

Analysis of the Determinants of Spatial Inequality in Ghana Using Two-Stage Least-Square Regression

Charles Y. Oduro*, Charles Peprah & Ronald Adamtey

Department of Planning, Kwame Nkrumah University of Science & Technology, Kumasi, Ghana

* E-mail of the corresponding author: yawoduro68@gmail.com

Abstract

Achieving spatially equitable development is a key policy objective of many African governments. This is because the persistence of glaring inequality between different parts of a country is detrimental to its overall development and has the potential to trigger conflicts. In Ghana, attempts by successive governments over the years to address the problem have not been very successful because the phenomenon has not been adequately understood. While prior studies have done a good job in examining and describing the nature and manifestations of inequality, not much has been done in terms of formal analysis of factors that might have given rise to it. This paper sought to fill this gap by identifying and analysing some of the plausible determinants of spatial inequality in Ghana. Employing the two-stage least-square (2SLS) regression method, and using district-level data, we develop a model to test the effects of several factors on socio-economic development, including levels of urbanisation, ecological factors, proximity to the national capital, proximity to the inter-regional highway system and the so-called North-South dichotomy. The results show that differences in the level of urbanization, proximity to the national capital (Accra) and ecological conditions are some of the factors contributing to spatial inequality.

Keywords: Socio-economic development; spatial inequality; north-south divide; urbanization; ecological zones; 2SLS regression

1. Introduction

Inequality among people and between geographical areas is a critical developmental issue in to-day's developing world just as it was in developed countries in the early stages of their development (Williamson 1965). In Latin America, research has long established the acuteness of the problem (see Cogneau & Gignoux 2005; Deininger & Squire 1996; Bourguignon, Ferreira & Menendez 2007). Although the subject is relatively under-studied in sub-Saharan Africa, available evidence shows various forms and levels of inequality that give cause for concern (Cogneau & Mesple-Soms 2008). For example, inequality is known to be a major source of ethno-political conflicts in countries where administrative demarcations are coterminous with ethnic or religious groupings (Cederman *et al.* 2010; Langer 2004; Østby 2004; Østby *et al.* 2006; Venables & Kanbur 2003). In Côte d'Ivoire, inequality is said to present

an extremely explosive socio-political situation because in these situations the excluded political elites not only have strong incentives to mobilize their supporters for violent conflict along ethnic lines, but are also likely to gain support among their ethnic constituencies quite easily (Langer 2004: 2).

In a study of 21 sub-Saharan African countries, Østby *et al.* (2006) found intra-regional inequality to correlate positively with conflict in countries like Nigeria, Equatorial Guinea, Senegal and Sudan. Even in countries where spatial jurisdictions "do not represent ethnic or other cleavages, but command the allegiance of the population as political entities", spatial inequality can trigger conflicts (Venables & Kanbur 2003: 12).

Addressing the problem of spatially uneven development is not only critical for the prevention of conflicts, but also a legitimate developmental goal in itself. However, finding workable solutions to the problem is possible only if it is clearly understood. Researchers and policy makers need to understand the various forms and manifestations of inequality as well as the factors that give rise to it. More often than not, analyses of inequality focus on such measures as Gini coefficient, quintiles and percentiles of income distribution and other welfare indicators among individuals or households in a given country or region. These measures are also used to compare countries based on levels of inequality, track changes in inequality over time or, as in the case of the popular Kuznet curve, assess the relationship between inequality and parameters like economic growth, access to opportunity and poverty (see Bourguignon *et al.* 2007; Cogneau & Gignoux 2005; Cogneau & Mesple-Soms 2008; Deininger & Squire 1996; Dunn 2007). While these studies provide insights into inequality within a given population, they seldom analyse the nature and dynamics of the spatial dimensions of inequality in individual Third World countries, especially in Africa.

As is the case in other West African countries like Côte d'Ivoire and Nigeria, Ghana's socio-economic development is spatially lopsided in favour of the southern half of the country (Konadu-Agyemang 2000; Cogneau & Mesple-Soms 2008). Ghana has ten administrative regions, each of which is divided into districts (see Figure 1). In many respects, the Northern, Upper East and Upper West Regions, which make up Northern

Ghana, is much less developed than the seven regions of Southern Ghana. Significant spatial variations also exist both within and across the two sectors of the country, especially when one compares rural and urban areas.

Figure 1: Administrative Regions, Districts and North-South Divide



Socio-economic inequality between the North and the South, as well as between rural and urban areas have already been documented (see Adjasi & Osei 2007; Al-Hassan & Diao 2007; Higgins 2009; Konadu-Agyemang 2000; Oduro 2010; Songsore 2003; Tsikata & Seini 2004). However, while prior studies have done a good job in examining and describing the nature and manifestations of inequality, not much has been done in terms of formal analysis of factors that might have given rise to it. This paper seeks to fill this gap by identifying and analysing some of the plausible determinants of spatial inequality in Ghana. Employing the two-stage least-square (2SLS) regression method, and using district-level data, we develop a model to test the effects of several factors on socio-economic development, including levels of urbanisation, ecological factors, proximity to the national capital, proximity to the inter-regional highway system and the so-called North-South dichotomy.

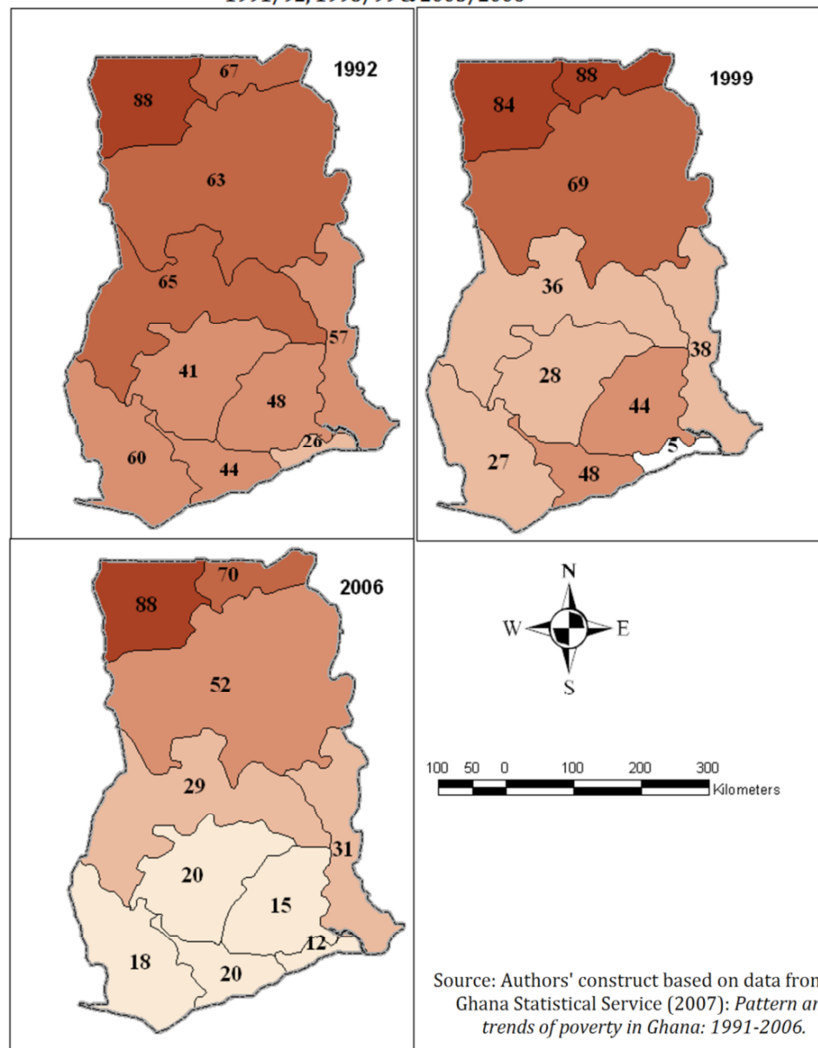
2. Overview of Spatial Inequality in Ghana

Spatial inequality in Ghana dates back to the colonial period when investments in infrastructure were concentrated in the South (Konadu-Agyemang 2000; Songsore 2003; Tawiah 1995), which was endowed with minerals, timber and export crops. In addition, the sea, which borders Southern Ghana, was needed to ship slaves to the Americas and raw materials to Europe. To take advantage of these factors and to facilitate the exploitation and export of resources, “efforts were made to create social and economic infrastructure in the form of schools and hospitals, and harbours, railways and roads in the forest and coastal belts, [while] the resource-poor rural savannah belt was denied any meaningful social and economic development” (Konadu-Agyemang 2000: 475).

