A spatial analysis of the determinants of Inter-regional migration: evidence from Ghana

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Evidence from Ghana

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ABSTRACT

Sub-Saharan Africa has experienced a rapid population increase and growing urbanization rates in recent years and is bound to have the world's largest urban population. If no steps are taken against it, the fast rise in the urban population will result in severe consequences for urban localities in the developing countries located in this region. Along with the natural population increase, internal migration is one prime reason for a fast-rising urbanization process. Since this type of migration is very common in developing countries, this following paper conducts a spatial analysis of inter-regional migration with special reference to Ghana. Specifically, it analyzes the Ghana's migration patterns in Ghana by visualizing the regional differences in net migration and the major migration flows from one region to another. Data for this analysis were collected from a population census and a household survey. A cross-sectional regression analysis was conducted to examine which factors explain inter-regional migration flows in the country. The regression model employed in the analysis is based on the gravity model of migration, which explains how the size of and the distance between two places affects the movement between them, and added the rate of urbanization as well as the average annual income per capita of both regions. The regression results reveal that the distance between two administrative regions in Ghana and the birth region's urbanization rate refrain people from migrating to other regions. In contrast, the urbanization rate and the average income of the destination region are positively associated with the inflow of migrants. Nevertheless, due to the data's limitations, the nexus between migration flows and regional disparities cannot be fully investigated. Therefore, this paper calls for more research to be done in this field.

Keywords: Inter-regional migration, Urbanization, Spatial analysis, Gravity model of migration, Ghana

[1] This paper is an adaptation of an assignment that was written and submitted within the scope of the course Economics of Cities and Spatial Methods (JECR20) at Jönköping University in December 2020.

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1 Introduction

The fast-rising population growth is a major ongoing issue that countries in Sub-Saharan Africa will face in the future. It is estimated that these countries have more than doubled their population from 504.171 million in 1991 to 1,011.429 million in 2017 (United Nations Department of Economic and Social Affairs, 2019b). According to projections made by the United Nations (UN), the population of this particular region will reach its 1.5-billion mark by 2035 and its 2-billion mark by 2050 (United Nations Department of Economic and Social Affairs, 2019a).[2] As the population in this part of the world increases sharply, so does the share of people living in urban areas. Sub-Saharan Africa has already become the fastest-rising urban population worldwide. As of 2019, this region's urban population grows at an average growth rate of 4.027 %, approximately two percentage points higher than the global urbanization rate (The World Bank Group, 2020c). At that rate, the region will likely have an urban population twice as much in 25 years from now (Saghir & Santoro, 2018). This uncontrolled rise in the urban population may result in several challenges with which cities in this part of the world are confronted. For one, due to the subsequent rise in the informal sector, which does not contribute to the city's resources, cities lack financial means to fund necessary urbanization projects that help improve the city's infrastructure. This lack of infrastructure and the insufficient provision of basic services makes the urban population more vulnerable to natural disasters and the consequences of climate change. However, Saghir and Santoro (2018) argue that if the city holistically addresses these issues and includes all participating actors, the rapid rise in the urban population can positively impact a city's economic growth, employment and even reduce poverty.

The dynamics of internal migration play an essential role in this context, since a large part of the urban population growth is explained by internal rural-urban migration patterns. Hence, it is a matter of high importance to examine internal migration in developing countries, such as in Sub-Saharan Africa, to fully understand the process of urbanization and find solutions to challenges caused by this process (Todaro, 1997). Increasing internal migration flows, in particular rural-urban migration flows, are observed as a result of the ongoing structural transformation in these countries (De Brauw et al., 2014). In other words, internal migration is a natural occurrence in the economic development process of a country. The negative

[2] These predictions made by the UN are based on the median prediction interval (See UN, 2019b).

relationship between a country's economic output per capita and its share in the rural population for the case of Sub-Saharan countries is an indication of a rise in internal migration. If internal migration from rural to urban areas is weak or not observable at all, a country might forgo potential economic growth and development (De Brauw et al., 2014).

Despite its importance and high topicality, research on the nexus between migration and urbanization in the Global South has been rather slim. That being the case, this paper contributes to the existing literature by spatially examining inter-regional migration patterns in Ghana. More precisely, it will analyze the factors and regional disparities that drive internal migration in the country. The case of Ghana was chosen for various reasons. First, it should be noted that Ghana has developed strong and stable economic activities in the past decades in comparison to other West African nations (Alagidede et al., 2013). Ghana's economy has been experiencing substantial economic growth in recent years and had an annual growth rate of 6.5 % in 2019 (The World Bank Group, 2020a). These high rates trace back to the country's structural transformation due to a rising industry and service sector (Alagidede et al., 2013; Molini & Paci, 2015). In terms of GDP per capita, Ghana is one of Western Africa's wealthiest nations (The World Bank Group, 2020b). Moreover, the widely accessible survey and census data provided by Ghana Statistical Services (GSS) allow researchers to look deeper into regional disparities and drivers for migration and thus analyze migration flows.

As follows, this paper conducts a spatial analysis of inter-regional migration in Ghana. The paper's theoretical framework assesses two models describing the occurrence of internal migration in a country. Specifically, the paper focuses on the gravity model of migration that explains how gravitational forces like size and distance as well as other external factors act on inter-regional migration. Furthermore, this paper reviews and reflects on previous literature that explained the different determinants of internal migration for Ghanaians and its effect on their welfare. Section 3 includes a thorough spatial analysis of inter-regional migration flows in Ghana and the regional disparities that explain it. A cross-sectional regression analysis tests the beforementioned gravity model. The data for this analysis were collected from different reports published by GSS. Section 4 includes a discussion of the findings of the empirical findings and how they can be interpreted. It also gives insight into some of the policy recommendations that reduce the regional disparities and the fast-growing urbanization process in some Ghanaian cities in the country. In the end, the conclusion provides a summary of the main points presented in the paper.

2 Theoretical Framework

A theoretical framework is to be created before examining the existing inter-regional migration patterns in Ghana and determining the drivers for migration. First, this section looks at different models that have been previously used to describe internal migration. After that, the paper's brief literature review highlights the important empirical findings researched the reasons for and determinants of internal migration in Ghana.

2.1 Models of internal Migration

The term internal migration describes the process of a country's population to move from one part of the country to another (United Nations Conference on Trade & Development, 2018). Hence, a person changes his or her place of residence within the same country. The determinants of and drivers for such form of migration are numerous and differ from country to country. Previous papers have addressed the process of internal migration through different models. One model explaining the determinants of internal migration from a microeconomic point of view is the Todaro migration model (Todaro, 1980). This model takes the migration decision of an individual into consideration. In this model, migrants are seen as rational individuals who base their migrating decision by considering and weighing the costs and benefits of such migration. That being said, individuals are expected to maximize their so-called expected gains from migration (Todaro, 1980). The expected gains from migration and the decision to migrate depend on two factors, the real income difference that the migrant receives if he or she is employed in an urban job somewhere else and the probability for the migrant to receive that job. Hence, the model states that internal migration occurs until the point is reached where the expected gains from migration equal to zero. However, it can be argued that the Todaro migration model only partially explains the appearance of internal migration in developing countries and rather explains the labour market dynamics in these countries (Todaro, 1980).

