

**The North-South Divide and the Disappearing Middle Class:
An Analysis of Spatial Inequality and Polarization in Ghana**

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Abstract

This paper assesses trends in spatial inequality and polarization in Ghana over the period of economic reform. It contributes to the existing literature in three ways. First, it focuses on the spatial dynamics of inequality in Ghana. Secondly, it introduces the concept of polarization to the income distribution-welfare dialogue in Ghana. Finally, it proposes an index for measuring the share of spatial variation in changes in total inequality, as well as determining which spatial dimension primarily affects the variation in total inequality. The results establish that the Ghanaian population is clustered and that polarization is increasing in Ghana. The differences within-group specific means are considerably larger than the between-group components in explaining static levels of interpersonal inequality. However, changes in the levels of inequality are principally driven by changes in the between-group, i.e. the spatial, component of inequality. This suggests that inequality in Ghana may be assuaged by formulating regional policies directed at reducing down-side fluctuations in spatial inequality.

I. INTRODUCTION

Ghana is often touted as the success story of economic reform. This reform process may be broken into three main phases: successful stabilization (1983-86), structural adjustment (1986-91) and the oscillating policy reform (1992-00). Indeed, growth rates moved from negative to positive and the macroeconomy was effectively stabilized. Inflation rates were reduced significantly and the size of the budget deficit ratio declined. Savings and investment rates as well export and import volumes also increased.

Despite the improvement in macroeconomic indicators, the socio-economic impact of the reforms resulted in a worsening of the plight of some members of the population. The downsizing of the public sector, as part of the civil service reforms, involved the retrenchment of a sizeable share of the nation's formal sector labor force. Access to health services was also inhibited by the introduction of payments for health services as part of the health sector reforms¹.

As with most developing countries, the economy of Ghana is extremely vulnerable to the effects of the political environment. Given weak institutions, there is a proclivity for political business cycles; with reversals of fiscal and monetary policy reforms during election periods. Successful macroeconomic adjustment was partially derailed in 1992, partly due to an (80 percent) election-related wage increase to civil servants. This was in the wake of the transition from a military to a democratic political regime. The immediate effect was the emergence of a fiscal deficit of about 5 percent of GDP in 1992, from a surplus of 1.5 percent in 1991, as the money supply increased by more than 50 percent. Attempts were made to salvage the economy in the ensuing years. However, government spending again escalated in 1999, prior to the next national elections. In a bid to maintain control of the government, the incumbent party again

¹ See Appendix 1.A for a compilation of some macroeconomic and social indicators

indulged in excessive spending -- developing infrastructure in “strategic” areas, *inter alia*.

Recently, inflation rates have been in the 30-50 percent range. The cedi is depreciating at a rapid (nominal) rate with external financing becoming increasingly difficult. The debt situation has become unsustainable. Ghana has therefore joined the Highly Indebted Poor Countries initiative.

There is a growing debate about fate of the average Ghanaian. It is asserted the income distribution is worsening. High levels of inequality in income and asset ownership are bad for subsequent growth (Rodrik, 1998). It is feared that the middle class is rapidly disappearing in Ghana. In spite of these concerns, there are tensions between policies aimed at fostering economic growth and those aimed at poverty reduction. A better understanding of the distribution of income, given the spatial variation in endowments and socio-economic infrastructure, is imperative in formulating integrated regional strategies that may succeed in achieving sustainable poverty reduction whilst fostering economic growth. It is in this sense that the present study is both timely and informative.

The primary objective of this paper is to examine how economic reform has impacted² spatial inequality in the period 1987-99. The specific objectives are as follows:

- To assess the trends in spatial inequality for given dimensions, over the study period using the Gini coefficient and the generalized entropy class of measures
- To determine how much of total inequality in Ghana can be attributed to spatial inequality
- To empirically analyze trends in polarization in Ghana

The current study builds on existing studies to produce a consistent analysis of

²This study abstracts from the rest of the economy. It focuses on trends in the economic reform process and inequality. Undoubtedly, there are other factors determining the distribution of income and its change, hence this paper establishes correlations and not causality.

inequality in Ghana. It extends the analysis by closely examining the spatial dimension of inequality. The issue of polarization in distribution has been ignored in the welfare dialogue in Ghana. Although the extant literature identifies areas where poverty is prevalent, no research has been undertaken to examine the extent and nature of clustering in the income distribution. This has implications for the assessment of economic growth and the nature of poverty in Ghana. Hence, the current study is of particular relevance, not only serving as a platform for introducing another dimension to the income distribution - welfare dialogue in Ghana but also for informing policy formulation and targeting.

The paper is organized as following. Section II presents a review of literature on spatial inequality in Ghana. Section III assesses trends in spatial inequality. Section IV analyses polarization in Ghana. Section V presents a decomposition exercise, analyzing the micro-determinants of income growth. Section VI discusses political business cycles. The concluding section then summarizes the major findings of the paper.

II. Analysis of Spatial Inequality in Ghana

Generally, the dialogue on spatial economics³ has evolved from the 1970's, when neo-Marxists viewed the world economy as made up of the “core” and the “periphery”, through the rather disconcerting characterization into “temperate” and “tropical” by Karmack (1976), to the new Keynesian perspective of “North” and “South”.

“Colonial dependency is at the root of the inequalities so evident in the Ghanaian space economy”, Songsore (1989)

This sentiment underlies most studies undertaken on spatial inequality in Ghana. Spatial inequality in Ghana has been treated predominantly as a “reversed” North-South

³ Reflecting the definition of developed and underdeveloped areas, respectively.

phenomenon⁴. However, a core-periphery structure may be gleaned out of the North-South spatial economy. The core consists of the Ashanti, Eastern and Central Regions as well as the Western and Brong-Ahafo Regions. These regions, which make up the forest ecological zone of the country's South, are the prime cocoa, timber and mineral producing areas⁵. The coastal areas are also a part of the core by virtue of rapid growth in the port towns.

Researchers have identified broad disparities between the northern part of Ghana and the rest of the country. Forde (1968), using factor analysis, principal components and regression analysis, divided Ghana into relatively homogenous multivariate regions. Based on the 1960 population census he derived two main regions - the North and the South, reflecting regional inequality accompanying economic development. Songsore (1989) used principal component analysis and data from the 1970 population census to identify key variables explaining inequality⁶. He concluded that the North-South divide was the main dimension of spatial inequality: the North had been left behind in the development process.

Songsore (1989) argued that dependency and capitalist penetration, which under colonialism shaped the internal structure to fit the needs of the colonial metropolis, continue under neo-colonialism to distort the internal patterns of production, and the spatial organization of economic and social activity. On the other hand, Chazan (1991) pointed out that between 1983-1991, the period marking the early stages of the Economic Reform Program (ERP), the nation was insulated from strong interest group demands.

⁴ Contrary to the New Keynesian perspective, North and South, as used in the Ghanaian literature, refer to underdeveloped and developed areas respectively. This is purely a geographical classification.

⁵ During the colonial era, Ghana was developed as a satellite nation to export food and raw materials to Britain and to consume manufactured products from the latter. Hence, prior to the 1980's, differential policies were pursued in the North (Northern, Upper-East and Upper-West Regions) and the South (the rest of Ghana) to ensure labor flows from the former to facilitate the export industry in the South.

⁶ He defined the variables as general social welfare, literacy factor and the ethnic mixture - electricity factor.

The military government, at the time, had broken ties with the post-colonial elites.

The mid-1980s saw an increasing awareness of the deprived North and a shift in policy focus to facilitate the development of the area. Given the vestiges of colonial legacy, the adjustment policies may not have bridged the North-South gap. A widely held view is that economic growth, associated with adjustment, will necessarily be inequitable in low-income countries (Watkins, 1995)⁷. Bruno et al (1998) concluded that the rate of overall economic growth has no systematic impact on inequality in the adjusting economies. It has been argued, however, that some of the policy changes advocated as promoting growth led to increases in inequality.

It is, however, erroneous to treat the North or South as monoliths. Within these two broad areas, there is a rural-urban divide. In the North, for instance, Tamale and its vicinity monopolize the social services in the area. This has been attributed to the strategy of locating social services in the administrative centers for the benefit of the bureaucratic elite (Dickson, 1984). A similar pattern underlying rural-urban disparities is observed in the South⁸.

The decentralization process aimed at empowerment at the grass-root level, *inter alia*, may have affected the rural-urban divide. In a recent study, Canagarajah et al (1998) using the Gini coefficient, entropy class measures and stochastic dominance analysis examined changes in inequality by locality. Based on the first three rounds of the Ghana Living Standards Survey (GLSS) they defined locality as Accra, Other Cities and Rural Areas. They reported the within-group inequality in these three areas and the fraction of overall inequality explained by within inequality. The fraction of overall inequality explained by inequality between these localities as well as the administrative regions was also reported. They observed that within-group inequality and its contribution to overall inequality increased in Accra but decreased in the Other Cities and Rural Areas.

⁷ By this view, the rich are usually the first to reap the benefits of national income growth.

⁸ See for instance Songsore (1989).

The pattern of spatial inequality may also be attributed to the differential resource endowment of regions as perceived within the colonial development paradigm⁹. Within a given locality, there is a rural-rural divide between those rural areas more closely tied to commodity production for export and those tied to subsistence production by peasants. The literature attributes this to the greater bargaining power of old cocoa districts. Like Northern Ghana, the nonexport oriented rural areas of Southern Ghana are relatively worse-off in terms of welfare.

At the regional level, Canagarajah et al (1998) observed that inequality between administrative regions contributed the most to overall inequality in 1988 but this declined in 1992. However, this dimension along with the other partitions¹⁰, explained only about 30 percent of overall inequality. Through regression analysis, they examined the contribution of the respective regions, *inter alia* to total expenditure¹¹. However, the results do not yield definitive conclusions. The study did not report between-group inequality and fully explore the spatial dynamics in income inequality.

The present study departs from this, by examining the various dimensions of the Ghanaian geographic space. It analyses inequality in the North-South dimension as well as on the basis of ecological zones, allowing for differential resource endowments and the interaction between these and the rural-urban dimension. Is inequality in Ghana essentially a spatial phenomenon? Which dimension is most germane to efforts aimed at reducing inequality? Within-group inequality increased in Accra but decreased in Other Cities and Rural Areas (Canagarajah et al, 1998). However, how does this compare to the changes in the between-regions component? Is the population becoming clustered, vis-à-

⁹ Forde (1968) stated that under the impact of colonialism, the internal production structure had been divided into a dynamic modern export sector and a "backward" and underdeveloped subsistence sector.

¹⁰ The other dimensions they explore are gender and education level of household head and socio-economic group

¹¹ They show that the positive effect of Western and Greater Accra Regions on the expenditure decreased from 1988-92, whereas that of Volta, Ashanti and Upper Eastern Regions increased for the same period. It is evident that the regions have different effects on income distribution, but the results are difficult to explain in any aggregated spatial dimension.

vis the income distribution, such that within each locality members are very similar but between localities members are very different?