Since independence, several policies have been implemented not just to improve upon general living conditions of the populace, but also to reduce spatial inequality. Among them include the siting of state-owned industries outside the major cities of Accra, Kumasi and Sekondi-Takoradi; free primary and secondary education for students in the North; structural adjustment programmes (SAPs); and decentralization of planning and administrative functions to the districts. However, little success has been achieved in this regard. For example, although SAPs had a number of positive impacts on Ghana’s macro-economic environment, “uneven development may have indeed occurred under SAPs” (Konadu-Agyemang 2000: 475). Thus, not surprisingly, the proportion of the population below the national poverty line in 2006 was 12% in the Greater Accra Region (in Northern Ghana) while the corresponding proportion in Upper West Region (in Southern Ghana) was as high as 88% (see Figure 2). In 2010, Upper East Region recorded the highest maternal mortality ratio of 802 per 100,000 live births, compared to 355 per 100,000 live births recorded by Greater Accra region. In the same year, all the three regions in Northern Ghana recorded a literacy rate of less than 50% while the Greater Accra,

Ashanti and Eastern Regions recorded literacy rates of 81-89% (GSS 2013). Apart from the North-South disparity, the living conditions of residents in urban areas are markedly better than those in rural areas. For example, between 1995 and 2000, under-five mortality rate averaged 117 per 1,000 in rural areas and 80 per 1,000 in urban areas (Ghana Statistical Service [GSS] 2005a). In 2000, per capita income in urban areas was 48% higher than that of rural areas (GSS 2005b). In 2010, adult literacy rate was only 63% in rural areas, compared to 84% in urban areas (GSS 2013).

Figure 2: Percentage of Population Below Poverty Line by Region, 1991/92, 1998/99 & 2005/2006



Source: Authors' construct based on data from: Ghana Statistical Service (2007): *Pattern and trends of poverty in Ghana: 1991-2006*.

The persistence of spatially uneven development can partly be attributed to inadequate understanding of the complexities associated with the spatial dimensions of development. Therefore the need to empirically explore such disparities in Ghana, and for that matter Africa, cannot be over-emphasised.

3. Determinants of Socio-Economic Development: Research Hypotheses

This section discusses plausible determinants of the socio-economic development of districts and accompanying research hypotheses. They include the North-South divide, inter-regional highways, proximity to the national capital, urbanisation and the natural environment.

3.1 The North-South Divide

Why does Northern Ghana persistently lag behind South Ghana in terms of socio-economic development? Some commentators point to policy neglect and systematic discrimination that date back to British colonial rule and are entrenched in post-independent Ghana (see Konadu-Agyemang 2000; Songsore 2003; Phebih-Agyekum 2006; Akologo & van Klinken 2008). This claim presupposes that being located in the South in and of itself produces better outcomes of socio-economic wellbeing than being located in the North even after controlling for the

effects of other factors. *Therefore, we hypothesize that, barring all other factors, districts located in the South are more developed than those located in the North.*

3.2 *The Natural Environment*

It is proposed that the level of socio-economic development of a district is dependent on the natural environment within which it is located, including ecological conditions and natural resource endowments. That is, differences between districts in terms of natural forces are expected to translate into different levels of human wellbeing. Natural environmental factors considered in this paper include *ecological conditions* and *mineral wealth*.

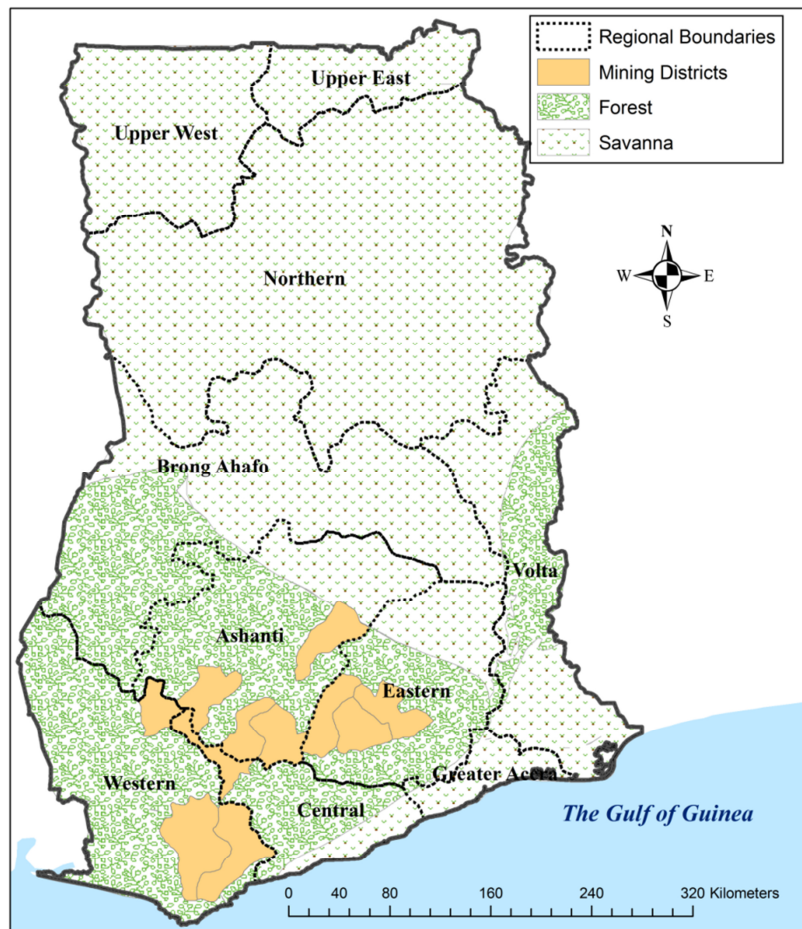
3.2.1 Ecological Conditions

Could it be the case that variations in ecological conditions across Ghana have contributed to variations in socio-economic development? The country can be divided into two main ecological zones: forest and savannah (see Figure 3). The forest zone includes a rainforest belt in the south-western corner of the country, a semi-deciduous forest belt that occupies most of the southern half of the country and a transitional forest belt that lies between the semi-deciduous forest and the northern grasslands. The savannah zone consists of two belts: (a) vast stretches of Guinea and Sudan savannahs that cover the whole of Northern Ghana and; (b) the dry coastal grasslands that cover the whole of Greater Accra Region and parts of Central and Volta Regions (Oppong-Anane 2001; Parker 2000).

The forest zone has two rainy seasons in a year and a mean annual rainfall ranging from 1,300 mm to 2,200 mm, while most of the savannah zone (with the exception of the coastal savannah belt) has only one rainy season and a mean annual rainfall ranging from 800 mm to 1,100 mm (Kundell 2008; Oppong-Anane 2001). The generally wet conditions and bi-modal rainfall pattern allow two crop farming seasons in the forest zone while most of the savannah zone has one farming season. Thus, while farmers in the forest zone enjoy a total of 240-280 days of farming in a year, their counterparts in the savannah zone have 150-200 days to farm (Kundell 2008; Oppong-Anane 2001). In addition, while most farmers in the savannah zone produce mainly annual crops, those in the forest zone produce both annual crops and perennial tree crops such as cocoa, oil palm, coconut, cola and citrus, some of which are either exported or serve as industrial raw materials. In particular, Ghana's largest export commodity—the cocoa bean—is produced exclusively in the forest zone. In addition, lumbering and saw-milling are important economic activities in the forest zone. Another difference between the savannah zone and the forest zone is that the former is much more prone to bushfires, draughts and soil erosion, which are partly attributed to the spreading effects of the Sahara desert.