Instead, this paper is interested in a model that explains how regional differences influence inter-regional migration in a country. That is why it focused on the gravity model of migration. This model is based on the dynamics of Newton's gravity model and is used to explain and understand internal as well as international migration flows (Poot et al., 2016). The use of this model in studies concerning migration has risen in popularity (Poot et al., 2016; Ramos, 2016). It considers spatial interaction explaining how migration differs from the proximity between and the size of two regions or countries (Greenwood & Hunt, 2003). The simple gravity

migration model, which explains migration flows M_{ij} from the place of origin i to the place of destination j, is depicted in Equation 1:

$$lnM_{ij} = \beta_0 + \beta_1 lnP_i + \beta_2 lnP_j - \beta_3 lnD_{ij} + \varepsilon_{ij}. \quad (1)$$

Taking the logarithmic values of the dependent and independent variables allows the coefficient β_1, β_2 and β_3 to be interpreted as migration elasticities (Greenwood & Hunt, 2003). Note that the migration flow M_{ij} considers all people who changed their residence from place *i* to place *j* (Poot et al., 2016). The signs in this model imply that the migration flow from one place to another is positively associated with their population sizes P_i and P_j and negatively associated with the distance D_{ij} between those two places (Greenwood & Hunt, 2003). It is assumed that higher populations in both places increase the number of migrants between these places, everything else held constant. In contrast, an increase in the distance is associated with higher costs, which deters them from migrating between these places (Lewer & Van den Berg, 2008). Over the years, there have been modified versions of this simple gravity model of migration. In addition to size and distance, these models also include other spatial factors that impact a person's decision to migrate (Greenwood & Hunt, 2003). Equation 2 is such a modified migration gravity model that includes income *Y* and various other variables for both the place of origin *i* and the place of destination *j*, and can be described by

$$lnM_{ij} = \beta_0 + \beta_1 lnD_{ij} + \beta_2 lnP_i + \beta_3 lnP_j + \beta_4 lnY_i + \beta_4 lnY_j + \sum_{n=1}^{m} \alpha_n lnX_{in} + \sum_{n=1}^{m} \gamma_n lnX_{jn} + \varepsilon_{ij}, \quad (2)$$

with X summarizing other variables that can include socioeconomic characteristics of both places (Greenwood & Hunt, 2003).

This has helped researchers dig deeper into the nexus of migration by examining different external factors that push and pull migrants or investigate the effect of new migration policy impositions, for instance, visa restrictions (Ramos, 2016). The gravity model of migration is also applicable to describing factors influencing inter-regional flows. Hence, this paper employs its regression model based on the gravity migration model to examine the size of and proximity between regions and includes other exogenous factors.

2.2 Literature Review

This section reviews a set of different studies that have focused on explaining the dynamics of internal migration in Ghana and analyzing the determinants driving such migration. This is important, as it will give an idea of what has already been researched and which factors this research paper should focus on when conducting the spatial analysis.

Arthur (1991), who examined the determinants of inter-regional migration in Ghana, primarily from rural to urban places, stated that migrants select their destination by several personal factors. For him, the main reason for rural-urban migration in Ghana is to maximize the family's well-being. The family has very high importance in Ghanaian society, implying that an individual's well-being is a function of the family's average well-being. Migrants improve the well-being of the family, and thus also theirs, by sending remittances home. For this reason, families choose a family member with a relatively high educational attainment, as the probability of finding a good-paying job in the industrial sector in urban areas is higher for better-qualified migrants. Some secondary determinants of migration might include economic policies imposed by the government, conflicts in the family and the desire for self-actualization (Arthur, 1991). In a somewhat more recent study, Ackah and Medvedev (2012) empirically examined the determinants of migration and effects on the welfare of households, based on survey data for roughly 9000 households. Confirming Arthur's assertion, their model shows that the probability of migrating increases with educational attainment. When individuals acquired a secondary or even tertiary education, they are more likely to migrate. However, considering household characteristics, the educational attainment of the family impacts the decision to migrate negatively. These person and household characteristics are also referred to as pull determinants, as they determine whether an individual leaves the household or not (Ackah & Medvedev, 2012).

The relationship between monetary remittances and internal migration was explained by (Adaawen & Owusu, 2013), who looked at the labour migration dynamics of young Ghanaians from the north to the country's southern regions. This migration is mainly due to the existing income disparity between the poor in the north and the rich in the south. They argue that migrants from the north relocate to the south with the intention of finding better-paying employment. This money is then sent to the family in the region of origin to improve their well-being. Adaawen and Owusu's findings show that most surveyed migrants send monetary remittances home to provide for the family. By employing a binary logistic and multiple regression based on survey data of young migrants in the cities Accra and Kumasi, they were

able to determine the impact of background variables on the likelihood of sending money back home and the number of such remittances. Their analysis showed that the higher the income of these migrant, the more likely it is for them to send remittances. The income also has a positive impact on the number of remittances. Migrants who stay longer than one year are much more likely to send remittances home. Other background variables, such as occupation, educational attainment and the region of origin, are not statistically significant and thus do not impact the likelihood and amount of remittances (Adaawen & Owusu, 2013).

Molini et al. (2016) contributed to examining the impact of internal migration on household's welfare by using more recent household survey data. In particular, it examines how the household's decision to migrate affects the change in consumption level compared to non-migrating households. They employ a selection-corrected estimation equation that corrects for the non-random selection of migrants. Based on this estimation, the average consumption level for migrating households is 77 percent higher than for households that have not migrated (Molini et al., 2016). The education level and the gender of the household head also positively affects the welfare of the household through high consumption. Most of this high relationship between the decision to migrate and the consumption level is explained by households that have migrated from the country's northern regions. In contrast, households that have migrated from the more economically more stable coastal regions have experienced no significant increase in consumption level. The authors showed that migrants from the less developed northern regions benefit from migration to a great extent and make them escape poverty.

3 Spatial Analysis

This paper now conducts a spatial analysis of inter-regional migration, a form of internal migration. First, the research paper gives an overview of the country's population distribution and shows whether or not there exist discernible regional disparities concerning per capita income and urbanization. Subsequently, this paper sheds light on differences in net migration and highlights the major inter-regional migration flows. Hence, this paper gives an understanding of the important existing migration patterns in the country. In addition, a cross-sectional regression analysis will be employed to analyze the effects of certain push and pull factors on inter-regional migration in Ghana.

