/or long-lived employment contracts need to be explained better to students, especially prospective graduates. With the increased frequency of more peripheral job markets, a policy initiative of the government should be to expand the nature of job benefits protection for all workers to include not only minimum wage but also compulsory superannuation and social security deductions for all workers.



The relationship between increasing age burden and increasing unemployment rate in a district uncovered in this study suggests that the government should continue to expand its social intervention anti-poverty programmes such as Livelihood Empowerment Against Poverty (LEAP) to vulnerable people and deprived communities across the country.

Another policy implication of the study is related to the increasing rate of unemployment due to increasing urbanization. Hence it is suggested that the government expand its programmes and activities that reduce the rural-urban drift of people especially young men and women. One way of achieving this objective is for the District Assemblies to develop modern self-contained farmer market centres in the district capital and a few of its major towns. The self-contained farmer centres need to have facilities such as lockable stores, day nurseries, cold stores, modern toilet facilities and banks and associated financial service. The modern hygienic surroundings and the availability of trading spaces can spur many educated young people into agricultural ventures that can be sold at these modern farmer market centres.

One further policy implication from this study is related to governance at the local level. In many parts of the world, local governments, especially those based on directly-elected Mayors and Chief Executives, are a major source of employment at the local level in various areas such as municipal waste collection, development and maintenance of parks and recreational facilities, local libraries and environmental sanitation facilities in public places and open spaces. The development of major towns in districts through a development push that modernises the country is a key tool to advance development and reduce unemployment through encouraging local youth to stay home to reduce rural-urban migration.

Finally, the result related to the effect of separated marriages on the rate of unemployment rate is an important issue requiring further research which can incorporate the impact of other forms of marriage settings on unemployment and economic welfare of households.

7.0 Appendices

Appendix Table 1: Data on the estimated total population, total civilian labour workforce, total formal work force and total informal workforce in Ghana from 1992 to 2017.

| Year | Population | Total labour force | Total informal workforce | Total formal workforce | Proportion of workforce which is |
|------|------------|-----------------------|-----------------------------|---------------------------|--|
| 1992 | 15249407 | 6425427 | 5013285 | 1412142 | 0.780 |
| 1993 | 15665301 | 6550795 | 5156251 | 1394544 | 0.787 |
| 1994 | 16092537 | 6676164 | 5301766 | 1374397 | 0.794 |
| 1995 | 16531425 | 6801532 | 5449899 | 1351633 | 0.801 |
| 1996 | 16982283 | 6926900 | 5600720 | 1326181 | 0.809 |
| 1997 | 17445437 | 7052269 | 5754303 | 1297966 | 0.816 |
| 1998 | 17921223 | 7177637 | 5910725 | 1266913 | 0.823 |
| 1999 | 18409985 | 7303006 | 6070065 | 1232941 | 0.831 |
| 2000 | 18912079 | 7428374 | 6232406 | 1195968 | 0.839 |
| 2001 | 19420587 | 7722904 | 6497279 | 1225625 | 0.841 |
| 2002 | 19942768 | 8017435 | 6763508 | 1253927 | 0.844 |
| 2003 | 20478989 | 8311965 | 7031091 | 1280874 | 0.846 |
| 2004 | 21029628 | 8606496 | 7300030 | 1306466 | 0.848 |
| 2005 | 21595073 | 8901026 | 7570323 | 1330703 | 0.851 |
| 2006 | 22175721 | 9195556 | 7841970 | 1353586 | 0.853 |
| 2007 | 22771982 | 9490087 | 8114973 | 1375114 | 0.855 |
| 2008 | 23384275 | 9784617 | 8389331 | 1395286 | 0.857 |
| 2009 | 24013031 | 10079148 | 8665043 | 1414104 | 0.860 |
| 2010 | 24658823 | 10373678 | 8942110 | 1431568 | 0.862 |
| 2011 | 25321716 | 10668208 | 9220533 | 1447676 | 0.864 |
| 2012 | 26002567 | 10962739 | 9500309 | 1462429 | 0.867 |
| 2013 | 26701724 | 11257269 | 9781441 | 1475828 | 0.869 |
| 2014 | 27419680 | 11551800 | 10063928 | 1487872 | 0.871 |
| 2015 | 28156940 | 11846330 | 10347769 | 1498561 | 0.874 |
| 2016 | 28914024 | 12435391 | 10890915 | 1544476 | 0.876 |
| 2017 | 29691464 | 13024452 | 11436771 | 1587681 | 0.878 |