In view of its apparently superior agronomic and industrial potentials, we postulate that the forest zone generates more economic activities than the savannah zone. *Therefore, we hypothesize that the level of socio-economic development is higher in districts within the forest zone than those within the savannah zone, even after controlling for other factors.*

Figure 3: Ecological Zones (Forest and Savannah) and Mining Districts



Source: Authors' construct

3.2.2 Mineral Wealth

Are spatial variations in mineral wealth a significant contributor to spatial variations in socio-economic development? Long before the Portuguese arrived in 1471, the people of the Gold Coast (now Ghana) had been exploiting and trading in gold with Trans-Saharan caravan traders from North Africa and other parts of the Mediterranean region, and probably with Phoenician and Carthaginian sailors who reached the West African coast in the 5th and 6th centuries B.C. (see Agbesinyale 2003). While gold mining continues to be the single most important mining activity, the exploitation of other minerals such as diamonds, bauxite and manganese is a key part of the country's mining sector. The mining sector received a boost in the 1980s when the country's mining laws and policies were changed to encourage foreign investments, following the adoption of SAP (Agbesinyale 2003). Although mineral deposits stretch from the southwest to the northeast, mining on commercial scale has since the 19th century been predominant in selected districts in the South (see Figure 3). Apart from providing direct employment and income to mine owners and workers, mining can have a positive multiplier effect on the local economies of mining districts through its linkages with other economic activities, especially commerce. But does this really matter, especially in view of the inconclusive debate about whether endowment in natural resources (a.k.a. *natural capital*) is a curse or an asset for the socio-economic development of nations (see Barbier 2003; Chambers & Jang-Ting 2009; Sachs & Warner 1997; Toman 2003)? Whatever the verdict is, does mineral wealth (and for that matter natural capital) play a role socio-economic development at the sub-national level? *For our analytic purposes, we hypothesize that, all other things being equal, mining districts are more socio-economically developed than non-mining districts.*

3.3 Urbanisation

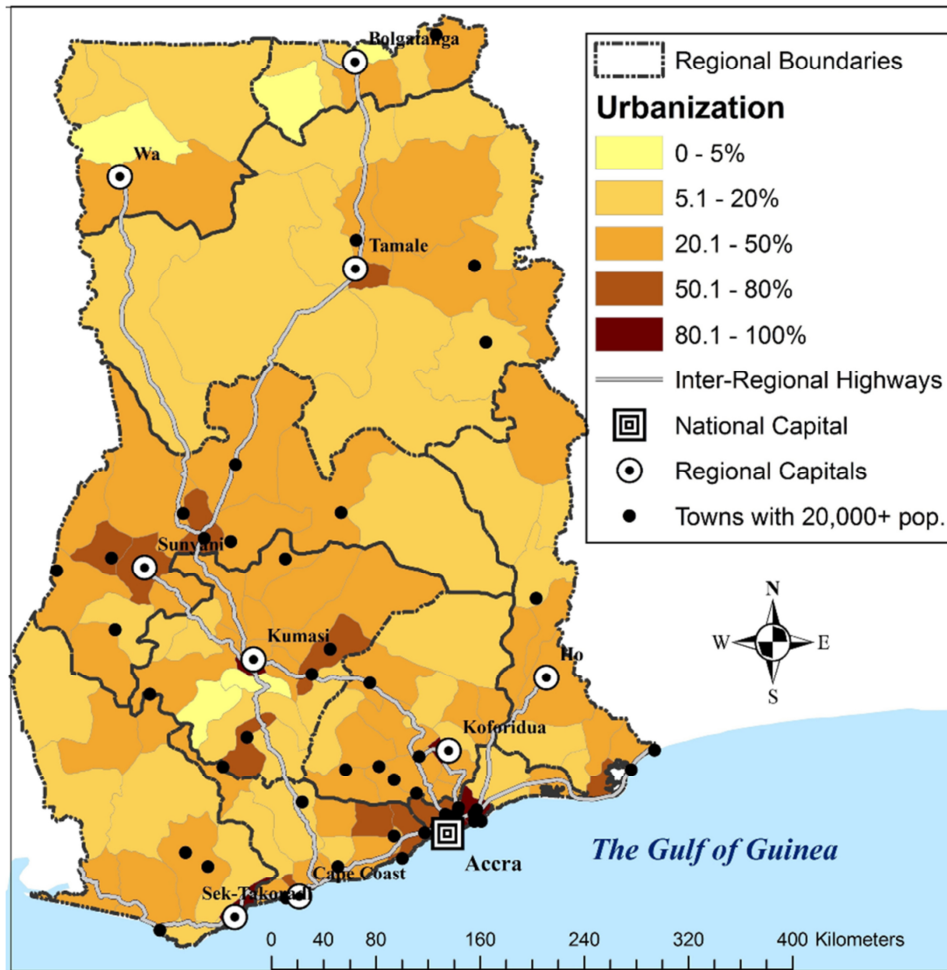
The role of urbanisation in the development process of the developed world is well documented (see Bairoch 1988). But can the same be said of today's developing countries? While one school of thought has a somewhat negative view of the role of urbanisation in socio-economic development in the developing world, another school of thought portrays it as a necessary part of the development process. Those who have a negative view of

urbanisation accuse governments of developing countries of pursuing urban-biased policies that protect the interests of the urban elite and pressure groups (Lipton 1977; 1980; 1993; Stren & White 1989). The consequences include non-competitiveness of the rural export sector, complete stagnation of the rural economy, widening disparities in wages and quality of life between cities and rural areas, and rural-urban migration (Agesa 2001; Drakakis-Smith 2000; Henderson 2005; Lipton 1977; Todaro 1976; 1989). Thus, while the sceptics of urbanisation admit that quality of life is generally better in urban centres than in rural areas, they attribute the disparity to over-investment in urban centres and disinvestment in rural areas.

The idea that urbanisation is a necessary part of the development process was encapsulated by Jacques Ledent when he suggested that “urbanisation is a finite process experienced by all nations in their transition from an agrarian to an industrial society; thus, different urbanisation levels reflect differing degrees of economic development” (Ledent 1982: 507; see also Njoh 2003). The supposed positive correlation between urbanisation and socio-economic development has been partly explained by the *agglomeration economies* (*external economies of scale*) hypothesis. This hypothesis, which can be traced to the *location theory* branch of spatial economics, is linked to the ideas of Alfred Marshall, who suggested that “Great are the advantages which people following the same skilled trade get from near neighbourhood to one another...” (Marshall 1890 cited in Glaeser 1999: 254). In other words, the high concentrations of population and economic activities in a given space that go with urbanisation produce various advantages—termed agglomeration economies. One such advantage is that, concentration enhances interactions between people, which in turn lead to the acquisition of new skills, new ideas and innovations (Glaeser 1999). Another advantage is that the relatively close proximity between employers and workers, as well as between producers and consumers, ensures easy access to labour, a reduction in market area and, hence, a reduction in the cost of transporting goods and services (Krugman 1991; Alonso-Villar 2001; Handerson 2002; 2004). Urban Agglomeration also increases the cost-effectiveness of providing public infrastructure and services (e.g. schools, health services, water, electricity, etc). Thus, compared to rural areas, urban areas have greater capacity to support diverse economic activities, gainful non-agricultural employment opportunities and the provision of essential social services, and hence stimulate economic development. A similar view is held by modernization theorists (such as Arthur Lewis in his two-sector model of economic development and Rostow in his stages of economic growth theory) who suggest that economic development and social change come about through an evolutionary process by which a country is transformed from ‘traditional’ to ‘modern’ society. To them, the ‘traditional society’ is rural, rudimentary, culturally and technologically backward, and agrarian, while the ‘modern society’ is urban, advanced, culturally and technologically progressive, and industrialised (see Ledent 1982; Njoh 2003; Oduro 2010; Yuki 2007).

Empirical studies on the relationship between urbanisation and development at the sub-country level, especially in Africa, are rather scanty. Another unresolved issue is whether urbanisation is a cause or an effect of economic development. We take the position that urbanisation is both a cause and a consequence of socio-economic development. As demonstrated in the analysis, this can be ascertained by statistical methods that simultaneously account for the effect of urbanisation on economic development and the effect of economic development on urbanisation. *Thus, we hypothesise that, all other things being equal, districts with high levels of urbanisation produce high levels of socio-economic development and vice versa* (see Figure 4).