The paper's spatial analytical part is based on the data collected from Ghana Statistical Services (GSS). For examining the regional disparities and analyzing Ghana's migration flows, census data is required. The so-called Population and Housing Census is conducted at regular intervals to provide information about its demography and socioeconomic features (Ghana Statistical Service, 2013). Furthermore, it describes migration flows within the country (Ghana Statistical Service, 2014a). Especially the decomposition of the data between all ten administrative regions allow examining regional disparities. The use of census data might therefore be helpful for the empirical investigation following in Section 3.3. However, since a country-wide census is only conducted every ten years, this paper is limited to data from the last Population and Housing Census (PHC), dating back to 2010.[3] The considered census data also lacks to provide any information on average per capita income. This is why income data were collected from the 2012-13 Ghana Living Standards Survey (GLSS6). This household survey is conducted more frequently and provides additional and more detailed information about households' well-being of households based on characteristics, such as employment and living conditions (Ghana Statistical Service, 2014b). The survey collects this information from a sample of 18,000 Ghanaian households. By using census data for analyzing migration flows, one must be aware of the limitations it has. Due to the limitations considering the information in the census questions, the number of migrants as denoted by the data can underrepresent the actual number of migrants (Ghana Statistical Service, 2013).

Before moving on, it is a matter of great importance to note a few things on inter-regional migration, which plays an essential part in the spatial analysis. In this context, inter-regional

[3] Since access to the raw data file of the 2010 PHC was not granted in time, the data were instead taken from two official PHC reports published by GSS (See Ghana Statistical Service, 2013; Ghana Statistical Service, 2014a).

migration is defined as the change of residence from one administrative region to another (Ghana Statistical Service, 2014a). For the sake of simplicity and due to the just described limitations of census data, the paper defines inter-regional migrants as people for whom the place of enumeration of the census differs from their place of birth. This means that they must have migrated to the region of residence at some point in their lifetime. This approach was already used by (Arthur, 1991). However, he points at the shortcomings and estimation errors that this approach and the reliance on census data brings about.

3.1 Regional Disparities in Ghana

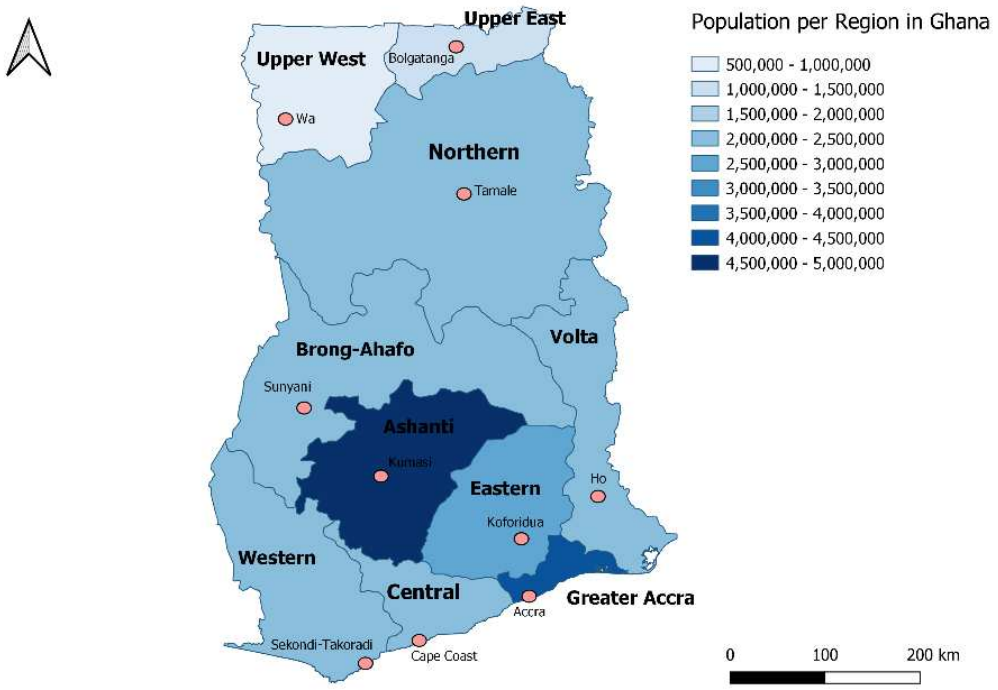
3.1.1 Population and Urbanization

In 2010, the year the census was conducted, Ghana was divided into ten administrative regions: Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, Volta and Western (See Figure 1).[4] As of 2010, Ghana's total population was 24,658,823. However, the population in the country was not distributed evenly, as more people were clustered in regions in the south rather than in the north of the country (See Figure 1). By far, the most populated administrative region in the country was Ashanti, with an estimated population of 4.78 million. This region is the country's political center, as it includes the capital and most populated city, Kumasi. Following Ashanti, the Greater Accra Region was the second most populated region, with around four million in 2010. Although it only had the country's second-highest population at that time, this region has an important role in the economy and Ghanaian culture (Yankson & Bertrand, 2012). The uneven population distribution is clear when looking at the population gap between the southern and northern regions.[5] The population in the southern regions, mainly in Greater Accra, Ashanti, Western, Central and Eastern, consisted of 65 % of the total population. In contrast, the two least populated regions of Upper East and Upper West are located in the very north of the country (See Figure 1).

[4] Due to structural changes in country in 2018, Ghana has gained six new regions by splitting up the regions Brong-Ahafo, Northern and Volta.

[5] The paper refers to the regions Northern, Upper East and Upper West as northern regions, while the regions Ashanti, Central, Eastern, Greater Accra and Western are referred to as southern regions. This is done to avoid confusion.

Figure 1: Population distribution of Ghana's regions



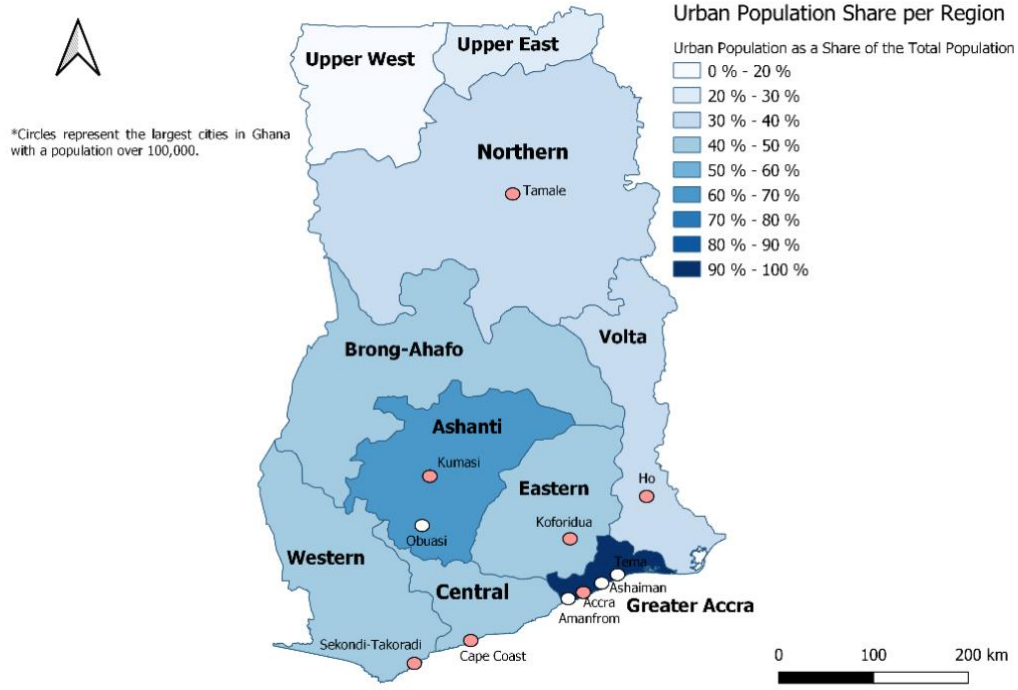
Source: Own Figure based on Ghana Statistical Service (GSS) Census Data 2010