Source: Estimated from the 1984, 2000 and 2010 National Censuses information based on interpolation analysis. Data for 2000 and 2010 are actual recorded census figures.

Appendix Table 2 : Estimated real per capita GDP, labour productivity, and employment- population ratios from 1992 to 2017 using 2006 real values.

| Year | Annual Economic Growth Rate (Percent) | Per Capita Real GDP in Ghana Cedi | Labour Productivity in Ghana Cedi | Labour Productivity in United States dollar | Employment- Population Ratio |
|------|--|---|--|--|------------------------------------|
| 1992 | 3.89 | 645.3 | 1531.5 | 1705.3 | 0.421 |
| 1993 | 4.97 | 659.4 | 1576.8 | 1457.5 | 0.418 |
| 1994 | 3.27 | 662.9 | 1597.8 | 1301.5 | 0.415 |
| 1995 | 4.02 | 671.2 | 1631.5 | 1522.2 | 0.411 |
| 1996 | 4.60 | 683.4 | 1675.6 | 1599.6 | 0.408 |
| 1997 | 4.20 | 693.2 | 1714.9 | 1564.5 | 0.404 |
| 1998 | 4.69 | 706.5 | 1764.0 | 1671.7 | 0.401 |
| 1999 | 4.43 | 718.2 | 1810.5 | 1691.4 | 0.397 |
| 2000 | 3.74 | 725.3 | 1846.5 | 1074.8 | 0.393 |
| 2001 | 4.18 | 735.8 | 1850.3 | 1103.3 | 0.398 |
| 2002 | 4.55 | 749.1 | 1863.4 | 1233.2 | 0.402 |
| 2003 | 5.25 | 767.8 | 1891.7 | 1471.2 | 0.406 |
| 2004 | 5.58 | 789.4 | 1928.9 | 1654.6 | 0.409 |
| 2005 | 5.87 | 813.8 | 1974.5 | 1932.8 | 0.412 |
| 2006 | 6.43 | 843.5 | 2034.1 | 2220.7 | 0.415 |
| 2007 | 4.35 | 857.1 | 2056.7 | 2609.4 | 0.417 |
| 2008 | 9.15 | 911.0 | 2177.3 | 2915.2 | 0.418 |
| 2009 | 4.84 | 930.2 | 2216.1 | 2577.0 | 0.420 |
| 2010 | 7.90 | 977.4 | 2323.3 | 3101.6 | 0.421 |
| 2011 | 14.05 | 1085.5 | 2576.4 | 3708.3 | 0.421 |
| 2012 | 9.29 | 1155.3 | 2740.2 | 3795.6 | 0.422 |
| 2013 | 7.31 | 1207.3 | 2863.7 | 4322.0 | 0.422 |
| 2014 | 3.99 | 1222.6 | 2901.9 | 3337.3 | 0.421 |
| 2015 | 3.84 | 1236.2 | 2938.3 | 3058.5 | 0.421 |
| 2016 | 3.70 | 1245.6 | 2896.2 | 3432.3 | 0.430 |
| 2017 | 8.50 | 1316.1 | 3000.3 | 3571.1 | 0.439 |

Source: Figures are computed from data obtained from Ghana Statistical Service

Appendix Table 3: Results of cross-sectional model analysis of district-level Characteristics influencing the district-level unemployment rate based on 2000 population census data.