Figure 4: Urbanization Levels by Districts, Capital Cities and Inter-Regional Highways



If urbanisation is both a predictor and an outcome of socio-economic development, then it should be expected that some of the determinants of socio-economic development are also determinants of urbanisation; that is, conditions that attract development also attract population. However, there are also possible exogenous factors that correlate with urbanisation but do not necessarily correlate with socio-economic development. Two of such factors considered in this study are the presence or absence of *regional capitals* and whether a district is located at the *coast*.

3.3.1 Regional Capitals

By reason of their status as administrative centres, regional capitals attract more governmental and non-governmental activities and population than ordinary towns and cities. Thus, by virtue of their status and functions, regional capitals have the potential to urbanise faster than other settlements. We account for this effect by differentiating between districts that double as regional capitals and those that do not (see Figure 4). *That is, holding all other factors constant, it is proposed that districts that double as regional capitals are more urbanised than ordinary districts.*

3.3.2 Coastal Location

During the colonial days, Ghana's coastal settlements became important gateways to the country. Many of these settlements became bases for European merchants and colonial administrators, ports, trading centres, as well as important centres of education and other social and economic infrastructure (e.g. Accra, Tema, Cape Coast and Sekondi-Takoradi). They have over the years attracted population from the rest of the country and have thus grown to become major centres. *Therefore, all other things being equal, coastal districts are expected to be more urbanised than inland districts.*

3.4 Proximity to National Capital

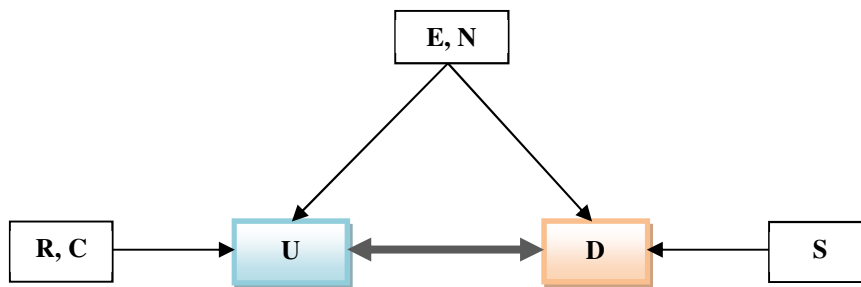
The national capital, Accra, is the country's industrial and commercial hub and thus receives more investments

than any other district, making it the most developed ‘district’ in the country (see Figure 4). In 2003, the city accounted for 44% of total employment, 62% of wages and salaries, and 69% of the value of total output of the nation’s manufacturing sector (Oduro 2010). As a result of its political and economic dominance, Accra interacts intensively with the rest of the country through the exchange of labour, goods and services. It is the largest ‘market’ for human capital, agricultural and forestry products produced in other parts of the country as well as the most important ‘exporter’ of social services such as specialist health care and secondary and tertiary education to the rest of the country. As a result of these spatial forward and backward economic linkages, Accra is expected to have considerable socio-economic impacts on other districts. *However, it is hypothesised here that, all other things being equal, the magnitude of these impacts diminishes with distance from the city.*

3.5 Inter-Regional Highways

Highways facilitate the movement of people and goods, and as such can be regarded as one of the drivers of socio-economic development. However, as Adanu (2006) has noted, there are wide spatial disparities in the development of roads in Ghana. This differential development of the road network could contribute to spatial inequality in socio-economic development. In this paper, the focus has been on the country’s most important road network—the inter-regional highways (see Figure 4). Being located along or close to this network enhances people’s ability to travel to the national capital, the regional capitals and other service centres. The network also facilitates the movement of people and goods between Ghana and its neighbours—Côte d’Ivoire, Burkina Faso and Togo. *We therefore hypothesise that, holding all other factors constant, districts located along the inter-regional highways are more developed than districts located outside highway corridors.*

In brief, this paper proceeds by testing the hypothesis that a district’s level of urbanisation (U) and its socio-economic development (D) are each an outcome and a predictor of the other, and that both ‘U’ and ‘D’ are influenced by the natural environment (E) and proximity to the national capital (N). In addition, ‘D’ is separately influenced by whether a district is located in the South (S) while ‘U’ is separately influenced by whether a district doubles as a regional capital (R) and whether it is located at the coast (C). These relationships are as illustrated below:



The above relationships can also be represented by the following simultaneous equations:

$$D = f(U, E, N, S) \dots\dots\dots(a)$$

$$U = g(D, E, N, R, C) \dots\dots\dots(b)$$

4. Data and Methods

The unit of analysis in this study is the *district*, which is used generically to refer to Ghana’s local government jurisdictions made up of metropolises, municipalities and ordinary districts. The focus of the empirical aspect of the paper has been to analyse whether, and the extent to which, variations in selected independent variables may account for observed variations in socio-economic development among districts using the 2SLS method. Operationalization of the variables, data sources and specification of regression models are discussed as follows.

4.1 Dependent and Independent Variables

The main dependent variable, ‘socio-economic development’ (with variable name ‘*INDEX*’), is measured here as a composite index constructed from a broad spectrum of 20 district-level indicators of social and economic wellbeing (see Table 1).

Table 1: District-Level Indicators of Socio-Economic Development

<p>Education</p> <ul style="list-style-type: none"> • Percentage of the population aged 15+ years who are literate • Percentage of children of school-going age enrolled in primary schools (net primary school enrolment) • Percentage of the population aged 6+ years who have ever attended school • Percentage of primary school children who attend school within 30 minutes from home • Percentage of secondary school children who attend school within 30 minutes from home <p>Health</p> <ul style="list-style-type: none"> • Percentage of households with access to health facility within 30 minutes from home • Percentage of women with live birth who received pre-natal care • Percentage of women with live birth who received post-natal care <p>Housing</p> <ul style="list-style-type: none"> • Percentage of households living in houses with burnt brick/sandcrete walls • Percentage of households living in houses with metal/concrete/asbestos roofs <p>Water and sanitation</p> <ul style="list-style-type: none"> • Percentage of households with access to potable water • Percentage of households who reach potable water source in less than 15 minutes from house • Percentage of households with access to safe toilet facilities • Percentage of households that use safe solid waste disposal methods <p>Food security</p> <ul style="list-style-type: none"> • Percentage of households able to meet food needs without difficulty throughout the year <p>Employment</p> <ul style="list-style-type: none"> • Employment rate (Percentage of active labour force employed) <p>Road conditions and accessibility to food markets</p> <ul style="list-style-type: none"> • Percentage of households living in communities whose main road is accessible throughout the year • Percentage of households who access food markets within 30 minutes from home <p>Access to the mass media</p> <ul style="list-style-type: none"> • Percentage of the population who listen radio regularly (most common source of news and information in Ghana) • Percentage of the population who read newspaper regularly (second most common source of news and information in Ghana)
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Source: Author' construct

Indicator-specific indices were calculated by expressing the district average of each indicator as a percentage of the national average of that indicator. For each district, all the indicator-specific indices were then added up and the result was divided by 20 (total number of indicators) to obtain a composite development index (*INDEX*). The computation is summarised as follows:

$$INDEX = 100 \left(\frac{R_{1d}}{R_{1n}} + \frac{R_{2d}}{R_{2n}} + \frac{R_{3d}}{R_{3n}} + \dots + \frac{R_{20d}}{R_{20n}} \right) \div 20$$

where $0 \leq INDEX \leq \infty$

R_1, R_2, \dots, R_{20} = the 20 socio-economic indicators; and

d and n denote district and national averages for R_1, R_2, \dots, R_{20} .

The value of *INDEX* for the nation as a whole is 100, meaning that any district with an *INDEX* exceeding 100 has a level of 'socio-economic development' that exceeds the national average while the opposite is true for any district whose *INDEX* is less than 100.

'Urbanisation' (with variable name '*URBAN*') is operationalised as the percentage of a district's population that lives in urban centres based on Ghana's official definition of an *urban* centre, which is any settlement with 5000 or more inhabitants. Proximity to the national capital (with variable name '*DISTANCE*') is measured as the approximate distance (km) of the centroid of a district from the centroid of Accra metropolis. The names and descriptions of other variables are as shown in Table 2.