The population distribution shows most of the population were clustered in the coastal regions, where two-thirds of the largest urban areas are located. Figure 2 depicts the share of urbanization of each administrative Ghana and the location of the largest cities in Ghana with a population above 100,000. The majority of cities are on or relatively close to the coast. Tamale is the only major city in one of the northern regions, indicating that these regions have a rather rural population. This is also shown in the rate of urbanization in these regions (See Figure 2). In 2010, the least urbanized region was Upper West with 16.3 %, followed by Upper East and Northern, where only less than one-third of the population lived in urban areas[6]. In contrast, the regions in central and southern Ghana experienced higher urbanization rates. In the densely populated Greater Accra Region, for example, roughly 90.6 % of the total population lived in urbanized localities. The urbanization rate in Ashanti, on the other hand was 60 %. These regional differences demonstrate that Ghana's rural population that depends on agriculture is more widespread in the northern regions as well as in Volta. Conversely, the more urbanized population is inclined to reside in the southern regions, especially in the Greater Accra Region and in Ashanti. Based on population and urbanization data provided by the 2010

[6] GSS defines urban areas as towns and cities with a population of at least 5,000 (See Ghana Statistical Service, 2013).

PHC, a gap between the rural north and the urbanized south is noticeable. Although, the differences concerning urbanization rates is far more apparent, differences in urbanization rates are also discernible in the southern regions. While the regions Ashanti and Greater Accra have the largest share of urban population in the country, their surrounding regions had an urbanization rate of no more than 50 % (See Figure 2). Hence, one can find regional disparities in the population and the urbanization rate in the country.

Figure 2: Urban population share per region in Ghana



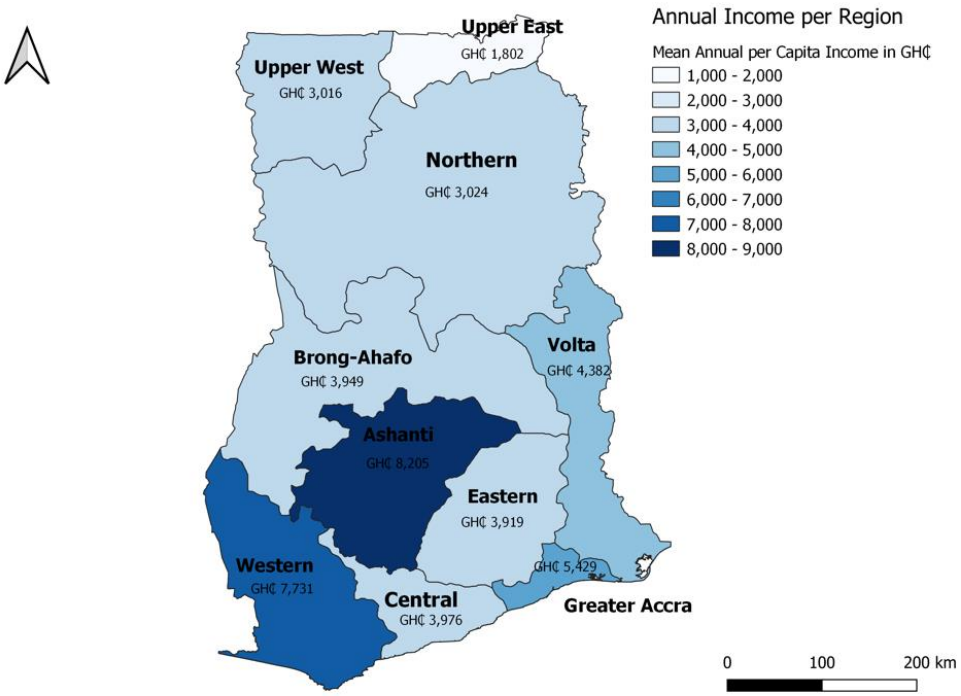
Source: Own Figure based on Ghana Statistical Service (GSS) Census Data 2010

3.1.2 Income

To find out if such a gap is also discernible for average earnings, this paper looks at the distribution of average income per capita between Ghana's ten administrative regions. The focus has been laid on income, among others because previous studies showed that one of the prime determinants of inter-regional migration was sending remittances back home (Adaawen & Owusu, 2013; Arthur, 1991). Thus, migrants are likely to move to regions where income is higher than in the region of origin. For the spatial analysis, this paper uses the average annual income per capita, as this is a good proxy of the income migrants would expect in the destination region. Figure 3 depicts the regional income distribution based on the mean annual per capita income in Ghanaian Cedi (GH₵). According to this figure, income differences between the more rural northern regions and the more populous and urbanized regions are

visible. The region Upper East had by far the lowest earnings with an average income of GH₵ 1,802 per year. This is followed by the other northern regions, Upper West and Northern. The low per capita earnings in these regions are traced back to the fact that most of these rural regions depend on self-sufficient agriculture and thus earn only little income. Although having a higher income than the northern regions, Brong-Ahafo, Eastern, and Central had an average income of less than GH₵ 4,000 per capita, making them the lowest-earning regions in the southern part of the country. In contrast, Ashanti, Western and Greater Accra had higher expected income. This suggests that most high-paying industry and service jobs are located in these regions. In Ashanti, people earned on average GH₵ 8,205 per year, making it the highest-paying region in the country. Thus, Figure 3 confirms that there are substantial average per capita income differences between regions, especially between the more rural regions in the north and the urbanized regions in the south, with the exception of Volta.

Figure 3: Annual income per region



Source: Own Figure based on the 2012-13 Ghana Living Standards Survey (GLSS6)

The regional distribution of population, urbanization and income allowed this paper to discover disparities between the different regions. Figures 1 to 3 displayed a gap between the northern and southern regions. The lesser populated regions of Northern, Upper East and Upper West experienced high shares of the rural population and the lowest earned average income in the

country. In terms of population size and average income per capita, the regions Brong-Ahafo, Eastern and Central only have slight differences compared to the northern regions. It appears quite differently for the two regions in particular. The regions of Ashanti and Greater Accra stood out, as they were more urbanized and its citizens tended to earn more on average. All in all, it can be said that there exist indeed disparities between regions, especially between the rural regions and the more urbanized regions Ashanti and Greater Accra.