From the review of relevant literature, it is evident that some work, albeit very little, has been done on spatial inequality in Ghana. No research has been undertaken on income polarization in Ghana. There is a paucity of knowledge concerning the context of the present study.

III. Estimating Spatial Inequality in Ghana

This study adopts the standard procedure of using the real per capita consumption expenditure¹² as a measure of the standard of living. The Lorenz consistent (relative) measures of inequality - the Gini coefficient (Cowell 1995) and the Generalized Entropy (GE) class of measures (Shorrocks, 1980,1984) are used as the basis for analysis.

The Gini coefficient is sensitive to changes that occurred at the middle of the distribution. It is a widely used summary statistic and is thus useful for purposes of comparison. It can be expressed as follows:

$$G = \frac{1}{\mu} \sum_{i=1}^K \sum_{j=1}^K f(y_i) f(y_j) |y_i - y_j|$$

Where y_i is the value of the welfare index in for the given spatial dimension i , μ is the average value for the whole country, $f(y_i)$ represents the population share of the dimension i in the total population and K is the number of dimensions.

The GE class of measures is (collectively) sensitive to all parts of the distribution. The mean logarithm deviation (GE with $c=0$) is especially sensitive to incomes at the

¹² This measure is preferred over per capita income because of the inherent measurement problems associated with the latter. If one assumes all households have the same utility function, consumption expenditures may thus be interpreted as a money metric measure of utility and would result in the same ranking of welfare levels. In addition, the real per capita expenditure is more stable and thus a better measure of welfare, following the permanent income hypothesis.

bottom of the distribution; the Theil index (GE with $c=1$) is constructed to be responsive

$$GE = \begin{cases} \sum_{i=1}^K f(y_i) \left[\left(\frac{y_i}{\mu} \right)^c - 1 \right] & c \neq 0,1 \\ \sum_{i=1}^K f(y_i) \left(\frac{y_i}{\mu} \right) \log \left(\frac{y_i}{\mu} \right) & c = 1 \\ \sum_{i=1}^K f(y_i) \log \left(\frac{y_i}{\mu} \right) & c = 0 \end{cases}$$

across all ranges of the distribution; while the GE with $c \neq 0,1$ is sensitive to changes that occur at the middle part of the distribution. The three GE class of measures are defined on the following page, with the variables as defined for the Gini coefficient. It must be noted that the GE class of entropy measures is additively decomposable into within-group and between-group components.

For K exogenously given groups the GE can be decomposed as following:

$$GE = \sum_{g=1}^K w_g I_g + I(\mu_{1e_1}, \dots, \mu_{ke_k})$$

The first term on the right-hand-side of the above equation is the within-group inequality and second term is the between-group inequality.

Where

$$w_g = \begin{cases} f_g \left(\frac{\mu_g}{\mu} \right)^c & c \neq 0,1 \\ f_g \left(\frac{\mu_g}{\mu} \right) & c = 1 \\ f_g & c = 0 \end{cases}$$

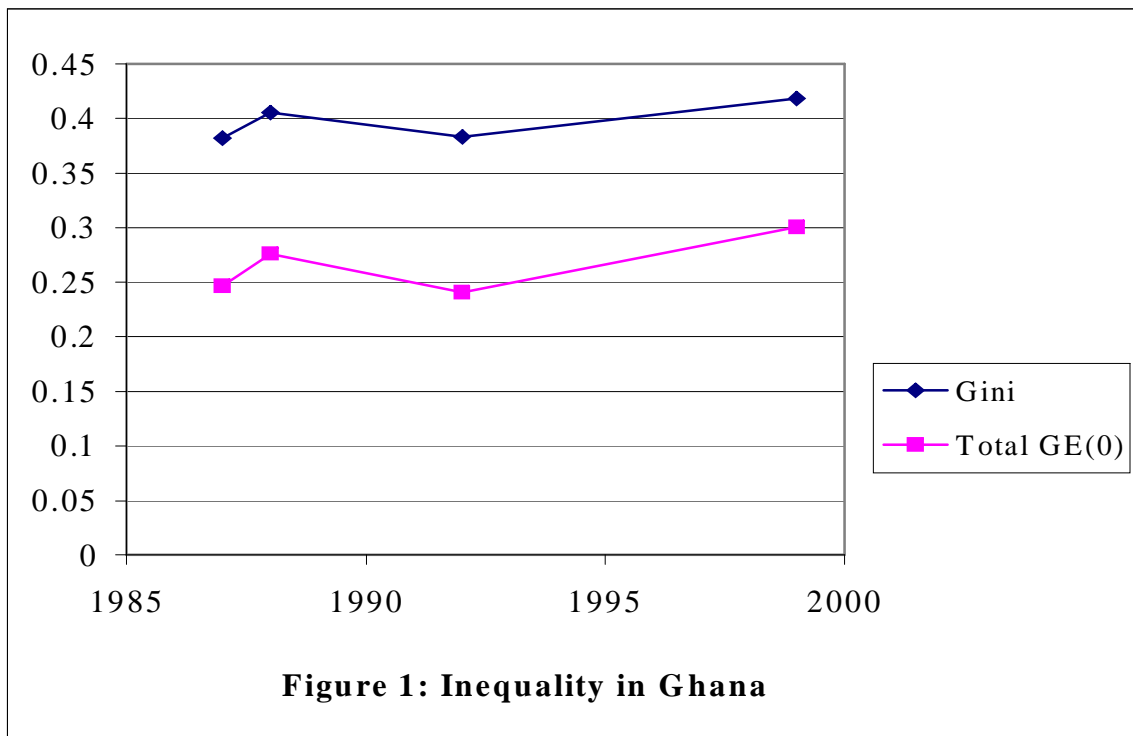
I_g is the inequality in the g^{th} group, μ_g is the mean of the g^{th} group, e_g is a vector of 1's of the length n_g , and n_g is the population of the g^{th} group.

I estimate the overall inequality in Ghana, using the Gini coefficient and the GE (with $c=0$) measure, as a benchmark for analysis. Both measures reveal similar trends in

inequality over the period of study (Table 1 and Figure 1)¹³. These match the phases of economic reform in Ghana remarkably well. Inequality in Ghana increased in 1987, when the civil service reforms were launched, and lasted till 1988-89. It then fell until 1992, reflecting the adjustment phase of the reforms. The upward turn that began in 1992, lasting through to 1999, is consistent with the derailment of the economy in the wake of the multiparty elections, *inter alia*, in the oscillating phase.

Table 1: Inequality in Ghana, 1987-99

Year	Gini	GE (0)
1987	0.38197	0.24608
1988	0.40534	0.27604
1992	0.38303	0.24070
1999	0.41816	0.30080



¹³ The values of the Gini and GE (0) measures are not directly comparable. However the trends are informative, in that they both map out the reform process.

Given the trends in overall inequality, how does spatial inequality vary over time? As aforementioned, the GE measure can be decomposed into the within-group and between-group components. For a given spatial dimension, the former captures what happens within the respective groups in a given dimension whereas the latter reflects the average level of inequality between the respective groups.

Thus a measure of spatial inequality can be defined as the between component of the GE¹⁴:

$$\text{i.e. } SI = I(\mu_1, \dots, \mu_k)$$

There still remains a question of what the relevant dimensions are. From Section II, several dimensions of spatial inequality can be identified. I will focus on a range of these, given the socio-political processes attendant with the economic reform. The conventional dimension in economics is the Rural–Urban divide. However, North–South is widely perceived as the prime dimension of disparity in Ghana. With developments in the constitution and the appointment of regional ministers, the ten administrative regions have become important levels of governance. Differential policies and public expenditures will reflect in disparities in the income distribution. In addition, differences in resource endowments as captured by the ecological zones, warrants a closer look at the latter as a dimension of spatial inequality. Variants of these are also defined to capture the rural-rural, urban-urban, within-North and within-South dynamics¹⁵. Precise definitions of these dimensions are given in Appendix 1.B.

A comparison of the group-specific means of the per capita expenditure measure for the respective dimensions is presented in Table 2. Households in rural areas

¹⁴ Recall, I_g is the inequality in the g^{th} group, μ_g is the mean of the g^{th} group, e_g is a vector of 1's of the length n_g , and n_g is the population of the g^{th} group.

¹⁵ The within-South and within-North components were dropped since these were not exhaustive subsets of the whole population and hence yielded GE measures equal to zero.

had lower per capita expenditure measures than households in urban areas for the respective survey periods. The percentage difference was 40.52%, 5.86%, 91.28% and 74.22% in 1987, 1988, 1992 and 1999, respectively. Similarly, households in the North had lower per capita expenditures than those in the South in all the survey periods except 1992. The percentage difference vis-à-vis the group with the lowest per capita expenditure was 68.84%, 4.33%, -33.15% and 83.41% in 1987, 1988, 1992 and 1999, respectively.

Households in the coastal ecological zone consistently had the highest per capita expenditure levels across all survey periods. This area includes the Accra- Tema metropolis which is the business and administrative core of the country. The savannah ecological zone had the lowest per capita expenditure in 1987, 1998 and 1999. The percentage difference between the savannah and forest zones was 34.48%, 12.52%, -17.03% and 36.70% in 1987, 1988, 1992 and 1999, respectively. On the other hand, the difference between the savannah and coastal zones was 86.28%, 97.94%, 3.06% and 97.24% in 1987, 1988, 1992 and 1999, respectively.

The results for the administrative regions is mixed. Whereas households in the Greater Accra region had the highest per capita expenditures in 1987 and 1999, this position was taken by Volta and Upper East regions in 1988 and 1992, respectively. Upper East region had the least per capita expenditure level in 1987 and 1999. Upper West and Ashanti regions had the least per capita expenditure levels in 1988 and 1992, respectively. The fluctuation in relative positions by the Upper East region is reflected in the aforementioned change in the position of the savannah zone and North in 1992. The widest percentage difference between the administrative regions was 160.60%, 13.60%, 74.33% and 362.52% in 1987, 1988, 1992 and 1999, respectively.

It is interesting to note that with the exception of the percentage difference between the savanna and coastal zones, 1988 consistently had the least difference among the groups in the respective dimensions. The mean values for *Locality 7* reflect the above

results. Accra had the highest per capita expenditure level. The results for *Locality 5* and *Locality 3* are similar. This is to be expected since the latter are higher-level aggregates of the *Locality 7*.