Table 2: Variable Description

Name	Description
<i>INDEX</i>	Composite socio-economic development index
<i>URBAN</i>	Percentage of Urban Population
<i>DISTANCE</i>	Distance (km) of the centroid of a district from the centroid of Accra
<i>FOREST</i>	Whether a district is located within forest zone
<i>MINING</i>	Whether a district is a mining district
<i>COAST</i>	Whether a district is at the coast
<i>SOUTH</i>	Whether a district is located in the South
<i>CAPITAL</i>	Whether a district is a regional capital
<i>HIGHWAY</i>	Whether district is located along an inter-regional highway

Source: Author' construct

4.2 Data Sources

District-level data on the 20 indicators used to construct *INDEX* were obtained from the *Ghana 2003 Core Welfare Indicators Questionnaire (CWIQ II)* survey. CWIQ is a periodic nationwide cross-sectional sample survey carried out by the Ghana Statistical Service (GSS) to provide data for governmental and non-governmental agencies to assess human welfare. While data from the first survey (CWIQ I), carried out in 1997, was aggregated to the regional level, the 2003 survey (CWIQ II) was aggregated to the district level. This makes it possible to use the CWIQ II dataset for analyses in which the unit of analysis is the *district*. Unfortunately, the GSS has not carried a similar survey since 2003, thus making CWIQ II the most 'up-to-date' national survey on comprehensive welfare indicators disaggregated to the district level. (Although the 2010 Population and Housing Census provides some district-level demographic data, it does not cover the variables needed for our analysis.) Despite the fact that the dataset is quite old, we think it sheds considerable light on spatial inequality that can still inform current policy and debate on the subject matter.

CWIQ II involved a national random sample of 49,005 households distributed among all the 110 districts existing in 2010. (Although the number of districts has since increased to about 217, this does not affect the analysis and interpretation of the data.) Because CWIQ II was conducted in 2003 we used the 2000 urbanisation levels of districts based on the 2000 Population and Housing Census, which was also carried out by the GSS. This is the closest district-level data on urbanisation as far as the reference year (2003) is concerned. Distances between the districts and Accra were computed (as the crow flies) from a digital (GIS) district map of Ghana while the other variables (all of which are dichotomous variables) were constructed based on information from secondary sources and the authors' knowledge of the study area.

4.3 Model Specification

Based on a preliminary assumption that the two simultaneous general equations hypothesised above, (a) and (b), is linear and can be fitted using ordinary least-square (OLS) regression, the following structural equations were derived from (a) and (b), respectively:

$$INDEX = a_1 + b_{11}URBAN + b_{12}DISTANCE + b_{13}HIGHWAY + b_{14}FOREST + b_{15}MINING + b_{16}SOUTH + e_1 \dots (c)$$

$$URBAN = a_2 + b_{21}INDEX + b_{22}FOREST + b_{23}MINING + b_{24}CAPITAL + b_{25}COAST + e_2 \dots (d)$$

where,

- a_i is the intercept of the i^{th} equation;
- b_{ij} is the coefficient of the j^{th} variable in the i^{th} equation; and
- e_i is the error term of the i^{th} equation.

However, diagnostic tests revealed that the variables *URBAN* and *DISTANCE* are not normally distributed as expected and that the assumption of linear relationship between *INDEX* and these predictors does not hold. These problems were corrected by transforming *URBAN* and *DISTANCE* into their respective square roots. The transformed variables are named '*sqtURBAN*' and '*sqtDISTANCE*'. Further diagnostic tests revealed negligible amounts of heteroscedasticity and autocorrelation (usually caused by spatial clustering). Thus equations (c) and (d) were modified as:

$$INDEX = a_1 + b_{11} \cdot sqtURBAN + b_{12} \cdot sqtDISTANCE + b_{13} \cdot HIGHWAY + b_{14} \cdot FOREST + b_{15} \cdot MINING + b_{16} \cdot SOUTH + e_1 \dots (1)$$

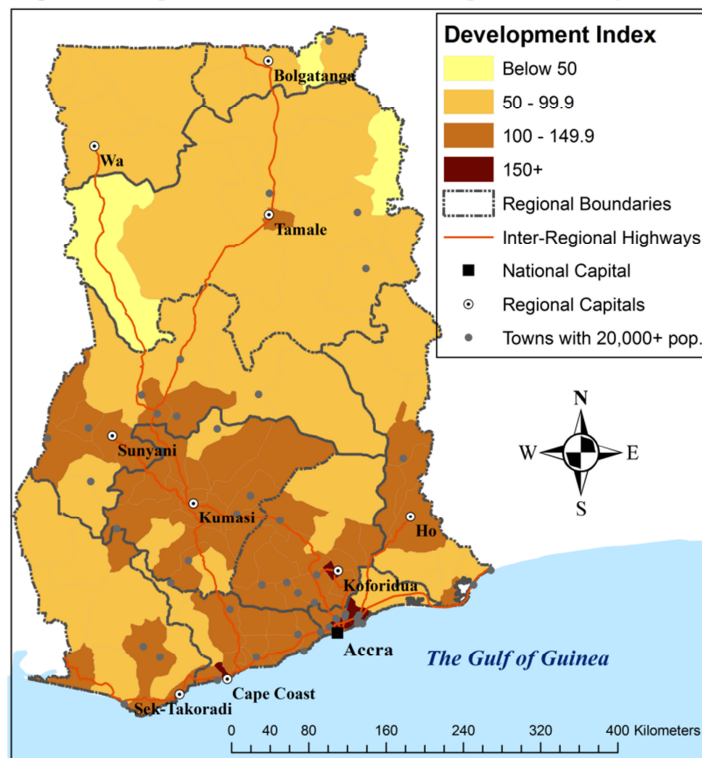
$$URBAN = a_2 + b_{21} \cdot INDEX + b_{22} \cdot FOREST + b_{23} \cdot MINING + b_{24} \cdot CAPITAL + b_{25} \cdot COAST + e_2 \dots (2)$$

Fitting models (1) and (2) as OLS regression models show that *INDEX* and *sqtURBAN* are positively correlated with significance level exceeding 99.9%. However, *variance inflation factors* (VIF) tests, which examine the OLS assumption of non-collinearity (orthogonality) between independent variables, showed that *sqtURBAN* correlates with some of the other predictors of *INDEX*. This is an indication of possible biases in the estimated slopes and standard errors of models (1) and (2) and that OLS regression is not appropriate. Therefore, models (1) and (2) were re-fitted using the *two-stage least squares* (2SLS) regression method. The 2SLS approach, which allows error terms to correlate with independent variables, simultaneously accounts for the effect of *sqtURBAN* on *INDEX* and the effect of *INDEX* on *sqtURBAN*. The condition that each of the two structural equations should have individual identification (by the inclusion of at least one exogenous variable) is already satisfied in models (1) and (2). Results of the 2SLS regression are shown as models (3) and (4) in Tables 4 and Table 5, respectively.

5. Results

As Figure 5 shows, the value of *INDEX* is generally higher for districts in the South than those in the North. For example, only one out of the 59 districts with *INDEX* values exceeding 100 is the North. The similarity of this spatial pattern to the urbanisation pattern depicted in Figure 4 is a further demonstration that the two variables are related. Descriptive statistics for the other variables are shown in Table 3.