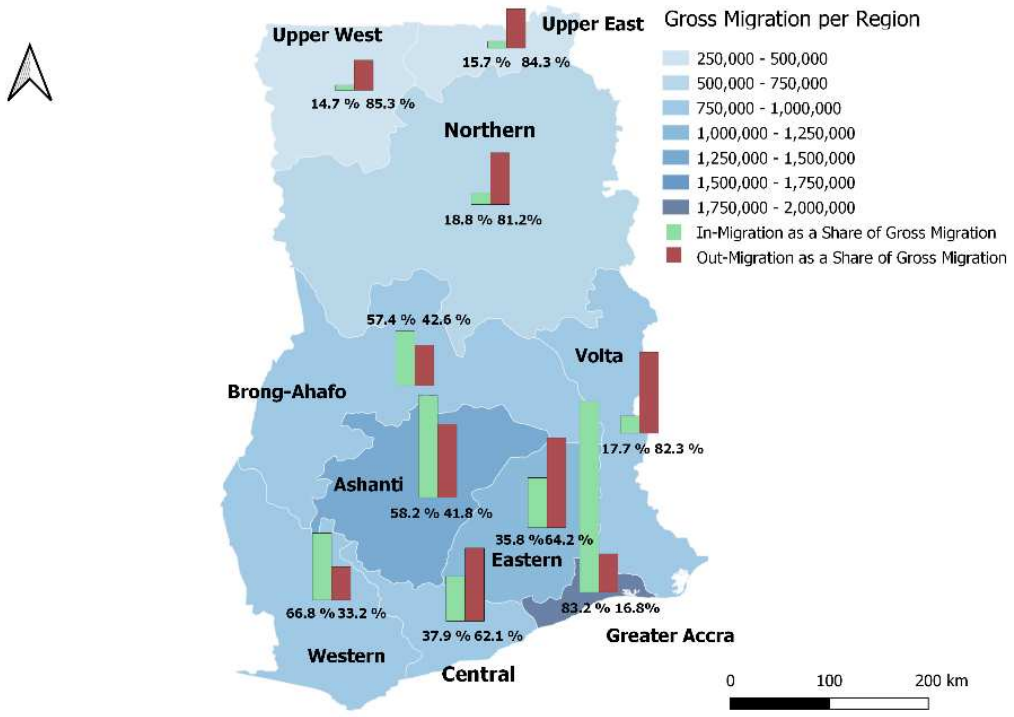
3.2 Regional Disparities in Ghana

This paper now explains the characteristics of inter-regional migration in Ghana and identifies the migration patterns visible in Ghana. Taken from the 2010 PHC, total inter-regional migration amounted to roughly 4.49 million, or to put it differently, 19 % of the total Ghanaian population by birth. Thus, migration between regions was more widespread than migration within regions, which only amounted to 15.1 % of the country's total population (Ghana Statistical Service, 2014a). Gender differences in inter-regional migration were quite small. Although women were more likely to migrate inter-regionally, the gender migration ratio was relatively small (Ghana Statistical Service, 2014a). Figure 5 depicts the age distribution of Ghanaian inter-regional migrants (See Appendix). The distribution demonstrates that the prime group of migrants who settled to another region was young adults between 20 and 29. Again, no substantial differences in the age distribution between males and females were seen. Compared to intra-regional migrants, Ghanaians who migrated inter-regionally tended to be slightly older (Ghana Statistical Service, 2014a). The actual number of internal migrants settling to new places varied from region to region and thus was unevenly distributed. It is discernible that migration, both intra- and inter-regional, was by far more likely to occur in the regions Greater Accra, Ashanti and Western, as depicted in Figure 6 (See Appendix). According to census data, almost 40 % of Greater Accra’s population consisted of people who had migrated from other regions in Ghana. In the other surrounding southern regions, inter-regional migration inflows to these regions made up roughly 15 % to 20 % of the regions' total population. In contrast, migration to and within the northern regions and Volta was comparatively low (See Appendix, Figure 6).

In order to find regional differences in the degree of inter-regional inflows and outflow, gross and net migration of each administrative region are analyzed. Figure 4 visualizes in- and out-migration as a share of gross migration per region. According to this map, the northern regions experienced a higher share of outflows. For instance, in Upper East, 85.3 % of gross migration is explained by outflows, meaning that migrants were more likely to leave the region than move

to the region. In the more populated Northern region, migration outflow still made up 81.2 % of gross migration population. Likewise, the regions Volta and Eastern experienced high amounts of outflows, but only small amounts of inflows. The Central region was the only coastal region that exhibited negative net migration, i.e. having less inflows than outflows. In contrast, only four of the ten regions in the entire country had positive net migration, namely Ashanti, Brong-Ahafo, Greater Accra and Ashanti. Not only did the Greater Accra region have the highest gross migration, but also received the most inter-regional migrants in the country. Based on the 2010 PHC, the region consisting of the city of Accra and its surrounding suburbs had approximately 1.6 million migrants from other Ghanaian region in 2010, making up roughly 35 % of the country's inter-regional migrants (Ghana Statistical Service, 2014a). Hence, this was the region with by far the highest positive net migration. The other regions experiencing positive net migration like Ashanti and Central had lower gaps between migration inflows and outflows (See Figure 4).

Figure 4: Gross migration per region



Source: Own Figure based on the 2010 Population and Housing Census

The gap between inter-regional migration inflows and outflows can also be interpreted as the migration effectiveness ratio (Ghana Statistical Service, 2014a). Regions with more inflows than outflows have a positive ratio, and vice versa. It is argued that the differences in the

migration effectiveness ratios induces population redistribution. That is, regions with more people coming than leaving pull people from other regions, while these latter regions are considered to have push effects on the migrating population (Ghana Statistical Service, 2014a). Figure 4 indicates that migration in- and outflows were also distributed unevenly across the country. Most migrants were clustered in the southern regions of the country, particularly in Ashanti, Greater Accra and Western. On the other hand, the rural northern regions and the regions surrounding Greater Accra encountered most of the outflows.

The most important inter-regional migration patterns in the country are now being highlighted. The different migration flows between each region were collected by comparing the birth region and the region of enumeration during the 2010 PHC of each Ghanaian by birth. As previously mentioned, this paper considers people as inter-regional migrants whose birth region do not match the region of enumeration and thus must have migrated to the region of residence at some point in time. Table 1 depicts the three most frequented migration flows per administrative region as a share of the total number inter-regional migrants that have left the birth region.

The table below shows that the most popular destination regions depend on the geographical location of the migrants' birth region. Most migrants originating from the northern regions selected the region of Ashanti and Brong-Ahafo as their destination. Migration to Greater Accra was uncommon for these regions, with the exception of Northern, where roughly a fifth of its inter-regional migrants settled to. Alongside the northern region, migration to Ashanti was common among migrants from adjacent regions like Brong-Ahafo, Western and Central. The Greater Accra region was primarily the number one destination for migrants from the southern region, especially those that border the region. Approximately 60 % of all migrants originating from Eastern had migrated to Greater Accra at some point in time, while it was around half of all migrants from Volta and 42 % from Central, all regions bordering Greater Accra (See Table 1). According to the data most outflows from Accra went to Central, Eastern and Ashanti, although they did not make up a high share of the total number of inter-regional migrants. Table 1 also reveals that more people migrated from Ashanti to Greater Accra than vice versa.