Table 2: Group-Specific Mean Values of Per Capita Expenditure per Dimension

Spatial Dimension\ Characteristic	1987	1988	1992	1999
a) Rural-Urban				
Rural	48340.81	138263.00	199345.20	766749.70
Urban	67928.37	219473.70	201913.20	1335822.00
b) North-South				
North	37186.43	153816.30	264405.5	618293.60
South	62786.02	160471.80	198574.8	1134042.00
c) Ecological Zones				
Forest	54546.30	131786.20	180179.70	903537.80
Coastal	75556.83	231836.70	217328.50	1303687.00
Savannah	40559.96	117126.30	210867.10	660976.50
d) Administrative Regions				
Greater Accra	95402.37	144578.30	247844.30	2208993.00
Central	48912.01	165512.00	210969.60	1062490.00
Western	75066.55	152310.20	217072.50	1255969.00
Eastern	57483.49	161481.60	247640.40	662766.10
Volta	46491.41	166615.30	195045.90	1153986.00
Ashanti	54168.35	165005.10	159381.20	1621644.00
Brong-Ahafo	55965.04	156480.10	189493.30	1398515.00
Northern	37649.17	144974.50	262049.30	893255.10
Upper East	36609.30	156339.80	277855.40	477595.10
Upper West	36959.53	143948.90	248413.50	727574.30
e) Locality 7				
Accra	78154.31	265945.00	220707.69	1524937.00
Urban Coastal	57115.02	246370.44	201490.531	1121497.50
Urban Forest	54856.21	215794.66	215800.19	1351821.00
Urban Savannah	42371.16	200021.32	196885.53	979519.13
Rural Coastal	53312.55	148943.52	195667.97	799180.00
Rural Forest	41610.98	151560.64	200425.13	793526.88
Rural Savannah	23312.39	103882.81	172622.92	542183.50
f) Locality 5				
Accra	78154.31	265945.00	220707.69	1524937.00
Other Urban	55003.08	205256.19	196232.06	1074174.76
Rural Coastal	53312.55	148943.52	195667.97	999180.00
Rural Forest	41610.98	151560.64	200425.13	993526.88
Rural Savannah	23312.39	103882.81	172622.92	542183.50
g) Locality 3				
Accra	78154.31	265945.00	220707.69	1524937.00
Other Urban	55003.08	205256.19	196232.06	1074174.75
Rural	48340.81	138263.00	199345.20	766749.70

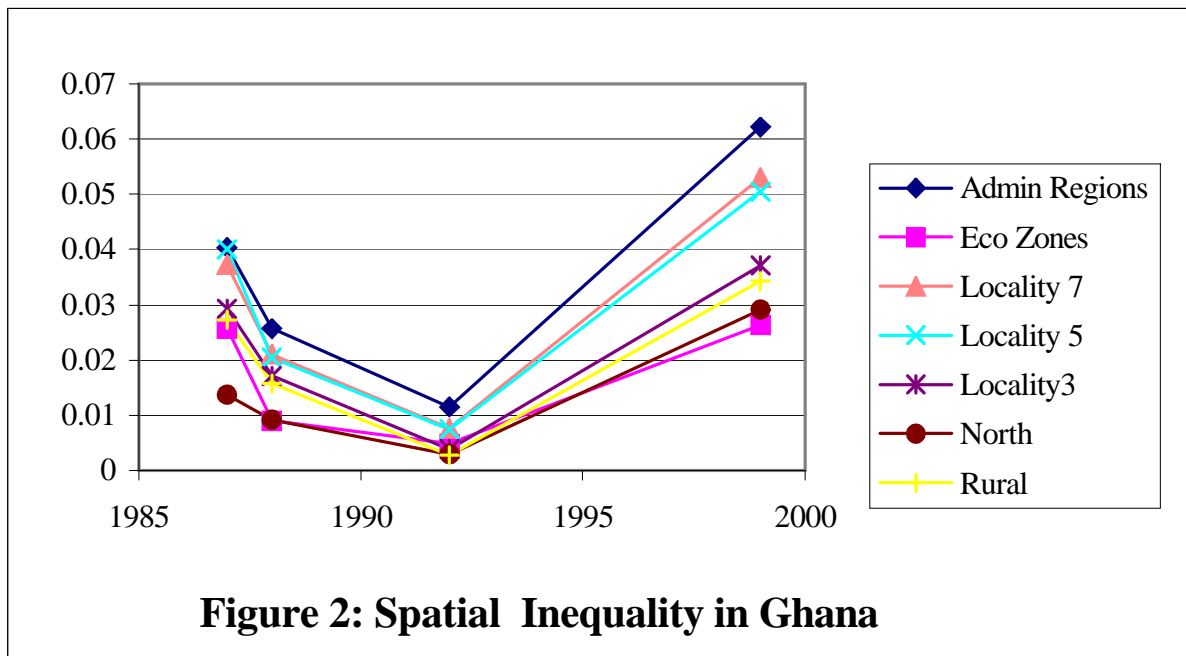
Spatial inequality in Ghana was estimated using on these seven dimensions. As aforementioned, the between group component of the GE is used as the measure for spatial inequality. This reflects the mean difference between group specific distributions. In essences, it captures the static level of interpersonal inequality between individuals in respective groups in a given dimension.

All the dimensions yield the same trend (Table 3 and Figure 2). The fact that multiple alternative groupings of individuals along the dimensions all yield the same trend reflects the robustness of the results. Spatial inequality in Ghana fell sharply in the period 1987-88. It continued to decline, albeit less steeply, in 1988-92 after which it took an upward turn. This varies slightly from the trend in overall inequality – spatial inequality was declining in 1987-88 as overall inequality was rising. The continued decline in spatial inequality in 1988 is consistent with the results from Table 2.

Table 3: Spatial Inequality in Ghana

Year	Administrative Regions	Ecological Zones	Locality 7	Locality 5	Locality 3	North-South	Rural-Urban
1987	0.0404	0.0257	0.0373	0.0400	0.0293	0.0137	0.0273
1988	0.0257	0.0090	0.0209	0.0204	0.0172	0.0093	0.0156
1992	0.0115	0.0048	0.0076	0.0075	0.0039	0.0029	0.0028
1999	0.0622	0.0264	0.0530	0.0505	0.0371	0.0292	0.0343

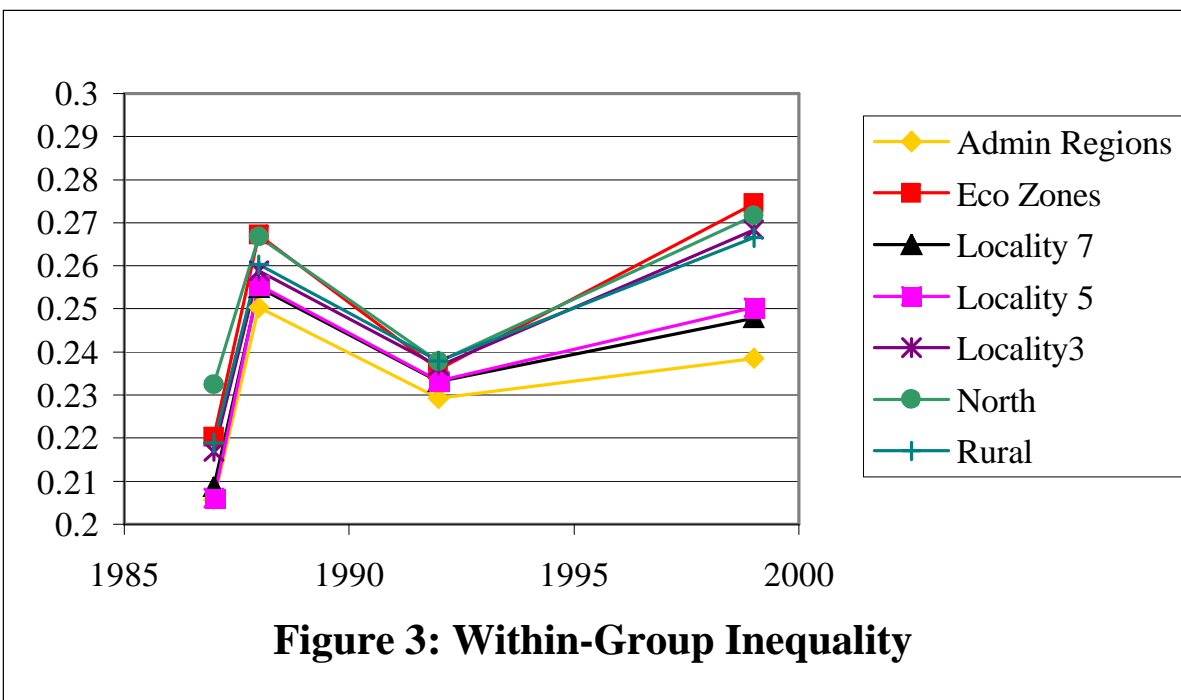
The socioeconomic impact of the reform process aforementioned, especially the downsizing of the public sector, and the increase in overall inequality did not offset the decrease in spatial inequality resulting from the growth of the economy in the adjustment phase. This observation mirrors the tension between policies targeted at economic growth and those aimed at poverty reduction and improving the income distribution -- while the groups in the respective dimensions were growing more like each other with macroeconomic improvement, the income distribution for the entire population was worsening.



With regards to the relative magnitudes, the graph for the administrative regions was almost everywhere above those for the other dimensions. Spatial inequality is relatively higher in the administrative regions and not the North-South dimensions. However, the magnitudes of spatial inequality were consistently low.

To further understand the dynamics in overall versus spatial inequality, I examined the within-group component of the GE measure (Appendix 1.C). The magnitudes were consistently larger than the spatial inequality estimates: the disparity in the income distribution within the groups was more than that between groups. This underscores the tensions mentioned earlier.

With regards to the trends in inequality (Figure 3), the respective dimensions yielded the same trend, congruent with the phases of economic reform. Within-group inequality increased in the 1987-88 period, declined till 1992 beyond which it increased. It is interesting to note the dynamics in spatial versus within-group inequality. In 1987-88, as the populations within the groups became more disparate, the groups' means were converging. Hence, intra-group populations were becoming equally disparate for all dimensions. The adverse socioeconomic impacts of reform became more evenly spread out. Beyond 1988, both spatial inequality and within-group inequality declined till 1992 and then took an upward turn as the macroeconomy was derailed by political business cycles.



This begs the question, how much of the change in overall inequality can be attributed to changes in spatial inequality? Advocating for integrated regional strategies in improving the income distribution, it is prudent to assess how variations in spatial inequality reflect in overall inequality.

Suppose there are K exhaustive and mutually exclusive groups in each spatial dimension¹⁶. The between-group (i.e. spatial) inequality, from the decomposable GE measure, represents the distance between the group means. The change in overall inequality attributable to the change in the between component can be estimated in one of three ways, two of which will be discussed in depth.