Figure 5: Composite Socio-Economic Development Index by District



Source: Authors' construct

Table 3: Descriptive Statistics

Variable	Number of Observations	Mean	Standard Deviation	Percent
INDEX	110	100.0	28.1	-
URBAN	110	30.4	21.7	-
DISTANCE	110	227.2	148.3	-
FOREST	110	-	-	100.0
Districts in forest zone	70	-	-	63.6
Districts in Savannah zone	40	-	-	36.4
MINING	110	-	-	100.0
Mining districts	11	-	-	10.0
Non-mining districts	99	-	-	90.0
COAST	110	-	-	100.0
Coastal districts	18	-	-	16.4
Non-coastal districts	92	-	-	83.6
SOUTH	110	-	-	100.0
Districts in the South	86	-	-	78.2
Districts in the North	24	-	-	21.8
CAPITAL	110	-	-	100.0
Regional capital	10	-	-	9.1
Not regional capital	100	-	-	90.9
HIGHWAY	110	-	-	100.0
District located along highway	62	-	-	56.4
District located along highway	48	-	-	43.6

Source: Authors' construct

As shown in Table 4, OLS regression model (1) explains 77.0% of variation in *INDEX*. It also shows that all the predictors, except *MINING*, correlate significantly with *INDEX*. Model (1) also shows that, after controlling for *sqrtDISTANCE*, *HIGHWAY*, *FOREST*, *MINING* and *SOUTH*, *sqrtURBAN* is the strongest predictor of *INDEX*. That is, holding other factors constant, urbanisation correlates positively with socio-economic development. *FOREST* is the second most important predictor of *INDEX*; that is, holding all other factors constant, districts in the forest zone are more socio-economically developed than those located in the savannah zone. The third most important predictor of *INDEX* is *sqrtDISTANCE*, followed by *SOUTH* and *HIGHWAY*, respectively. In other words, holding other factors constant, districts that are close to Accra tend to have higher levels of socio-economic development than those located farther away. Similarly, districts located in the South tend to have higher levels of socio-economic development than those in the North, while districts located along highways tend to be more developed than those located away from highways.

Table 4: OLS & 2SLS Regression Models of the Effects of Urbanization, Ecological and Other Variables on Socio-Economic Development (INDEX) in Ghana

Predictors	Model (1): OLS		Model (3): 2SLS	
	Coefficient	Beta	Coefficient	Beta
<i>sqrtURBAN</i>	6.290**** (0.761)	0.446	8.761**** (1.646)	0.621
<i>sqrtDISTANCE</i>	-1.046*** (0.424)	-0.189	-0.727* (0.482)	-0.131
<i>HIGHWAY</i>	7.353*** (2.926)	0.130	5.124* (3.336)	0.091
<i>FOREST</i>	16.361**** (3.992)	0.281	15.971**** (4.197)	0.274
<i>MINING</i>	-.132 (4.655)	-0.001	2.074 (5.054)	0.022
<i>SOUTH</i>	11.829** (6.181)	0.174	11.523* (6.492)	0.170
Constant	58.706**** (10.717)	--	42.979 (14.514)****	--
R ²	0.770 (77.0%)	--	0.746 (74.6%)	--
N	110	--	110	--

Instrumented: *sqrtURBAN*

Instruments: *sqrtDISTANCE*, *HIGHWAY*, *FOREST*, *MINING*, *SOUTH*, *CAPITAL*, *COAST*

Legend: * p<0.10; ** p<0.05; *** p<0.01; **** p<0.001

Standard Errors are in parentheses

Model (3) in Table 4 is a refinement of model (1) using the two-stage least square (2SLS) method. It shows that, the amount of variation in *INDEX* explained by 2SLS model (3) is 75%, which is slightly lower than the 77% explained by OLS model (1). Model (3) also shows lower coefficients for the following predictors: *sqrtDISTANCE*, *HIGHWAY*, *FOREST* and *SOUTH*. In addition, *sqrtDISTANCE*, *HIGHWAY* and *SOUTH* have

lower significance levels in model (3). However, the coefficient of *sqtURBN* increases considerably and its significance level remains 99.9%. In sum, both the OLS and 2SLS models show that urbanisation and ecological conditions are the most important predictors of socio-economic development, while other predictors (i.e. distance from Accra, location along a highway and location in Southern Ghana) have marginal impacts. However, being a mining district has no significant influence on socio-economic development.

As indicated in Table 5, both OLS model (2) and 2SLS model (4) show that *INDEX* and *CAPITAL* are the most important predictors of *sqtURBAN*. In other words, holding all other factors constant, the level of urbanisation of a district is influenced by its level of socio-economic development and whether it is a regional capital. Both models also show that, contrary to expectation, districts located in the savannah zone tend to be slightly more urbanized than those located in the forest zone when the other variables are held constant. Finally, the two models show that being a mining district or a coastal district does not have any significant impact on urbanisation.

Table 5: OLS & 2SLS Regression Models of the Effects of Socio-Economic Development, Ecological and Other Variables on Urbanization (*sqtURBAN*)

Predictors	Model (2): OLS		Model (4): 2SLS	
	Coefficient	Beta	Coefficient	Beta
<i>INDEX</i>	0.051**** (0.007)	0.725	0.049**** (0.013)	0.697
<i>FOREST</i>	-0.857** (0.366)	-0.208	-0.784* (0.538)	-0.190
<i>MINING</i>	-0.327 (0.442)	-0.049	-0.317 (0.445)	-0.048
<i>CAPITAL</i>	1.672**** (0.482)	0.242	1.728**** (0.569)	0.250
<i>COAST</i>	0.210 (0.387)	0.039	0.261 (0.475)	0.049
_cons	0.401 (0.528)	--	0.543 (0.935)	--
R ²	0.580 (58.0%)	--	0.579 (57.9%)	--
N	110	--	110	--

Instrumented: *INDEX*

Instruments: *FOREST*, *MINING*, *CAPITAL*, *COAST*, *sqtDISTANCE*, *HIGHWAY*, *SOUTH*

Legend: * p<0.10; ** p<0.05; *** p<0.01; **** p<0.001

Standard Errors are in parentheses

6. Discussions and Recommendations

This paper has shown that, variation in socio-economic development among districts in Ghana can be attributed to multiple factors, including ecological conditions, urbanisation pattern, proximity to the national capital, proximity to highways and the North-South divide.

6.1 Ecological conditions

The results show that, as far as Ghana is concerned, districts located in the forest zone tend to be more socio-economically developed than districts located in the savannah zone. This is primarily due to a number of peculiar natural constraints that hinder development in the savannah zone. These include long periods of draughts, perennial bushfires, frequent and extensive spates of flooding, and a short farming season. The consequences of these factors for communities located in the savannah zone include seasonal unemployment (during the long dry season), food insecurity, limited sources of livelihoods, high levels of poverty, and out-migration of the youthful and educated segments of the population. In view of the fact that the savannah zone covers over two-thirds of the country's total land area, it is imperative that efforts at reducing spatial inequality include measures to overcome or minimise the impacts of these natural constraints.

To this end, the central government should formulate policies and programmes that target districts in the savannah zone, which is primarily agrarian. The focus should be on agriculture-oriented programmes aimed at improving livelihoods and raising household incomes. Among other things, they should include the promotion of small-scale irrigation and other strategies to develop and transfer production technologies that enable farmers in the zone to overcome or minimise the effects of the harsh ecological conditions. There is also the need for regional and local governments in the zone to work with the National Disaster Management Organisation, the Ghana Fire Service, the Ministry of Agriculture, other state agencies and communities to find ways of curbing the outbreak of bushfires and minimising the effects of flooding.

6.2 Urbanisation

Urbanisation is found to be another key determinant of the level of socio-economic development of a district, even after accounting for the fact that urbanisation itself is influenced by socio-economic development. This is

consistent with the idea that urban areas possess agglomeration economies that enhance the efficient production and distribution of goods and services—including manufactured goods, wholesale and retail services, roads, water, healthcare, education and other infrastructure and services. This means, all other things being equal, urban dwellers enjoy higher standards of living than rural dwellers since the latter have greater physical and financial access to goods and services. In addition to agglomeration economies, it is also plausible, as some scholars suggest, that the relatively high levels of socio-economic development in urban areas is as a result of investment decisions made by government that are biased in favour of such areas (Lipton 1977; Stren and White 1989). Thus, generally, predominantly ‘urban’ districts have higher levels of productivity (resulting from agglomeration economies) and greater public investments than predominantly ‘rural’ districts. These translate into higher standards of living in urban centres, which in turn serve as ‘pull factors’ that attract more people from rural districts (see Pradhan 2007). This positive correlation between urbanisation and socio-economic development is backed by other empirical studies. For example, Moomaw (1996) has shown that, in both developed and developing countries, the urban share of a nation’s population increases significantly with both its GDP per capita and export orientation (measured as the proportion of GDP exported) (see also Tettey 2005). Bertinelli and Black (2004) also found that rural–urban migration leads to human capital accumulation, which in turn leads to technological progress and thus stimulates growth. They warn that restricting urbanisation can lower ‘steady-state level of technology’ which could in turn cause an economy to get ‘stuck in a development trap’ (Bertinelli & Black 2004, p. 92). However, it is also empirically evident that excessive urbanisation (often represented by high *urban primacy*) can adversely impact development (McKee & Leahy 1970; Moomaw 1996; Mutlu 1989).