Table 1: Most popular destination region per birth region

REGION OF BIRTH	MOST COMMON REGIONS OF DESTINATION
ASHANTI	Greater Accra (40.17 %), Western (15.16 %), Brong-Ahafo (14.77 %)
BRONG-AHAFO	Ashanti (42.98 %), Greater Accra (18.25 %), Western (18.22 %)
CENTRAL	Greater Accra (41.74 %), Western (23.45 %), Ashanti (18.38 %)
EASTERN	Greater Accra (60.58 %), Ashanti (12.75 %), Central (10.16 %)
GREATER ACCRA	Central (26.66 %), Eastern (23.42 %), Ashanti (16.63 %)
NORTHERN	Ashanti (27.61 %), Greater Accra (21.63 %), Brong-Ahafo (20.54 %)
UPPER EAST	Ashanti (40.52 %), Brong Ahafo (18.68 %), Western (14.64 %)
UPPER WEST	Brong-Ahafo (41.69 %), Ashanti (23.05 %), Western (11.02 %)
VOLTA	Greater Accra (50.71 %), Eastern (18.80 %), Ashanti (8.42 %)
WESTERN	Greater Accra (29.66 %), Ashanti (27.65 %), Central (20.80 %)

Source: Own table based on 2010 Population and Housing Census

To identify the most important migration patterns in the country, this paper visualizes the three most frequent migration flows per region that are depicted in Table 1 (See Appendix, Figures 7 & 8). The arrows illustrate the migration flows between two regions as a share of all 4,615,329 inter-regional migrants that are considered for this analysis. Therefore, the more people moved between two regions, the thicker is the arrow between these two regions. For better depiction, these flow patterns are broken into two parts based on their geographical location. First, it is looked at the inter-regional migration flows from the lesser populated regions, namely Brong-Ahafo, Northern, Upper East, Upper West and Volta (See Appendix, Figure 7). The majority of migrants from Upper East and Upper West migrated to Ashanti, Brong-Ahafo or Western. Due to the comparatively low population in the regions of origin, however, these migration flows were rather small. The flow arrows in Figure 6 show that for the northern regions, migration to the Greater Accra region was, although it was existing, not as widespread as for other regions, such as Ashanti and Western (See Appendix). A reason for this could have been the distance and cultural similarities between these regions as it will be discussed thoroughly later. This was not the case for Volta, where some of the settlements and urban areas are closely located to the Greater Accra region. According to the 2010 PHC, approximately 345,000 people who resided in this region were originally from Volta. Hence,

migration to there was substantially high. Another region that should receive some attention is Brong-Ahafo. From all the regions depicted in Figure 7, Brong-Ahafo had the largest cases of in-migration. These migrants mostly came from the northern regions. However, they also experienced a high share of its own people to other regions, such as Ashanti, Western and Greater Accra (See Appendix, Figure 7). Addressing the regions located in the southern and more urbanized part of the country, which is home of the majority of the population (See Section 3.1), the first thing noticeable is that the most of Ghana's inter-regional migrants occurred between these regions. This is illustrated by thicker arrows in Figure 8 (See Appendix). The thicker arrows point towards Greater Accra, indicating that most migrants settle to this region at a certain point in time. Most of these inter-regional migrants who resided in the city of Accra and the surrounding settlements were originally from the Eastern region. Migration from Eastern to Greater Accra consisted almost a tenth of all migrations that had happened inter-regionally, thus making it the biggest migration flow in the country. This is followed by migration from Ashanti and Central region to Greater Accra. In total, migration made up 34.6 % of all inter-regional migration in the country. Comparing the migration flow arrows from Figures 7 and 8, it is apparent that the migration flows in the south were on average much shorter than from the regions in the north of the country, implying that most migration occurred between neighboring regions (See Appendix).

Having visualized the different inter-regional migration flows in Ghana, there are few trends concerning migration patterns that have become clear. First, Figure 7 confirms the existence of the so-called north-south migration, where Ghanaians originally from the northern regions move southwards, particularly to Ashanti, Brong-Ahafo or Western (See Appendix). Nevertheless, this migration pattern does not make a large share of migration across regions. Instead, most Ghanaians migrate between the more populated southern regions. Other than those from the north, migrants from the southern regions do not tend to migrate long distances. They instead move to adjoining regions or regions that are close by. Among southern migrants, the region Greater Accra is considered the most popular. This is not the case for the northern regions. The most frequented flows in the country are between Accra and its surrounding regions. As more than one third of all inter-regional migrants moved to Greater Accra, it can be considered Ghana's most popular migration destination, followed by Ashanti with 18.5 % of all migrants. The migration flows that are depicted in Figures 7 and 8 let suggest that distance is a big factor for selecting the destination region. This will be analyzed more thoroughly in the next section.

3.3 Regression Analysis

In the regression analysis, the factors that have been described in Section 3.1 are being investigated. The regression model is based on the modified version of the gravity model of migration that was introduced earlier (See Section 2.1). It consists of two main components, namely the gravitational and socioeconomic components. The gravitational component describes the dependency of inter-regional migration on the size of and the distance between the region of birth and enumeration. In addition to that, the external factors income and the urbanization rate have been included. Given that, the regression model for this analysis is

$$lnM_{ij} = \beta_o + \beta_1 lnPop_i + \beta_2 lnPop_j + \beta_2 lnDist_{ij} + \beta_3 lnInc_i + \beta_4 lnInc_j + \beta_5 lnUrb_i + \beta_6 lnUrb_j + \varepsilon_{ij}, \quad (3)$$

with *i* representing the region of birth and j the region of enumeration. β_o refers to the constant of the model and ε_{ij} refers to the error term. Keep in mind that the logarithm is taken on both sides of the model to interpret the results as elasticities (Greenwood & Hunt, 2003). The dependent variable lnM_{ij} describes the inter-regional migration flows from one administrative region to another. The independent variables consist of the gravitational force, described by population and distance, and two additional exogenous variables, the rate of urbanization and average income.

The size of each region is explained by the total population $lnPop_i$ for the region of birth and $lnPop_j$ for the region of enumeration. The distance, on the other hand, is described by $lnDist_{ij}$. For the distance between the region of birth and enumeration, this paper uses the distance between the capital city of each region. Although migration does not precisely give the distance between a certain place in region *i* and region *j*, it is a good proxy for the distance between two regions in relation to others. The distance is given by the beeline between both capitals (Lewer & Van den Berg, 2008).[7] To analyze how the regional disparities, discussed in Section 3.1, impact migration flows from one region to another, the model includes the average income per capita (*lnInc*) and the urbanization rate (*lnUrb*) of both regions.