Dependent Variable is UNEMPLOYMENTRATE: Proportion of the total workforce that is unemployed

| Explanatory Variable | Unstandardized Parameter | Standardised Parameter | T- statistic | P Value | VIF |
|-------------------------|-----------------------------|---------------------------|-----------------|----------|--------|
| | Estimate | Estimate | | | |
| INTERCEPT | 38.201 | 0.000 | 2.670 | 0.009*** | 0.000 |
| SEPARATEDPROP | 0.921 | 0.112 | 1.720 | 0.088* | 1.085 |
| LITERACYPROP | -1.476 | -2.459 | -7.468 | 0.000*** | 27.771 |
| LITERACYPROPSQ | 0.014 | 2.266 | 7.019 | 0.000** | 26.695 |
| URBANPROP | 0.107 | 0.206 | 2.448 | 0.016** | 1.808 |
| AGEDR | 0.139 | 0.148 | 1.492 | 0.139 | 2.513 |
| SEXRATIO | -0.114 | -0.107 | 1.647 | 0.103 | 1.090 |
| ASHANTI | 20.333 | 0.686 | 8.919 | 0.000*** | 1.514 |

| Notes | |
|---|-----------|
| Sample size | 110 |
| Adjusted R2 | 0.602 |
| F value | 22.035*** |
| Probability level of significance of correct specification of the model using the | |
| Ramsey Reset test with null hypothesis of correct specification | 0.101 |
| Probability level of significance of the LM test for heteroscedasticity | 0.777 |

Probability level of significance of the LM test for heteroscedasticity with the null hypothesis of homoscedasticity or no heteroscedasticity

*** denotes 1 percent statistical significance,

** denotes 5 percent statistical significance

* denotes 10% significance.

Appendix Table 4: Results of cross-sectional model analysis of district-level Characteristics influencing the district-level unemployment rate based on 2010 population census data.

Dependent Variable is UNEMPLOYMENTRATE: Proportion of the total workforce that is unemployed

| Explanatory Variable | Unstandardized Parameter Estimate | Standardised Parameter Estimate | T- statistic | P Value | VIF |
|-------------------------|---|---------------------------------------|-----------------|----------|--------|
| INTERCEPT | 20.502 | 0.000 | 8.832 | 0.000*** | 0.000 |
| SEPARATEDPROP | 0.373 | 0.166 | 3.589 | 0.000*** | 1.385 |
| LITERACYPROP | -0.103 | -0.844 | -3.007 | 0.003*** | 50.748 |
| LITERACYPROPSQ | 0.001 | 0.835 | 2.858 | 0.005*** | 55.070 |
| URBANPROP | 0.014 | 0.158 | 2.956 | 0.003*** | 1.845 |
| AGEDR | -0.094 | -0.570 | 7.821 | 0.000*** | 3.427 |
| SEXRATIO | -0.071 | -0.201 | 4.639 | 0.000*** | 1.209 |
| ASHANTI | 0.938 | 0.144 | 3.439 | 0.001*** | 1.138 |

| Notes | |
|---|-----------|
| Sample size | 110 |
| R2 | 0.677*** |
| Adjusted R2 | 0.667*** |
| F value | 62.398*** |
| Probability level of significance of correct specification of the model using the | |
| Ramsey Reset test with null hypothesis of correct specification | 0.784 |
| Probability level of significance of the LM test for heteroscedasticity | 0.421 |
| with the null hypothesis of nomoscedasticity or no neteroscedasticity | |

*** denotes 1 percent statistical significance,

** denotes 5 percent statistical significance

* denotes 10% significance.





Appendix Figure 2: Graphical illustration of the district unemployment rate (UNEMPLOYMENTRATE) and the proportion of the district adult population living in urban areas (URBANPROP).







Appendix Figure 4: Graphical illustration of the district unemployment rate (UNEMPLOYMENTRATE) and the district sex ratio.



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