6.3 Proximity to National Capital

Another important finding from the analysis is that, districts located close to the national capital, Accra, tend to be more socio-economically developed than those located farther away. Therefore, Accra can be thought of as a growth pole. Naturally, Accra should not have been the most developed city in Ghana. The city is located at the heart of the narrow coastal savannah belt which is dryer and experiences harsher ecological conditions than districts located in the interior (northern) savannah. Also, about 200 years ago ‘Accra was little more than a trading post, undifferentiated from many of the other posts along the Gold Coast’ (Acquah 1957 cited in Grant & Yankson 2003, p. 66). However, the decision of the British colonialists to develop the place as a new colonial capital in 1877 transformed Accra from a village to a city. As the country’s industrial and commercial hub, Accra (together with the neighbouring city of Tema) receives more investments than any other district. Consequently, the city has over the decades played the role of a national development node from which innovations, economic growth and social transformation originate and ‘trickle down’ to other parts of the country (Walters 1981).

The fact that the level of urbanisation and proximity to the national capital determine the level of development of a district suggests that urban centres, to some extent, play the role of economic ‘growth poles’. Through various spatial and functional interactions urban centres impact the development of surrounding districts and settlements. This implies that the settlement pattern of a country matters as far as the equitability in the spatial ‘distribution’ of socio-economic development is concerned. In other words, although urbanisation is necessary for economic development, it could create spatial inequality when it is excessively skewed towards a handful of cities (see Henderson 2005). Therefore, human settlement policies in Ghana, and for that matter Africa, should include measures to create spatial balance in the distribution of urban centres. In the case of Ghana, this calls for efforts to reduce the dominance of Accra by opening up other strategically located urban centres to serve as regional growth poles. These regional centres should have fairly high concentrations of population and economic activities, and interact with surrounding areas through the exchange of goods and services. For a start, urban centres that can be considered in this regard include Tamale, which would be a growth pole for Northern Ghana, Kumasi for the middle zone, and Sekondi-Takoradi for the south-western zone. These cities, all of which are located at strategic intersections of the national highway system, already serve as regional capitals.

6.4 Proximity to Highways

Another important finding is that, proximity to highways is an important determinant of the socio-economic development of districts. This is because, in Ghana, road transportation is not only the commonest mode of transportation, but also a major attractor of socio-economic activities (Adanu 2006). The national highways, which are often in better conditions than other categories of roads, enhance the ease with which people travel to access goods and services that are not available in their localities, as well as transport goods and services to market centres. However, the current road network, which is mainly a colonial legacy, has been designed to direct movements between the coastal port cities, particularly Accra, and the rest of the country. This has limited trading and other interactions among regions and districts over the decades. Therefore, it is recommended that the government’s transportation policy should aim at improving and realigning the highway network to facilitate inter- and intra-regional connectivity with regard to the movement of people and goods across the country.

6.5 *The North-South dichotomy*

The analysis has also shown that, even after controlling for the effects of ecological conditions, urbanisation pattern, proximity to the national capital and highways, being located in Northern or Southern Ghana makes a difference in the socio-economic development of a district. In other words, barring all the other determinants analysed in this paper, being a Northern district in itself impacts negatively on that district's socio-economic development. But the nagging question is, why is this so? The available data do not permit empirical analysis of the underlying causes of this North-South disparity. Some commentators attribute it to decades of policy neglect and systematic discrimination dating back to the colonial era (e.g. Phebih-Agyekum 2006; Akologo & van Klinken 2008). For instance, Phebih-Agyekum (2006) claims that 'being of northern Ghanaian origin puts a person in a disadvantaged position in the hierarchy of all things Ghanaian...'. Another plausible factor is conflict. Although communal conflicts resulting from factors such as ethnic and religious differences, chieftaincy, land disputes and partisan politics do occur in every region, certain districts in the North (particularly Yendi, Tamale and Bawku) appear to be noted for this problem. However, the spatial distribution of conflicts and whether indeed conflicts contribute to the North-South divide cannot be conclusively established based on the data available to us. Further empirical studies on this issue are therefore recommended. We also emphasise that the effect of the North-South dichotomy on the overall socio-economic development of districts is found to be minimal in both magnitude and statistical significance, especially when compared with the effects of urbanisation and ecological conditions (see Table 4). This implies that claims such as policy neglect and discrimination against the North could be exaggerations, even if they are real.

7. Conclusion

Spatial inequality is a major developmental problem in Ghana and other African countries. One of the reasons why it requires serious policy attention is that it threatens national security. In Ghana, attempts by successive governments over the years to address the problem have not been very successful because the phenomenon has not been adequately understood. This paper has established empirically that some of the factors that contribute to spatial inequality in socio-economic development among districts in Ghana include urbanisation, ecological conditions, proximity to the national capital, proximity to the inter-regional highway system and the so-called North-South dichotomy. Among other things, it is proposed that the government should take measures to promote three other cities as regional growth poles, improve inter- and intra-regional transportation connectivity and pursue agriculture-oriented development programmes aimed at applying technology to deal with the harsh ecological conditions faced by farmers in the Savannah zone. It is hoped that these measures, if vigorously pursued, would go a long way to reduce spatial inequality to an appreciable level in the medium to long term. Future research directions will focus on assessing the efficacy of various regional development policies in bridging spatial inequality and the factors that make such policies work or fail.

References

- Adanu, S. (2006), "Transportation as a Factor in the Socio-Economic Development of Ghana", in K. Konadu-Agyemang (ed), "Africa's Development in the Twenty-First Century: Pertinent Socio-Economic and Development Issues". Hampshire, Ashgate Publishing Ltd.
- Adjasi, C.K.D. & Osei, K.A. (2007), "Poverty Profile and Correlates of Poverty in Ghana", *International Journal of Social Economics*, 34, 449-471.
- Agbesinyale, P.K. (2003), "Ghana's Gold Rush and Regional Development: The Case of Wassa West District". SPRING Research Series No. 44, Dortmund, SPRING Centre, University of Dortmund.
- Agesa, R.U. (2001), "Migration and the Urban to Rural Earnings Difference: A Sample Selection Approach", *Economic Development and Cultural Change*, 49, 847-865.
- Akologo, S.Z. & van Klinken, R. (2008), "Ghana: why the North Matters", Pambazuka News 2008-06-17, Issue 381. <http://pambazuka.org/en/category/comment/48821>. Retrieved 29.12.2010.
- Al-Hassan, R.M. & Diao, X. (2007), "Regional Disparities in Ghana: Policy Options and Public Investment Implications". Discussion Paper No. 00693, International Food Policy Research Institute (IFPRI), March 2007.
- Alonso-Villar, O. (2001), "Large Metropolises in the Third World: An Explanation", *Urban Studies*, 38(8), 1359-1371.
- Bairoch, P. (1988), "Cities and Economic Development: From the Dawn of History to the Present". Chicago: University of Chicago Press.
- Barbier, E.B. (2003), "The Role of Natural Resources in Economic Development". *Australian Economic Papers*, 42(2), 253-272, June 2003
- Bertinelli, L. & Black, D. (2004), "Urbanization and Growth", *Journal of Urban Economics*, 56(1), 80-96.
- Bourguignon, F., Ferreira, F.H.G. & Menendez, M. (2007), "Inequality of Opportunity in Brazil", *Review of Income and Wealth*, 53(4), 585-618.