Firstly, the ratio of the change in between-group inequality to the change in total inequality can thus be regarded as a share of spatial variation index because it captures the proportion of variation in total inequality attributable to changing spatial variation. To determine how much of variation in overall inequality can be attributed to variation in spatial inequality a share of spatial variation index as:

$$\text{i.e. } SV = \frac{\Delta I(\mu_{1e_1}, \dots, \mu_{ke_k})}{\Delta GE}$$

There were some ex ante concerns regarding the measure. First, given the uneven spacing of the survey, I expected that estimates of the SV over longer time periods would be systematically overestimated. The change in spatial inequality would be larger over longer time periods, however this is matched by larger changes in the overall inequality¹⁷. The concern is thus nullified. Secondly, one might expect that the group size would bias the index upwards. In the limits, if you consider the individual as the unit of analysis, all of the variation in total inequality will be explained by the variation in the between component. However, the number of groups in a given dimension is a direct function of the definition of that dimension -- the latter is precisely the phenomenon that the study is interested in. For example, how does the North-South divide versus the disparity in administrative regions, say, affect overall inequality?

¹⁶ For instance, in the North-South dimension there are two groups (i.e. North and South), whereas in the ecological dimension there are three groups (i.e. coastal, forest and savanna).

¹⁷ This a structural phenomenon and does not imply any assumptions about causality

I estimated the share of spatial variation index for the respective dimensions over the contiguous survey periods. The absolute percentage values are presented in Table 4. It is encouraging to note that evidence from the table negates the initial concerns about the SV index¹⁸.

Table 4: Share of Spatial Variation in Change in Total Inequality (%)

Dimension \ Period	1987-88	1988-92	1992-99
Administrative Regions	-49.23	40.04	84.34
Ecological Zones	-55.81	11.88	35.92
Locality 7	-54.54	37.95	75.61
Locality5	-65.45	36.47	71.49
Locality3	-40.55	37.55	55.21
North	-14.75	17.94	43.69
Rural	-38.48	36.70	52.50

I focus on the last two columns¹⁹. With a caveat regarding the faults in the dimensionality of comparison, variations in inequality in *Administrative Regions*, rather than the *North*, seem to consistently have the most impact on overall inequality. Between 1988-92, 40.04 percent of the change in total variation was due to the change in the inequality between administrative regions whereas in 1992-99 this dimension accounted for 84.34 percent of the change in overall inequality in Ghana. This result may have implications for the current debate on policy targeting focused on the North-South dimension.

Locality 7 is the next most relevant dimension explaining changes in overall inequality. This variable captures the dynamics between ecological zones (and thus resource endowments) and urbanization. In addition, changes in spatial inequality in *Locality 5*, *Locality 3* and *Rural* accounted for over 50 percent of the change in the overall inequality in the 1992-99 period.

The more fitting level of comparison is that of the temporal level in a given dimension. It is evident that the changes in spatial variation accounted for increasingly

¹⁸ Counter to the second caveat, it is not evident that the SV measure has been biased upwards by the group size. For instance, in 1988-92 *Locality 5* (of group size 5) was less than *Rural* (of group size 2).

¹⁹Demery and Mehra (1997) demonstrated that the GLSS2 and GLSS3 are more comparable than GLSS1 and GLSS3 for expenditure based analysis. The module for GLSS3 was maintained for GLSS4.

larger shares of the changes in overall inequality. It accounted for almost 100% more in 1992-99 than it did in 1988-92. It is interesting to note that once one moves from examining the levels of inequality to the changes in the levels of inequality, the spatial dimension seems to play a focal role.

In an attempt to allay the concerns about the effect of varying dimensionality, I undertook an extensive search of the literature and also sought the assistance of statistical consultants. There are no empirical approaches to dealing with issues of this nature. This in itself flags a deeper methodological issue - a gap in knowledge.

One crude way of controlling for dimensionality, is to normalize the SV measure by the size of the dimension (i.e. the number of groups in a given dimension). This controls for the very source of variation that one is interested in. I estimate the weighted share of spatial variation in inequality in Table 5.

Table 5: Normalized Share of Spatial Variation in Change in Total Inequality (%)

Dimension \Period	1987-88	1988-92	1992-99
Administrative Regions	-4.92	4.00	8.43
Ecological Zones	-18.60	3.96	11.97
Locality 7	-7.79	5.42	10.80
Locality5	13.09	7.29	14.30
Locality3	-13.52	12.52	18.40
North	-7.38	8.97	21.85
Rural	-19.24	18.35	26.25

In this case the variation in the Rural-Urban dimension, and not the Administrative Regions, consistently accounts for most of variation in total inequality. Albeit the fact that the result from Table 4 is not robust, one important conclusion can be drawn: the focus on the North-South dimension as the root of inequality may be overstated.

In addition to the aforementioned caveats this SV measure is unbounded. It is also ill-defined when the change in GE = 0. A more rigorous alternative is the change in the ratio of the between over the total²⁰.

$$\text{i.e. } SV = \Delta \left[\frac{I(\mu_{1e1}, \dots, \mu_{ke_k})}{GE} \right]$$

This measure is bounded in the interval [-1,1]. It is also well defined over the entire interval. The values are estimated in Table 6.

Table 6: Changes in the Share of Spatial Variation in Total Inequality (%)

Dimension \ Period	1987-88	1988-92	1992-99
Administrative Regions	-7.10	-4.53	15.90
Ecological Zones	-7.18	-1.27	6.78
Locality 7	-7.80	-4.20	14.46
Locality 5	-8.87	-4.27	13.67
Locality 3	-5.80	-6.07	10.71
North	-2.20	-2.16	8.54
Rural	-5.37	-4.56	10.24

Similar to the aforementioned results, the change in the share of spatial variation in total inequality is much larger in 1992-99 than in 1988-92 for all dimensions. There is a slight difference in interpretation. For instance, the negative values for 1988-92 implies that the share of between-group component in total inequality was much lower in 1992 than it was in 1988. However, share of between-group component in total inequality was

²⁰ A third possible measure of the share of spatial variation is the change in the ratio of the between-group to the within-group component, i.e.

$$SV = \Delta \left[\frac{I(\mu_{1e1}, \dots, \mu_{ke_k})}{\sum_{g=1}^K w_g I_g} \right]$$

However, this measure is more reflective of dynamics in the clustering of the income distribution discussed in section IV.

much larger in 1999 than in 1992. In essence the between group component is becoming increasingly important in explaining total inequality.

IV. Polarization

Concerns about the disappearing middle class warrant a closer look at the income distribution. Polarization captures the extent to which the population is becoming clustered, such that within each cluster members are very similar, but between clusters members are very different (Fedorov, 2000). This differs from inequality, which does not impose any conditions of clustering within the distribution.

Polarization is particularly pertinent since inequality in Ghana is perceived as a spatial phenomenon. In addition, a cursory look at a map of Ghana shows that the administrative regions, the North-South divide alluded to colonial and the post-colonial policies and ecological zones (and thus differences in resource endowments) run parallel to the coast. This captures the major ethnic and religious differences, as well. Polarization along spatial dimensions in Ghana could thus be very volatile. Civil strife/ ethnic conflicts that could result from this phenomenon, if unchecked, would not only inhibit further economic growth and but could result in a significant loss of infrastructure and manpower which would be a major set back to the economy.

A number of measures have been proposed for the measurement of polarization²¹. The most widely used measures are the Esteban –Ray (1994) and Wolfson (1994) indices. These indices, however, identify the existence of clustering in a given distribution without giving any information about the dimensions along which polarization occurs. We are interested in polarization between the exogenously given dimensions discussed in Section II. Section III reported that both the between (spatial) variation and the within variation move in the same direction in the 1987-88 and 1992-99 periods, which may render the change in polarization ambiguous. The Kanbur and Zhang

²¹ See Fedorov (2000) and Zhang and Kanbur (2001) for a detailed discussion

(2001) index of polarization allows for *a priori* specification of a given dimension and thus forms the basis of analysis here.

This index is based on the decomposable GE measure. For K groups in a given dimension, this measure captures the average distance between the group means in relation to the income differences within groups. As income differences within group diminish (i.e., as the groups become more homogenous internally), the relative differences between groups are magnified and polarization is higher. The Kanbur- Zhang polarization index thus defined as:

$$i.e. \quad KZ = \frac{I(\mu_{1e_1}, \dots, \mu_{ke_k})}{\sum_{g=1}^K w_g I_g}$$

The index was computed for the seven dimensions used thus far in the study, based on the real per capita expenditure and the GE measure with c=0. The results are presented in Table 7.

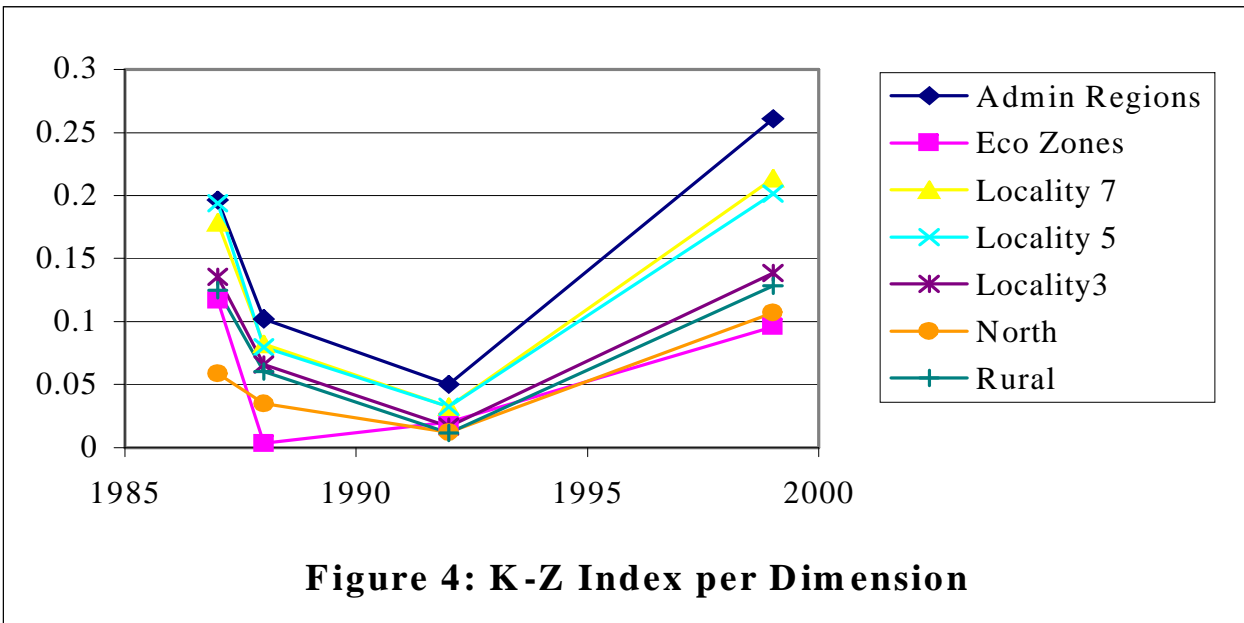
Table 7: Kanbur-Zhang Index of Polarization

Year	Administrative Regions	Ecological Zones	Locality 7	Locality 5	Locality3	North	Rural
1987	0.19648	0.11667	0.17877	0.19417	0.13527	0.05887	0.12468
1988	0.10248	0.00337	0.08226	0.07980	0.06633	0.03471	0.06051
1992	0.05022	0.02030	0.03247	0.03221	0.01647	0.01228	0.01168
1999	0.26069	0.09613	0.21393	0.20161	0.13820	0.10743	0.12883

The levels of polarization range from 0.00337 for the ecological zones in 1988 to 0.26069 for the administrative regions in 1999. In a similar study using per capita consumption figures in China, Kanbur and Zhang (2001) estimated the level of polarization levels in the range of 2.41 - 3.56 in the rural-urban dimension and 0.19 - 0.42 in the inland-coastal dimensions. Fedorov (2002) estimated values in the range of 0.006-0.0409 in the East-West dimension using expenditure data from Russia. With a cautionary note on the potential hazards of crude cross-country comparisons, it is evident

that the Ghanaian population is polarized in all dimensions, especially that of the Administrative regions.