[7] Information about the distance between each administrative region's capital was taken from an online distance calculator.

Table 2: Cross-sectional regression results

Dependent variable: Migration flow ($\ln M_{ij}$)	**Model 1**		**Model 2**		**Model 3**	
Independent variables	Coeff.	SE	Coeff.	SE	Coeff.	SE
Constant term	-10.875	4.441	-11.118	4.175	12.394	5.851
Gravitational Component						
Population of the Region of Birth ($\ln Pop_i$)	0.241	0.173	0.459*	0.225	1.279***	0.367
Population of the Region of Enumeration ($\ln Pop_j$)	1.560***	0.173	1.046***	0.225	0.266	0.371
Distance between Both Regions ($\ln Dist_{ij}$)	-0.963***	0.158	-0.944***	0.149	-0.942***	0.140
Socio-economic Component						
Average Income per Capita for Region of Birth ($\ln Inc_i$)	-	-	-0.363	0.276	-0.243	0.259
Average Income per Capita for Region of Enumeration ($\ln Inc_j$)	-	-	0.898**	0.276	0.921***	0.257
Urban population rate for region of birth ($\ln Urb_i$)	-	-	-	-	-1.105**	0.410
Urban population rate for region of enumeration ($\ln Urb_j$)	-	-	-	-	0.966*	0.386
Goodness of fit						
R^2	0.689	-	0.732	-	0.774	-
Adjusted-R^2	0.679	-	0.716	-	0.755	-
Observations	90	-	90	-	90	-

Source: Own results based on data from Ghana Statistical Service (GSS) Census Data 2010 and the 2012-13 Ghana Living Standards Survey (GLSS6)

Table 2 presents the regression results for the above-described regression model. For the purpose of this analysis, the model is divided into three modifications. This is done to see how the coefficients and their statistical significance change, as we include the external variable income and the urbanization rate. The analysis consists of 90 observations, which are made up of the inter-regional migration flows between all ten administrative regions in Ghana. The adjusted R-square depends on the model modification and has a higher value the more variables are added. The adjusted R-square for the first model modification is 0.679 (See Table 2). In other words, the variables describing the gravitational component of the model (i.e., population and distance) explains 67.9 % of changes in inter-regional migration. The relatively high adjusted R-value implies that a substantial amount of migration is explained through the gravitational force. When adding the external variables, the adjusted R-value increases to 0.755, indicating that the variables urbanization rate and average per capita income indeed contribute to explaining inter-regional migration flows in the country.

First, the focus is laid on the variables that explain the gravitational force in the model. The coefficients of the population for the region of birth and the region of enumeration are different and their value depend on the modification of the model. For the first two modifications, an increase in the population of the region of destination has a higher impact on migration flows than an increase in the population of the birth region. The coefficient β_3 takes the value 1.560 and is significant at the 0.01 level (See Table 2). This would mean that an increase in the destination region's population by 1 % leads to an increase in the inter-regional migration flow by 1.56 %. The population of the birth region, on the other hand, is statistically insignificant. Taken into account the other external factors, urbanization rates and income, the coefficients

as well as their level of significance of the variable population change substantially. A coefficient of 1.279 and a standard error of 0.367 indicates that the population of the origin region has a larger and statistically significant effect on inter-regional migration flows, whereas the population of the region of destination becomes small and insignificant. The relationship between inter-regional migration and the respective distance of the different regions remains negative and significantly strong throughout all three modifications. In the first modification, the distance coefficient is -0.963 and statistically significant at the 0.01 level. The negative effect of distance becomes smaller by adding the external variables but remains statistically strong. Considering all variables, the coefficient results bespeak that a one-percent increase in the distance between the two regions make the migration flow between these two regions increase on average by 0.942 %, ceteris paribus (See Table 2). The results for distance between the region of birth and the region of enumeration are in line with the findings by Poot et al. (2016), who argue that the coefficient can naturally not be smaller than -2. The findings confirm that the effect of distance on inter-regional migration flows is indeed negative and strongly significant.

The focus is now laid on interpreting the findings of the socioeconomic variables that have been included. The effect of an increase in average income per capita earned in the region of origin, which deters people from moving away from the region and accordingly has a negative effect on the dependent variable, is statistically insignificant. In contrast, the per capita average income earned in the region of destination has a positive and highly significant effect on inter-regional migration, shown by a coefficient of 0.898. Including the urbanization rate, an increase in the average income per capita by one percent even leads to an 0.921 % average increase in the number of inter-regional migrants between two regions, keeping all other variables constant. The result can be interpreted in such a way that the higher the average income in a region, the higher is the inflow of inter-regional migrants. Likewise, the effects of the rate of urbanization are different for the region of birth and enumeration. An increase of the rate of urbanized population in the origin region decreases inter-regional migration inflow on average by 1.105 %, everything else held constant. On the other hand, an increase in the urbanization rate of the destination region increases migration on average by 0.966 %. Both coefficients are statistically significant on the 0.01 and the 0.05 level, respectively (See Table 2). This implies that a region with a high share of the rural population has a low inflow of migrants, while having a high outflow of migrants. The opposite is visible for regions with a relatively high share of the urban population.

The regression analysis has been conducted to determine the effect of the gravitational variables and the external variables urbanization and income per capita. The cross-sectional regression model (See Equation 3) shows that the gravitational forces population of the birth region and the distance between the birth region and the destination region have strong and significant effects on Ghana's inter-regional migration flows. Additionally, the average income per capita for the destination region and the urban population of both regions can be used to explain inter-regional migration flows.

4 Findings and Discussion

The previous section has dealt with the spatial analysis of inter-regional migration in Ghana. By employing population census and household survey data, this paper showed regional disparities of socioeconomic factors, population, urbanization, income and unemployment, and identified the country's inter-regional migration patterns. This paper also conducted a cross-sectional regression using a modified migration gravity model based on this data. The model explains how the gravitational force (i.e., population and distance), income and the urbanization rate affect inter-regional migration flows in Ghana. More than two-thirds of all inter-regional migration between the region of birth and the region of enumeration are explained through the population of the two regions and the distance between them, or in other words, the gravitational force (See Table 2). The population of both the region of birth and enumeration have a positive effect on the size of the migration flow between them. Thus, it can be stated that the more populated both regions are, the more people move from one region to the other. This is visualized in Figures 7 and 8 (See Appendix), as the flows between the higher populated regions make up the majority of all inter-regional migration flows. For instance, inter-regional migration from Ashanti, the most populated region back then, to Greater Accra, the second-most populated region, made up 5.3 % of total migration. Unlike the size of the regions in terms of population, the distance between the two regions reduces the number of people migrated from one region to another. Looking at the most common migration destinations per region of birth, many migration flows occurred between adjacent regions (See Table 1). Also, the largest internal migration flows in the country by the number of migrants were between neighboring regions. Approximately 66 % of all inter-regional migrants who settled to the Greater Accra and 50.5 % of those who had settled to Ashanti were originally from the surrounding regions. This negative relationship between distance and migration size is likely to associate with higher migration costs, as already mentioned in Section 2.2. This