- Cederman, L.E., Weidmann, N.B. & Gleditsch, K.S. (2010), "Horizontal Inequalities and Ethno-Nationalist Civil War: A Global Comparison". A paper presented at the Annual Meeting of the American Political Science Association held at University of Maryland, September 2-5, 2010 and the 7th Pan-European IR Conference held at Stockholm, September 9-11, 2010.
- Chambers, D. & Jang-Ting, G. (2009). "Natural Resources and Economic Growth: Some Theory and Evidence", *Annals of Economics and Finance*, 10(2), 367–389.
- Cogneau, D. & Gignoux, J. (2005), "Earnings Inequalities and Educational Mobility in Brazil Over Two Decades". Document de Travail DT/2005-03, Développement Institutions and Analyses de Long terme (DIAL).
- Cogneau, D. & Mesples-Soms, S. (2008), "Inequality of Opportunity for Income in Five Countries of Africa". Document de Travail DT/2008-04, Développement Institutions and Analyses de Long terme (DIAL).
- Deininger, K. & Squire, L. (1996), "A New Data Set Measuring Income Inequality", *The World Bank Economic Review*, 10(3), 565-591
- Drakakis-Smith, D. (2000), "Third World Cities", 2nd edition. New York: Routledge.
- Dunn, C.E. (2007), "The Intergenerational Transmission of Lifetime Earnings: Evidence from Brazil", *The B.E. Journal of Economic Analysis and Policy*, 7(2), Article 2, 1-40.
- Ghana Statistical Service (2005b), "Population Data Analysis Reports Volume 1: Socio-Economic and Demographic Trends Analysis", Accra: Ghana Statistical Service.
- Ghana Statistical Service (2005a), "Population Data Analysis Reports Volume 2: Policy Implications of Population Trends Data". Accra: Ghana Statistical Service.
- Ghana Statistical Service (2005c), "Ghana 2003 Core Welfare Indicators Questionnaire (CWIQ) II: Survey Report (Statistical Abstract)". Accra: Ghana Statistical Service.
- Ghana Statistical Service (2013), "2010 Population & Housing Census: National Analytical Report". Accra: Ghana Statistical Service.
- Glaeser, E.L. (1999), "Learning in Cities", *Journal of Urban Economics*, 46(2), 254-277.
- Grant, R & Yankson, P. (2003), "City profile: Accra", *Cities*, 20(1), 65–74.
- Handerson, V. (2002), "Urbanization in Developing Countries", *The World Bank Research Observer*, 17(1), 89-112.
- Henderson, V. (2004), "Urbanization and Growth", in Aghion, P. & Durlauf, S. (eds.), "Handbook of Economic Growth Volume 1".
- Henderson, V. (2005), "Urban Primacy, External Costs and Quality of Life", in Meier, G. M. and Rauch, J.E. (eds). "Leading Issues in Economic Development, 8th edition". New York: Oxford University Press.
- Higgins, K. (2009), "Regional Inequality and Secondary Education in Ghana". Policy Brief No 1, Prepared for the World Development Report 2009.
- Krugman, P. (1991), "Increasing Returns and Economic Geography", *Journal of Political Economy*, 99(3), 483-499.
- Konadu-Agyemang, K. (2000): "The Best of Times and the Worst of Times: Structural Adjustment Programs and Uneven Development in Africa: The case of Ghana", *Professional Geographer*, 52(3), 469-483.
- Kundell, J. (ed.) (2008), "Water profile of Ghana", *Encyclopedia of Earth*, http://www.eoearth.org/article/Water_profile_of_Ghana
- Langer, A. (2004), "Horizontal Inequalities and Violent Conflict: the Case of Côte d'Ivoire". Working Paper No. 13, November 2004, Centre for Research on Inequality, Human Security and Ethnicity (CRISE), University of Oxford.
- Ledent, J. (1982), "Rural-Urban Migration, Urbanization, and Economic Development", *Economic Development and Cultural Change*, 30(3), 507-538.
- Lipton, M. (1977), "Why Poor People Stay Poor: A Study of Urban Bias in World Development" Cambridge: Harvard University Press.
- Lipton, M. (1980), "Migration from rural Areas of Poor Countries: the Impact on Rural Productivity and Income Distribution", *World Development*, 8(1), 1-24.
- Lipton, M. (1993), "Urban Bias: of Consequences, Classes and Causality", *Journal of Development Studies*, 29(4), 229- 258.
- McKee, D.L. & Leahy, W.H. (1970), "Urbanization, Dualism and Disparities in Regional Economic Development", *Land Economics*, 46(1), 82-85.
- Moomaw, R.L. (1996), "Urbanization and Economic Development: a Bias toward Large Cities?", *Journal of Urban Economics*, 40(1), 13-37.
- Mutlu, S. (1989), "Urban Concentration and Primacy Revisited: An Analysis and Some Policy Conclusions", *Economic Development and Cultural Change*, 37(3), 611-639.
- Njoh, A.J. (2003), "Urbanization and Development in Sub-Saharan Africa", *Cities*, 20(3), 167–174.
- Oduro, C.Y. (2010), "Effects of Rapid Urbanization on Livelihoods in the Peri-Urban Areas of Accra, Ghana".

- A Ph.D. Thesis, Florida State University, Tallahassee FL, USA.
- Opong-Anane, K. (2001), "Country Pasture/Forage Resource Profiles: Ghana", <http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Ghana.htm>.
- Østby, G. (2004), "Do Horizontal Inequalities Matter for Civil Conflict?". Paper presented at the Polarization and Conflict Winter Meeting, Barcelona, 10–11 December.
- Østby, G., Nordås, R. & Rød, J.K. (2006), "Regional Inequalities and Civil Conflict in 21 Sub-Saharan African Countries, 1986–2004". Paper presented at the Polarization and Conflict workshop in Nicosia, Cyprus, 26-29 April.
- Parker, J. (2000), "Making the Town: Ga State and Society in Early Colonial Accra". Portsmouth, NH: Heinemann
- Phebih-Agyekum, C.K. (2006), "Ghana's Gaping Gorge: The North/South Divide". A feature article published on *GhanaWeb*, 18 October. Web: <http://www.ghanaweb.com/GhanaHomePage/features/artikel.php?ID=112310>. Retrieved 12/28/2010).
- Pradhan, R.P. (2007), "Does Infrastructure Play a Role in Urbanization: Evidence from India", *India Journal of Economics & Business*, 6(1), 81-92.
- Sachs, J.D. & Warner, A.M. (1997), "Natural Resource Abundance and Economic Growth". JEL Classification: O4, Q0, F43, Centre for International Development and Harvard Institute for International Development, Harvard University, Cambridge, MA.
- Songsore, J. (2003). "Regional Development in Ghana: The Theory and the Reality". Accra: Woeli Publishers.
- Stren, R.E. & White, R.R. (1989), "African Cities in Crisis: Managing Rapid Urban Growth". Boulder: Westview Press.
- Tawiah, E.O. (1995), "Demographic Patterns and Sustainable Development in Ghana", *Africa Media Review*, 9(1), 96-114.
- Tetty, C. (2005), "Urbanization in Africa in Relation to Socio-Economic Development: A Multifaceted Quantitative Analysis". A Ph.D. Thesis, The University of Akron, Akron, USA.
- Todaro, M.P. (1976), "Internal Migration in Developing Countries: A Review of Theory, Evidence, Methodology and Research Priorities" Geneva: ILO.
- Todaro, M.P. (1989), "Economic Development in the Third World, 4th Edition". New York: Longman Inc.
- Toman, M. (2003), "The Roles of the Environment and Natural Resources in Economic Growth Analysis". Discussion Paper 02–71, Resources for the Future, Washington, D.C.
- Tsikata, D. & Seini, W. (2004), "Identities, Inequalities and Conflicts in Ghana". Working paper 5, Centre for Research on Inequality, Human Security and Ethnicity, University of Oxford.
- Venables, A.J. & Kanbur, R. (2003), "Spatial Inequality and development". Working Paper WP 2003-38), Department of Applied Economics and Management, Cornell University, Ithaca NY, USA.
- Walters, P.B. (1981), "Systems of Cities and Urban Primacy: Problems of Definition and Measurement", in Timberlake, M. (ed), "Urbanization in the World-Economy" New York: Academic Press, Inc.
- Williamson, J.G. (1965), "Regional inequality and the process of national development: A description of the patterns", *Economic Development and Cultural Change*, 13(4), 1- 84.
- Yuki, K. (2007), "Urbanization, Informal Sector, and Development", *Journal of Development Economics*, 84, Elsevier, 76–103.

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