Focusing on the dynamics instead of magnitudes, figure 2.4 shows trends in the polarization index. As in the previous cases, all the dimensions exhibit the same temporal trend in polarization. The latter is congruent to the pattern of spatial inequality. Polarization in Ghana declined during the adjustment phase (1987-92) and took an upward turn during the oscillating policy phase. The trend reflects the policy environment, and the underlying political economy, during the period of study.



V. Micro-determinants of Income Growth: A Simple Decomposition Exercise

The fact that all the spatial dimensions yielded the same trends in inequality and polarization provokes further investigation into the determinants of changes in per capita consumption expenditure. We explore which characteristics explain per capita consumption expenditure levels in the respective survey periods.

The analysis is carried out by examining the reduced form determinants of per capita consumption expenditure. Since the latter is not normally distributed, a semi-log²² model was specified following standard practice:

$$\log (y_i) = \beta X_i + u_i \quad (1)$$

where y_i is real per capita consumption expenditure and X_i is a vector of independent variables that influence consumption expenditures. The latter contains household and spatial characteristics. Apart from a constant, these include: (a) household size; (b) other demographic and gender variables: age and its square of the household head as well the gender of the household head; (c) education variables along four categories (some primary, completed primary school, completed secondary school, and tertiary²³); (d) occupation variables: the household head's main occupation or field of employment (four occupational classifications are used: white collar, agricultural, sales, production, and not working); (e)²⁴ spatial characteristics (fourteen geographical classifications are used (rural-urban, three ecological zones, and ten administrative regions).

The means and frequencies for the continuous and categorical variables were first computed (Appendix 1.E). For respective survey years, rural households had lower mean per capita expenditure values (48,340.81 Cedis -766, 749.70 Cedis) than urban households (67,928.37 Cedis-1,335,822.00 Cedis). Two-sample t tests, with the equal variance assumption, showed the differences in means for the two groups in this dimension were statistically significant at the 5% level for 1987,1988 and 1999 and the 10% level for 1992²⁵. Rural households also had larger and older household heads than urban households²⁶.

²² A simple regression was also carried out for comparison with the Canagarajah et al study. See Appendix 1.D.

²³ These were coded as 0⁰, 1⁰, 2⁰ and 3⁰, respectively, in Tables A6 to A10.

²⁴ The analysis was repeated replacing the administrative regions with a dummy North=1 if Northern, Upper East or Upper West regions, and 0 otherwise, capturing the conventional North-South divide

²⁵ The two-tailed t values were 28.9621, 33.7075, 1.7324 and 66.9973 for 1987, 1988, 1992 and 1999, respectively,

²⁶ The means were significantly different for both variables in all the survey periods, except in 1992 when difference in the age of the household heads was not statistically significant even at 10%.

Compared to those in the South, households in the North had lower per capita expenditures and were larger with older heads in 1987, 1988 and 1999. The results were reversed in 1992²⁷. Households in the savannah areas were also larger with older heads and lower per capita expenditures in 1987 and 1999. The results were mixed in 1988 and 1992. The results for the administrative regions were also mixed.

With regards to the categorical variables, fewer rural households had female heads. These heads had lower levels of education and were predominantly engaged in agriculture in 1987. The results were reversed in 1988, with more households in the rural areas having female heads with slightly higher levels of education. Although more rural households were engaged in agriculture, in comparison to urban households, the main occupation was production. The results were similar in 1999 and 1992, but the rural households in the latter had slightly lower levels of education. Pearson chi-squared tests for the differences in frequencies showed probabilities of approximately zero for gender of household heads and all occupational categories other than *not working* in 1987 and 1988. The frequencies were statistically different in education as well for 1992 and 1999. The results for the North-South dimension as well as the ecological zones and the administrative regions were mixed.

The regression equation (1) were estimated for 1987, 1988, 1992 and 1999, respectively, with robust standard errors. The results presented in Table 5 are interpreted under the maintained assumption that the returns to household attributes and asset holdings are identical across spatial dimensions. The cross-sectional estimates for all periods show that household size has a significantly negative impact on per capita consumption expenditure. However, care must be taken in interpreting this finding since it could disappear or be reversed by the use appropriate adult equivalence scales. Alas, it is almost impossible to compute credible equivalence scales²⁸. Although it is imperative

²⁷ With the exception of the age of the household head in 1988, the differences in means were statistically significant at the 5% level.

²⁸ See Deaton (1997)

to control for it, overall household size does not necessarily imply that larger households have lower welfare levels.

Households with female heads had consistently lower per capita consumption expenditures than male-headed households (the omitted category) over the period of study. Specifically, in 1987 female-headed households had per capita consumption expenditures of the order of 123%²⁹ lower than those of their male cohorts, *ceteris paribus*. This differential reduced to 108% by 1999.

Education did not have a significant effect in 1987. However having some tertiary education was associated with a 115% increase over those who had none or had not completed primary education. Surprisingly the signs reversed in 1992 and 1999, with highly significant negative expenditure premiums on education. In these periods, households headed by individuals who had completed either primary, secondary or had some tertiary education had lower per capita consumption expenditures than those with none or some primary education. It is interesting to note that this turnabout coincides with the general malaise of the economy in 1992-1999, with increasing overall inequality and within-group inequality as well as increasing polarization. This may well reflect decay in the formal sector, since the reference category is often self-employed: either trading in local markets, offering some service or involved in quasi-commercial agriculture.

The results *vis-à-vis* the occupation of the household head are consistent with this conjecture. In 1987, those involved in agriculture and production³⁰ had lower per capita consumption expenditures than those with white-collared jobs, with sales having higher returns. However, beginning in 1988 agriculture had higher per capita consumption expenditures than white-collared jobs, with production being positive in 1999. Households with unemployed heads and heads involved in sales also had higher per

²⁹ The coefficient on the variable is 0.2076. The percentage increase is given by $e^{0.2076}$ which equals 1.23. This method of calculating percentage impacts is used through out the analysis.

³⁰ Production includes those involved in the service, construction, transportation and communication.

capita consumption expenditures than white-collared jobs, although the latter may be explained by the preponderance of remittances to these households.

With regards to spatial characteristics, households in rural areas had significantly lower per capita consumption expenditures than those in urban areas. The differential was 119% in 1987. It increased to 136% in 1988 even as spatial inequality³¹ was decreasing (see Section III). This raises questions pertaining to conditioning the SI on national means. This imposes nationally representative household characteristics which are less favorable in each dimension than the sample mean characteristics on the sector themselves. For instance, urban households tend to have characteristics such as education which has a higher return in these areas, whereas the same may be said for rural households and land. Wodon (1999) noted using Ginis that “conditional between group Ginis tend to be lower than unconditional decompositions because these decompositions over-estimate the contribution of the dimension to inequality by failing to account for the fact that urban households have better characteristics (fewer children, better education, and better occupations) than rural households”. The value however decreased to 113% in 1999.

Households in the coastal areas, including the Accra-Tema metropolis, had higher per capita expenditures in 1987, 1988 and 1992 (116%, 137% and 129% respectively) than households in the forest areas. However, by 1999 the coastal areas had per capita expenditures on the order of 112% lower the forest regions. Households in the savanna areas had per capita expenditures 105% and 129% lower than forest areas in 1987 and 1988, respectively. There was a complete reversal by 1992 and 1999, with forest areas per capita expenditures being 129% and 112% higher, respectively.

With Ashanti region as the reference category, all the regions except Volta, Central, Northern, Upper East and Upper west regions had positive differentials. These last three fall in the North. Similar results pertain in 1988 with Greater Accra, Western

³¹ i.e., the conventional between-group component of the generalized entropy measure.

and the regions in the north being negative. In 1992, however, all regions including those in the North had higher per capita expenditures than Ashanti region. This was reversed in 1999.

Table 8: Regressions For Log Per Capita Consumption Expenditure

	1987		1988		1992		1999	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
a) Household size	-0.5522*	0.0013	-0.0633*	0.0017	-0.0414*	0.0018	-0.0813 *	0.0025
b) Other demographic characteristics								
Age of household head	-0.0019	0.0019	-0.0000	0.0012	-0.0323*	0.0021	-0.0272*	0.0018
Squared age of household head	0.0000	0.0000	-0.0000	0.0000	0.0002*	0.0000	0.0002*	0.0000
Gender of household head (female=1, male=0)	-0.2076*	0.0106	-0.0422*	0.0134	-0.1907*	0.0133	-0.0785*	0.0104
c) Education								
Some primary	-	-	-	-	-	-	-	-
Completed primary school	0.0012	0.0092	0.0085	0.0075	-0.0813*	0.1309	-0.0868*	0.0141
Completed secondary school	0.0246	0.0243	0.0049	0.0133	-0.0650*	0.0230	-0.0836*	0.0243
Tertiary	0.0512	0.0793	0.1467**	0.0826	-0.0871*	0.0358	-0.1333*	0.0472
d) Occupation								
White collar	-	-	-	-	-	-	-	-
Agriculture	-0.1217*	0.0211	0.0484*	0.0237	0.2824*	0.2299	0.5696*	0.0184
Sales	0.0440**	0.0258	-0.0138	0.0193	0.2107*	0.0475	0.5578*	0.0371
Production	-0.0087	0.0240	-0.0267*	0.0081	-0.0029	0.0153	0.2997*	0.0143
Not working	-0.3439*	0.1463	-0.493	0.0683	0.1372*	0.0512	0.1628*	0.0489
e) Spatial Characteristics								
Rural (rural=1, urban=0)	-0.1735*	0.0091	-0.3090*	0.0086	0.0063	0.0141	-0.1270*	0.0135
Forest	-	-	-	-	-	-	-	-
Coastal	0.1518*	0.0136	0.3162*	0.0111	0.2565*	0.0118	-0.1171*	0.0177
Savannah	-0.0483*	0.0181	-0.2576*	0.0098	0.2532*	0.0174	0.7917*	0.0237
Greater Accra	0.2604*	0.0202	-0.0337*	0.0119	0.1058*	0.0215	0.0574***	0.0321
Central	-0.2690*	0.0207	-0.0010	0.0124	0.2053*	0.0149	-0.4351*	0.0328
Western	0.2998*	0.0167	-0.0175***	0.0129	0.2483*	0.2000	-0.1959*	0.0263
Eastern	0.0333*	0.0154	-0.0081	0.0114	0.1026*	0.0212	-0.6295*	0.0204
Volta	-0.1832*	0.0182	0.0110	0.0119	0.1467*	0.1940	-0.2938*	0.0280
Ashanti	-	-	-	-	-	-	-	-
Brong-Ahafo	0.1457*	0.0168	-0.0053	0.0125	0.2175*	0.0144	-0.4076*	0.0374
Northern	-0.2175*	0.0264	-0.0178***	0.0139	0.1377*	0.2819	-1.2221*	0.0401
Upper East	-0.1783*	0.0314	-0.0605*	0.0205	0.1348*	0.0461	-1.0508*	0.0336
Upper West	-0.3316*	0.0303	-0.0188***	0.0143	0.1681*	0.0586	-1.5680*	0.3528
Constant	11.3842*	0.4907	12.5056*	0.0356	13.0066*	0.0586	14.9240*	0.0474
R-square	0.3601		0.4827		0.3955		0.6905	

* indicates significant at the 5% level

** indicates significant at the 10% level

*** indicates significant at the 20% level

VI. Political Business Cycles

The previous chapters looked at inequality between various geographic groups. The estimates for overall, spatial and within-group inequality were robust, yielding similar results irrespective of which dimension was used. A closer look at inequality dispels the popular wisdom that inequality in Ghana captured predominantly between the North-South dimension. Inequality in Ghana is essentially a within group phenomenon.

A clear result from the analysis is the consistency of temporal trends across all dimensions. The trends in spatial inequality closely map the political economy process experienced in Ghana. I hesitate to put a lot of emphasis on this given the discontinuous nature of the data; GLSS3 and GLSS4 coincide with the election periods. It may well be that there is some movement in inequality between the two survey periods that is not captured even these approximate trends. Nonetheless, the consistency in the patterns is telling. The most obvious candidate for explaining this is the political economy as alluded to earlier, specifically the political business cycles.

The suggestive evidence disclaiming conventional wisdom that income inequality in Ghana is merely a North-South phenomenon (i.e. the predominance of the administrative regions in determining spatial inequality) can be explained in the political economy context. Miguel and Zaidi (2003) in testing the “patronage” hypothesis in Ghana, find evidence of patronage targeting of government funds at the administrative districts (the level at which the national budget is allocated). There are no significant patronage effects at the parliamentary level. This suggests that patronage is not that rampant in new African democracies.

The theory on political business cycles has been centered on the politician’s objective function versus the citizens’ voting behavior. Conventionally, politicians are assumed to be identical and opportunistic with the sole aim of staying in power. Citizens’ on the other hand are assumed to be myopic with adaptive expectations and a penchant of voting for incumbents if favorable conditions exist prior to elections. Various revisions have been made to these assumptions allowing for partisan preferences and rational expectations³².

³² See Hibbs (1977), Alesina (1987), Rogoff and Sibert (1988), Stein and Streb (1998) for alternative models.

The empirical predictions of the respective models are largely similar³³. It is expected that monetary and fiscal policy will be expansionary prior to elections and contractionary thereafter. Governments will systematically take measures to generate multi-year cycles in growth and unemployment. Growth will be above normal prior to elections, whereas unemployment is restrained to sub-normal levels. The trends tend to the mean values after elections.

To date there are very few studies examining the political business cycle theory in the context developing countries. Notably, Shi and Svensson (2000), Moyo (1999), Khemani (2000) and Schuknet (1999) find some evidence of political business cycles. The extant literature on political business cycles in Africa is fewer still. This may be viewed as a major drawback. One could argue that it is precisely in African countries, with very weak institutions, that this phenomenon would be evident. Given the wave of economic reforms across the continent, Block (2001) argues that “political business cycles, if manifested in reversals of fiscal and monetary policy reform, suggest a potential conflict between political and economic reform”.

Fouda (1997), in examining the independence of the central bank in Cameroon, concluded that there were election cycles in money growth. Block (2001) found evidence of electorally timed interventions in fiscal and monetary policy variables in a panel of African countries, including Ghana, consistent with the rational opportunistic political business cycle theory. Election years were associated with faster monetary expansions and lower nominal interest rates (Block, 2001). Fiscal deficits, government consumption and public spending and net claims on the government as a share of GDP also increased prior to elections (Block, 2001). On the other hand, post-election years saw higher inflation rates and seignorage (Block, 2001). There were also significant foreign exchange devaluations in the post-election period (Block, 2001). However, post election retrenchments are empirically evident only for fiscal deficits and public expenditures (Block, 2001). In essence the decay in fiscal policy lingered in the aftermath of the elections

³³ Models based on rational expectations focus on the manipulation of policy tools whereas the partisan models make predictions based on whether the party is right-wing or left-wing. It must be noted that partisan models do not predict pre-post election cycles. Rather they focus on the relative levels unemployment and inflation expected with the government's party affiliation.

The theories and supporting studies focus on the policy instruments and changes in the real economy. None has examined the welfare implications of this phenomenon. The temporal trends evident in Figure 2.1 may be getting at that issue. There are seemingly no idiosyncratic shocks to spatial inequality for all the dimensions given. Rather all the dimensions seem to respond to a uniform (national-level), shocks coinciding with the timing of elections. If it is the case that spatial inequality increases in the run up to elections, then what are the implications for economic growth? Can it be concluded political reform in the short term is bad for social welfare and economic growth?

VII. Conclusion

The reform process in Ghana has often been commended for its overall success. Yet some major setbacks have been recorded. It is alleged that the average Ghanaian is becoming increasingly worse-off: the widespread perception is that poverty is deepening and income distribution worsening. The popular debate in the Ghanaian parliament is the deprivation of certain subsets of the population. The most widely cited deprived group is the northern part of Ghana. However, short of implementing policy for its own sake there is a need to fully comprehend the spatial dynamics of the income distribution in Ghana and the implications of the “model” reform process on spatial inequality.

During the period of study, the level of overall inequality tracked the phases of economic reform. It increased during the initial stages of the adjustment phase (1987-88) reflecting the adverse socioeconomic effects of policy reforms heavily focused on downsizing public sector employment rolls. It then declined in 1988-92, and subsequently took an upward turn with contested democratic elections. The latter underscores the sensitivity of developing economies to the political environment and hence the need for politically independent institutions and good governance.

Trends in the level of spatial inequality were consistent for all dimensions, attesting to the robust nature of the measure for multiple alternative groupings. There was a decline in spatial

inequality during the structural adjustment phase, whereas the period of oscillating reform saw increasing spatial inequality. However, changes in the levels of inequality are principally driven by changes in the between-group, i.e. the spatial, component of inequality. This suggests that inequality in Ghana may be assuaged by formulating regional policies directed at reducing upside fluctuations in spatial inequality.

With a caveat on the comparison of dimensions, the share of spatial variation in the change in total inequality revealed that the administrative regions may be the main determinant of variation in total inequality. These results are not robust to normalization. However, the analysis and the attendant quagmire of dimensionality highlights a shortfall in procedures of estimating inequality. The results using the changes in the share of spatial variation in total inequality as an alternative measure underscore the fact that the spatial dimension is becoming increasingly important in total inequality

Trends in the Kanbur-Zhang index reveal clustering in the population distribution along spatial dimensions. Ghana is becoming increasingly polarized. The pattern of polarization mirrors that of spatial inequality. This has implications for location-specific targeting of policy as well as the formulation of integrated policy to attain both economic growth and income distribution goals.

Some micro-determinants of per capita consumption expenditure were also identified. Household size, age of the household head, female-headed as well rural households had negative effects on per capita consumption expenditure. Completion of primary education or higher had positive premiums in 1987 and 1988 but the sign reversed for 1992 and 1999. On the same token, all occupational categories had negative premiums in 1987 and 1988 and then positive premiums in 1992. The results for the ecological zones and administrative regions were mixed.

In general, the results seem to be partly driven by the political business cycles. To date the literature in this area is sparse. Further research should be undertaken to determine the welfare implications of the political business cycle.

Appendix 1.A

Table A1: Selected Social and Economic Indicators, 1987-99

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Real GDP Growth (%)	4.8	5.6	5.1	3.3	5.0	3.9	5.0	8.0	4.5	5.0	3.1	2.9	4.9
Agricultural Growth (%)	0.0	3.6	4.2	-2.0	5.8	-1.3	2.3	2.7	4.2	0.5	1.0	NA	NA
Industry Growth (%)	11.5	7.3	4.2	6.9	3.7	6.2	5.4	2.8	3.3	3.5	3.8	NA	NA
Services Growth (%)	9.4	7.8	5.8	7.9	5.2	8.2	7.2	5.0	4.9	5.0	5.5	NA	NA
Real GNP Per Capita (cedis)	438	452	464	477	483	420	410	380	370	380	400	390	NA
Per Capita Income Growth (%)	1.1	2.4	2.0	0.3	2.1	0.7	1.7	0.8	1.3	2.2	0.1	NA	NA
Inflation Rate (%)	39.8	31.4	25.2	37.2	18	10.1	25	24.9	593.5	46.6	30.0	NA	NA
Tax Revenue to GDP (%)	12.7	11.9	12.6	10.5	11.2	11.1	14.9	18.7	20.4	17.6	17.3	18.7	NA
Expenditure to GDP (%)	13.6	13.6	13.8	12.5	13.2	16.7	29.0	31.2	30.4	29.7	28.4	7.7	NA
Current Account Balance to GDP ratio (%)	-21.1	-12.7	-8.9	-11.0	-10.4	-13.5	-14.5	-4.9	-1.9	-1.3	-3.9	-1.5	8
Credit to Central Govt (billion cedis)	22.2	11.0	-10.5	277.7	235.7	356.0	550.3	506.0	835.5	1062	787.0	NA	NA
Credit to Cocoa Sector (billion cedis)	16.5	21.0	23.7	17.1	27.6	48.0	28.7	7.9	8.1	9.1	87.3	NA	NA
Credit to Rest of Economy (billion cedis)	55.6	68.6	80.8	77.1	116.4	163.0	246.4	493.6	581.6	881.1	1373	NA	NA
Gross Investment Rate (% GDP)	10.4	10.9	13.5	13.0	13.5	13.8	15.8	16.0	13.9	17.0	18.5	NA	NA
Net Foreign Direct Investment (billion cedis)			4.9	5.4	7.6	5.9	30.5	120.8	151.9	36.1	32.6	-6.6	NA
Export Volume (1990=100)	80.0	81.2	91.3	100.0	98.2	90.54	106.6	96.6	95.6	141.1	100.0	NA	NA
Import Volume (1990=100)	86.8	90.9	97.5	100.0	107.9	110.0	121.4	126.0	107.5	133.7	157.0	NA	NA

Source: Jebuni et al (2001), Boateng et al (2001), African Development Indicators (Various issues)

Appendix 1.B: Definition of Variables

Variable	Definition
<i>North-South</i>	<i>North</i> =1 if: Northern Region; Upper East Region; or Upper West Region <i>North</i> =0 if: Western Region; Central Region; Greater Accra Region; Eastern Region; Volta Region; Ashanti Region; or Brong-Ahafo Region
<i>Administrative Regions</i>	The ten regions aforementioned
<i>Ecological Zones</i>	Coastal; Forest; Savanna
<i>Rural-Urban</i>	<i>Rural</i> =1 if: population < 1500 people or 0 otherwise
<i>Locality 7</i>	Accra; Urban Coastal, Urban Forest, Urban Savanna (i.e. other than Accra); Rural Coastal, Rural Forest; Rural Savanna
<i>Locality 5</i>	Accra; Other urban; Rural Coastal, Rural Forest, Rural Savanna
<i>Locality 3</i>	Accra; Other Urban; Rural

Appendix 1.C

Table A2: Within-Group Inequality

YEAR	Administrative Regions	Ecological Zones	Locality 7	Locality 5	Locality3	North-South	Rural-Urban
1987	0.20567	0.22037	0.20876	0.20606	0.21675	0.23239	0.2188
1988	0.25038	0.26705	0.25506	0.25564	0.25887	0.26678	0.26029
1992	0.22919	0.23591	0.23313	0.23319	0.2368	0.23777	0.23792
1999	0.23860	0.27443	0.24779	0.25034	0.2683	0.27163	0.26647

Appendix 2.D Regressions For Per Capita Consumption Expenditure

	1987		1988		1992		1999	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
a) Household size	-0.0554*	0.0014	-0.0642*	0.0017	-0.3262*	0.0017	-0.0737*	0.0021
b) Other demographic characteristics								
Age of household head	0.0003	0.0019	-0.0002	0.0013	-0.0375*	0.0020	-0.0271*	0.0013
Squared age of household head	-0.0000	0.0000	-0.0000	0.0000	0.0003*	0.0000	0.0002*	0.0000
Gender of household head (female=1, male=0)	-0.2338*	0.0112	-0.0475*	0.0141	0.1552*	0.0130	0.0609*	0.0096
c) Education								
Some primary	-	-	-	-	-	-	-	-
Completed primary school	-0.0005	0.0097	0.0091	0.0080	-0.0710*	0.0131	-0.0159	0.0144
Completed secondary school	0.0322	0.0255	0.0060	0.0139	-0.0569*	0.0231	-0.0135	0.2556
Tertiary	0.0466	0.0832	0.1477***	0.0922	-0.0746*	0.0359	-0.0642	0.0517
d) Occupation								
White collar	-	-	-	-	-	-	-	-
Agriculture	-0.1511*	0.0215	0.0526*	0.0251	0.3091*	0.0174	0.5241*	0.0186
Sales	0.0310	0.0269	-0.0158	0.0205	0.1951*	0.0479	0.7152*	0.0373
Production	-0.0237	0.0247	-0.0246*	0.0085	-0.0807*	0.0122	0.3564*	0.0138
Not working	-0.3909*	0.1436	-0.0274	0.0762	0.1288*	0.0505	0.2907*	0.0494
e) Spatial Characteristics								
Rural (rural=1, urban=0)	-0.0195*	0.0093	-0.3066*	0.0090	0.0687*	0.0135	-0.3746*	0.0098
Forest	-	-	-	-	-	-	-	-
Coastal	1,961,512*	0.0106	0.3122*	0.0116	0.3220*	0.0083	0.2267*	0.0094
Savannah	-0.0369*	0.0159	-0.2608*	0.0103	0.2230*	0.0148	0.6046*	0.0221
North	-0.2795*	0.0188	-0.0121***	0.0085	0.0038	0.0203	-0.6816*	0.0227
Constant	11.4239*	0.0506	12.5081*	0.0369	13.2030*	0.0570	14.6124*	0.0415
R-square	0.2886		0.4830		0.3720		0.6148	

* indicates significant at the 5% level

** indicates significant at the 10% level

*** indicates significant at the 20% level

Appendix 2.E Mean Values and Frequencies of Variables

Table A3: Mean Values for Continuous variables³⁴, 1987

Spatial Dimension\ Characteristic	Per capita expenditure	Household size	Age of head
a) Rural-Urban			
Rural	48340.81	7.19	47.09
Urban	67928.37 (28.96)	6.44 (-12.37)	45.99 (-4.58)
b) North-South			
North	37186.43	8.17	48.96
South	62786.02 (27.00)	6.54 (-19.63)	48.96 (-8.67)
c) Ecological Zones			
Forest	54546.30	6.67	46.41
Coastal	75556.83	6.13	46.04
Savannah	40559.96	8.09	47.40
d) Administrative Regions			
Greater Accra	95402.37	5.55	43.78
Central	48912.01	6.07	46.24
Western	75066.55	6.69	45.51
Eastern	57483.49	7.02	47.05
Volta	46491.41	7.07	48.58
Ashanti	54168.35	6.45	46.43
Brong-Ahafo	55965.04	7.08	45.07
Northern	37649.17	8.66	48.79
Upper East	36609.30	7.24	47.91
Upper West	36959.53	8.29	50.42

³⁴ Figures in parentheses are two-tailed t values

Table A4: Mean Values for Continuous variables, 1988

Spatial Dimension\ Characteristic	Per capita expenditure	Household size	Age of head
a) Rural-Urban			
Rural	138263.00	7.49	55.68
Urban	219473.70	6.29	54.23
	(33.71)	(-18.23)	(-3.94)
b) North-South			
North	153816.30	7.50	55.36
South	160471.80	7.07	55.34
	(2.37)	(-5.72)	(-0.06)
c) Ecological Zones			
Forest	131786.20	9.09	54.75
Coastal	231836.70	5.46	55.72
Savannah	117126.30	6.54	55.64
d) Administrative Regions			
Greater Accra	144578.30	7.28	55.06
Central	165512.00	6.77	55.00
Western	152310.20	7.41	55.19
Eastern	161481.60	7.24	55.30
Volta	166615.30	7.04	55.37
Ashanti	165005.10	6.85	55.81
Brong-Ahafo	156480.10	7.32	55.26
Northern	144974.50	7.96	55.50
Upper East	156339.80	7.21	55.20
Upper West	143948.90	7.64	55.27

Table A5: Mean Values for Continuous variables, 1992

Spatial Dimension\ Characteristic	Per capita expenditure	Household size	Age of head
a) Rural-Urban			
Rural	199345.20	7.19	54.72
Urban	201913.20 (1.73)	5.21 (-44.42)	54.90 (1.40)
b) North-South			
North	264405.5	3.27	49.05
South	198574.8 (-14.68)	6.61 (24.00)	54.92 (15.12)
c) Ecological Zones			
Forest	180179.70	7.37	56.12
Coastal	217328.50	6.15	52.95
Savannah	210867.10	5.42	55.40
d) Administrative Regions			
Greater Accra	247844.30	3.75	48.54
Central	210969.60	6.99	52.54
Western	217072.50	6.36	57.59
Eastern	247640.40	3.56	48.87
Volta	195045.90	4.87	57.94
Ashanti	159381.20	6.40	57.56
Brong-Ahafo	189493.30	11.29	51.18
Northern	262049.30	3.36	48.96
Upper East	277855.40	3.10	47.78
Upper West	248413.50	3.31	51.56

Table A6: Mean Values for Continuous Variables, 1999

Spatial Dimension\ Characteristic	Per capita expenditure	Household size	Age of head
a) Rural-Urban			
Rural	766749.70	5.33	57.45
Urban	1335822.00	5.25	46.51
	(67.00)	(-2.94)	(-54.20)
b) North-South			
North	618293.60	5.61	65.66
South	1134042.00	5.16	47.99
	(57.07)	(-14.76)	(-91.50)
c) Ecological Zones			
Forest	903537.80	5.11	52.79
Coastal	1303687.00	4.84	45.53
Savannah	660976.50	5.97	62.73
d) Administrative Regions			
Greater Accra	2208993.00	3.50	43.69
Central	1062490.00	3.91	48.95
Western	1255969.00	4.91	44.22
Eastern	662766.10	6.42	55.59
Volta	1153986.00	4.31	47.79
Ashanti	1621644.00	4.27	43.96
Brong-Ahafo	1398515.00	3.65	44.34
Northern	893255.10	9.76	82.41
Upper East	477595.10	4.05	65.84
Upper West	727574.30	5.97	51.96

Table A7: Frequency Values for Discrete Variables³⁵, 1987 (%)

Spatial Dimension\ Characteristic	Female Head	Education				Occupation				
		0 ⁰	1 ⁰	2 ⁰	3 ⁰	White Collar	Agriculture	Sales	Production	Not Working
a) Rural-Urban										
Rural	18.87	66.59	30.00	3.25	0.16	3.25	89.42	2.39	4.79	0.15
Urban	31.30	65.72	30.50	3.52	0.18	6.55	64.86	5.27	14.78	0.16
	(0.00)	(0.26)	(0.51)	(0.36)	(0.72)	(0.00)	(0.00)	(0.00)	(0.00)	(0.82)
b) North-South										
North	5.95	67.48	29.35	2.90	0	4.80	88.72	3.02	3.47	0
South	29.06	65.88	30.43	3.48	0.20	5.08	73.90	9.45	11.39	0.18
	(0.00)	(0.14)	(0.30)	(0.16)	(0.03)	(0.57)	(0.00)	(0.00)	(0.00)	(0.04)
c) Ecological Zones										
Forest	30.32	65.74	30.46	3.64	0.15	4.12	82.28	5.27	8.18	0.15
Coastal	28.56	65.28	31.05	3.37	0.30	6.18	61.34	15.55	10.68	0.24
Savannah	11.26	68.25	28.61	2.95	0	5.01	87.96	3.37	3.65	0
d) Administrative Regions										
Greater Accra	24.46	63.70	32.24	3.86	0.20	9.15	51.13	19.47	20.11	0.15
Central	31.49	64.19	31.92	3.54	0.35	4.81	75.30	12.10	7.64	0.14
Western	23.96	65.97	29.80	3.87	0.36	3.93	73.54	8.88	13.65	0
Eastern	26.47	66.62	30.06	3.08	0.23	4.24	79.88	5.80	9.71	0.37
Volta	28.74	66.82	30.13	2.91	0.13	3.77	72.45	9.54	14.24	0
Ashanti	36.61	65.60	30.43	3.81	0.16	2.70	80.34	7.17	9.38	0.41
Brong-Ahafo	30.52	68.70	28.18	3.12	0	7.40	85.97	3.05	3.57	0
Northern	4.35	67.17	29.80	3.03	0	4.16	90.07	2.08	3.69	0
Upper East	10.91	67.42	29.15	2.44	0	6.26	83.63	5.46	4.65	0
Upper West	3.50	68.13	28.72	3.15	0	4.38	91.77	2.10	1.75	0

35 Figures in parentheses are Pearson Chi2(1) probability values

Table A8: Frequency Values for Discrete Variables, 1988 (%)

Spatial Dimension\ Characteristic	Female Head	Education				Occupation				
		0 ⁰	1 ⁰	2 ⁰	3 ⁰	White Collar	Agriculture	Sales	Production	Not Working
a) Rural-Urban										
Rural	8.95	68.62	25.05	6.15	0.16	27.65	2.87	3.61	68.83	0.35
Urban	8.33 (0.25)	69.25 (0.46)	24.58 (0.56)	5.99 (0.72)	0.16 (0.95)	20.62 (0.00)	4.17 (0.00)	4.67 (0.00)	74.55 (0.00)	0.50 (0.20)
b) North-South										
North	10.09	71.06	22.46	6.18	0.14	24.02	2.58	4.45	72.24	0.38
South	8.68 (0.02)	68.41 (0.00)	25.54 (0.01)	5.89 (0.56)	0.16 (0.77)	26.40 (0.01)	3.39 (0.03)	3.78 (0.10)	69.56 (0.01)	0.36 (0.84)
c) Ecological Zones										
Forest	9.84	70.01	23.50	6.31	0.15	24.54	2.94	4.11	71.80	0.37
Coastal	8.94	66.58	27.02	6.13	0.25	24.43	3.99	4.33	70.84	0.57
Savannah	7.33	69.41	24.65	5.82	0.08	29.19	2.69	3.11	67.65	0.23
d) Administrative Regions										
Greater Accra	8.10	66.97	26.41	6.55	0.07	27.61	3.45	3.10	68.73	0.21
Central	8.40	69.07	25.37	5.51	0.06	29.12	3.46	3.98	66.98	0.35
Western	7.77	70.41	23.45	5.86	0.29	24.66	3.15	3.79	71.21	0.29
Eastern	9.20	69.70	25.06	5.16	0.08	24.56	3.35	4.19	71.29	0.21
Volta	9.69	67.49	26.17	6.08	0.26	25.64	3.57	4.20	70.30	0.21
Ashanti	8.45	67.11	26.32	6.36	0.20	27.18	3.34	3.30	68.68	0.73
Brong-Ahafo	8.70	70.25	23.21	6.34	0.21	25.55	3.03	3.51	70.65	0.69
Northern	11.31	72.99	20.81	5.64	0.16	23.67	2.22	5.16	72.36	0.34
Upper East	8.22	67.60	25.44	6.75	0.21	23.78	2.70	3.32	72.71	0.42
Upper West	11.16	73.88	21.41	4.71	0	23.98	3.00	4.71	72.53	0.43

Table A9: Frequency Values for Discrete Variables, 1992 (%)

Spatial Dimension\ Characteristic	Female Head	Education				Occupation				
		0 ^o	1 ^o	2 ^o	3 ^o	White Collar	Agriculture	Sales	Production	Not Working
a) Rural-Urban										
Rural	66.18	0.89	6.79	1.63	0.38	35.07	16.85	0.38	47.32	0.39
Urban	7.03	2.05	16.59	4.08	1.20	30.97	2.28	1.62	61.91	1.38
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
b) North-South										
North	18.97	2.37	22.95	4.74	1.02	63.17	7.05	2.66	24.76	2.35
South	47.23	1.20	9.22	2.29	0.62	32.96	12.76	0.74	52.79	0.68
	(0.00)	(0.00)	(0.00)	(0.00)	(0.10)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
c) Ecological Zones										
Forest	30.07	0.91	6.35	1.69	0.43	13.78	26.47	0.58	58.66	0.52
Coastal	50.94	1.85	14.99	3.52	1.00	25.49	2.52	1.21	69.64	0.01
Savannah	74.18	0.96	8.51	2.01	0.48	93.68	1.81	0.42	3.71	0.38
d) Administrative Regions										
Greater Accra	20.73	4.91	38.29	10.13	1.44	57.28	9.97	2.69	27.06	3.01
Central	56.68	1.71	12.04	2.90	0.77	17.65	2.78	1.03	77.54	1.00
Western	71.58	0.54	4.64	1.17	0.44	25.80	70.03	0.36	3.37	0.44
Eastern	19.42	5.77	35.81	9.56	3.07	59.48	7.44	4.10	26.25	2.73
Volta	91.50	0.50	3.88	0.73	0.18	95.81	0.91	0.15	2.95	0.18
Ashanti	4.37	0.49	5.36	1.51	0.43	9.70	1.62	0.43	88.02	0.22
Brong-Ahafo	4.82	0.83	8.86	2.09	0.68	34.60	1.90	0.49	62.43	0.58
Northern	18.93	4.14	40.83	8.58	2.08	62.13	6.51	2.66	26.33	2.37
Upper East	14.74	4.74	50.53	8.42	1.59	65.79	7.37	4.21	20.53	2.11
Upper West	26.36	4.55	33.64	10.00	1.82	61.82	8.18	0	27.27	2.73

Table A10: Frequency Values for Discrete Variables, 1999 (%)

Spatial Dimension\ Characteristic	Female Head	Education				Occupation				
		0 ^o	1 ^o	2 ^o	3 ^o	White Collar	Agriculture	Sales	Production	Not Working
a) Rural-Urban										
Rural	40.48	1.31	10.97	2.64	0.71	48.14	3.91	0.61	46.79	0.55
Urban	8.60 (0.00)	1.17 (0.32)	8.08 (0.00)	2.03 (0.00)	0.54 (0.12)	23.68 (0.00)	3.38 (0.03)	0.02 (0.00)	68.96 (0.00)	1.87 (0.00)
b) North-South										
North	1.12	0.43	3.44	1.20	0.27	83.09	1.00	0.05	15.75	0.11
South	41.21 (0.00)	1.63 (0.00)	12.81 (0.00)	2.96 (0.00)	0.81 (0.00)	19.58 (0.00)	4.93 (0.00)	0.02 (0.00)	72.39 (0.00)	1.45 (0.00)
c) Ecological Zones										
Forest	34.22	2.56	0.21	4.78	1.34	29.99	9.51	1.99	57.16	1.36
Coastal	42.06	0.99	7.24	1.68	0.46	5.72	2.18	1.58	89.02	1.50
Savannah	10.24	0.62	4.87	1.54	0.36	83.02	1.24	0.09	15.37	0.28
d) Administrative Regions										
Greater Accra	34.23	5.70	35.51	8.73	2.24	11.64	13.74	12.57	51.46	10.59
Central	42.71	3.57	38.57	7.00	2.59	44.14	4.43	2.71	44.43	4.29
Western	43.15	0.42	2.70	0.62	0.23	1.84	0.99	0.60	96.30	0.27
Eastern	39.47	1.23	11.36	2.74	0.69	34.04	8.59	0.36	56.76	0.25
Volta	34.88	5.85	35.12	8.05	2.47	44.15	10.00	2.80	38.90	4.15
Ashanti	43.54	4.40	35.49	7.87	1.70	39.79	6.65	6.09	43.07	4.40
Brong-Ahafo	42.04	4.07	40.56	10.74	2.61	57.78	5.93	2.22	29.81	4.26
Northern	2.25	1.09	8.09	3.60	0.77	16.31	3.53	0.13	79.64	0.39
Upper East	0.68	0.31	2.43	0.57	0.11	99.10	0.44	0.04	0.39	0.02
Upper West	1.27	0.20	2.09	0.76	0.25	98.78	0.31	0.00	0.81	0.10

Appendix 2.F: The Ghana Living Standards Survey

The Ghana Living Standards Survey (GLSS) is a nationwide household survey undertaken by the Ghana Statistical Service (GSS)³⁶. In designing the survey, a sample of 3200 households was selected based on the 1984 population census. The clusters of households were chosen such that each household had an equal probability of being selected. A multi-stage sampling technique based on a probability-proportional-to-size method was employed. The survey was designed to be a rotating panel. It must be noted that the change in sample composition would not affect the spatial analysis since the definitions of the respective dimensions do not change over time.

GLSS1 and GLSS2 were based on the same set of questionnaires. However, additional information was collected in GLSS2 and almost all resurveyed clusters were renumbered³⁷. GLSS3 and GLSS4 differ significantly from GLSS1 and GLSS2³⁸. The questionnaire for GLSS3 and GLSS4 had a longer recall period and contained more detailed income, consumption and expenditure modules³⁹. There are also differences in household size between GLSS1 and GLSS2. This may be adjusted for using per capita or the adult equivalence scales. At present, there is no agreement concerning a suitable equivalence scale for Ghana and since it may not be prudent to use that of another country, the GSS adopted the per capita measure. This is maintained in the present study. Various measures of mean expenditure have

³⁶ Four rounds of the survey have been conducted: 1987-88 (GLSS1), 1988-89 (GLSS2), 1991-92 (GLSS3) and 1998-99 (GLSS4). See the GLSS (1987-88) Data User's Guide for a detailed description.

³⁷ A panel with personal identification codes of 3370 individuals and 741 households has also been created by the GSS based on the comparisons of age and gender.

³⁸ See Coulombe and McKay (1995), Jones and Ye (1995) and Demery and Mehra (1997) for discussions of the comparability of the GLSS data sets

³⁹ The recall period for collecting food and subsistence expenditures reduced from 2 weeks in GLSS1 and GLSS2 to 2 days in the rural areas and 3 days in the urban areas. Both recall and coverage differences may cause food expenditure estimates in GLSS1 and GLSS2 to be biased downwards.

been proposed based on correction for the errors⁴⁰. The GSS corrected for changes in prices over time and across localities⁴¹. It also corrected for population growth over the survey periods. The data may be corrected for recall error, by adjusting the food expenditures in GLSS1 and GLSS2 upward by 2.9% for each additional day of longer recall period, up to the seventh day.

⁴⁰ See Coulombe and McKay (1995) for a discussion of these measures

⁴¹ Regional price indices were constructed and the household expenditure adjusted to a common base so as account for regional variation in purchasing power. Spatial and temporal variations in the cost of living was accounted for by deflating the nominal expenditure values with a Paasche price index.

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