makes settling to another region not beneficial anymore. Additionally, cultural differences and language barriers tracing back to the country's rich diversity can impede long-distance migration (Arthur, 1991). Surprisingly, migration to adjacent regions is not very widespread for the northern regions, as the benefits these migrants would gain from moving there would not outweigh the costs of leaving the region of origin. Instead, migrants from these regions move to regions farther away from the place of origin, such as Brong-Ahafo and Ashanti. However, migration from these regions all the way down to the coastal regions is still seldom. The negative coefficient and high statistical significance of distance, as shown in Section 3.3, prove that migrants are discouraged by migrating longer distances. The average income per capita in the destination region also plays an important factor in explaining Ghana's inter-regional migration. According to the regression results provided in Table 2, a region experiences a higher inflow the more income can be earned on average. Previous findings presented in the literature review confirm these empirical results. It is argued that migrants settle to other regions to earn a higher income, which is used to care for their families back home. Hence, regions where it is expected to earn higher income experience higher inflows. This is seen in the migration patterns. Ashanti, Greater Accra and Western, which have the highest average income per capita, are the most popular destination regions among migrants.

Another variable that has been included in the modified gravity model of migration is the urbanization rate, which gives the region's percentage of the urbanized population. The regression results indicate that the effect of the urbanization rate on migration is different for the region of birth and enumeration. The regression results exhibit a positive relationship for the region of destination and a negative relationship for the region of origin (See Table 2). Thus, it implies that an administrative region with a share of the urban population tends to have a higher inflow and a lower outflow of migrants for a region with a high share of the rural population, respectively. Figures 2 and 4 indicate similarities between net migration and the region's share of urban population. For instance, the rural northern regions, which have urbanization rates between 16 and 30 % of their total population, have all experienced a negative net migration, as they counted more outflows than inflows. In contrast, the four regions with a positive net migration were regions with the highest share of the urban population. Again, the Greater Accra region, the most urbanized region in the country, exhibited the highest net migration. These observations let suggest that the selection of regions with larger urban areas are popular among inter-regional migrants. This is no surprise since rural-urban migration is a common phenomenon (Sulemana et al., 2015). This form of

migration and the subsequent challenge arisen have been addressed by previous researches. There are several studies examining the consequences of the rapid urbanization process and rural-urban migration on the economic, social and environmental aspects of cities (Awumbila et al., 2014; Yankson & Bertrand, 2012; Yankson & Gough, 1999). Uncontrolled migration to larger urban areas has led to the creation and rapid growth of informal settlements around cities characterized by harsh living conditions, lack of basic services and a high share of informal employment (Awumbila et al., 2014). In order to regulate the increase in inter-regional migration to highly urbanized regions and curb the fast-growing urbanization process due to such migration, policies should be adopted addressing both rural and urban development (Awumbila et al., 2014). Urban development policies must include improvements in these informal localities by providing basic services to the inhabitants and guaranteeing at least decent living conditions for these migrants. Furthermore, rural development policies must be in place in the regions where outflows are substantially high, such as the northern regions. Awumbila et al. (2014) calls out for encouraging development in rural areas. (Sulemana et al., 2015) support this recommendation and state that governments need to make substantial investments in these rural regions' agricultural sectors, especially supporting small family farms. They argue that these investments could reduce poverty in these places by increasing income, and thus reduce the push factors driving inter-regional migration in the region of origin. Rural development investments can come in various forms (Sulemana et al., 2015). For one, the process in which small-scale farmers receive credits at an affordable interest rate should be simplified and more widespread. These credits are vital to farmers, as they make them invest in new equipment and produce at a larger scale, generating more household income. Another way to improve the situation in rural regions is to provide educational training in the agricultural sector. Farmers can then apply the gained knowledge in their own farms and make farming more productive. The by far most important solution to addressing regional disparities between the rural and urban regions and reducing inter-regional migration from these regions in the future is the improvement in infrastructure (Sulemana et al., 2015). The construction of new roads, for instance, would reduce travel time between towns and localities drastically, which in turn increases the availability of important services. It would also allow farms to sell their agricultural products to more markets. Moreover, infrastructure investment could lead to the provision of irrigation dams throughout rural areas, which help farms produce crops all year without worrying about drought leading to a bad harvest. New infrastructure projects might also encourage the clustering of new supplement production factories that process agricultural products. Sulemana et al. (2015) contend that the linkage between the

industrial and agricultural sectors in these rural areas in turn creates new promising and higher-paying jobs for young people. All in all, the improvement in infrastructure fosters household welfare in these rural regions. Thus, the importance of both national and local governments should be laid on adopting policies that address push factors in the regions of origin and therefore curb regional disparities.

5 Conclusion

The primary purpose of this paper was to conduct a spatial investigation of the dynamics of inter-regional migration in Ghana. The paper managed to address migration from one region to another by identifying and analyzing the migration patterns in the country. Furthermore, the regional distribution of factors population, urbanization and income were examined. A cross-sectional regression analysis was conducted to determine whether these factors drive the inflow of inter-regional migration. For its empirical part, the paper collected data from two data sources. The data on inter-regional migration flows, population and urbanization rates for all ten administrative regions were drawn from the 2010 Population and Housing Census (PHC). Information on income is based on household survey data conducted in 2012 and 2013.

The theoretical framework contributed to the paper's purpose by introducing the gravity model of migration on which the empirical analysis is based on. Furthermore, it reviewed various research papers dealing with internal migration in Ghana and its determinants to specify the factors migrants and their families take into account when making the decision whether they should migrate or not. Based on the literature review, the regional disparities concerning population, urbanization and income are looked deeper into. In the year the census was conducted, the country's population was distributed unevenly, as the majority of Ghanaians were clustered in the major cities located in the southern regions. In contrast, the northern regions are comparatively less populated and with more than half living in rural localities. These regional disparities are also reflected when looking at each administrative region's average income per capita, indicating that income was unevenly distributed among regions. Income tended to be higher for the more urbanized southern regions. Inter-regional migration was analyzed by considering all people who were not born in the same region as the region they were enumerated during the census was conducted. Inter-regional migration is quite common, as almost a fifth of all Ghanaians by birth are considered inter-regional migrants. Looking at the net migration of each region and the major migration flows, the paper identified some inter-regional migration trends in the country. Net migration reflects the regional

disparities in urbanization rates and average income per capita well. The regions with relatively less urbanized population and lower incomes, especially those in the north of the country, experience a higher outflow of migrants. Conversely, the regions with the highest per capita income and a high urbanization rate are most popular among internal migrants.

To show if income and urbanization actually affect the flow of inter-regional migration between the region of origin and the region of enumeration, this paper extended the gravity model of migration by including the urbanization rate and the average annual income per capita for both regions. The gravitational component of the model explains more than two-third of inter-regional migration flows between regions. The regression results confirm that the flow of migrants from one region to another is negatively associated with the distance between these two regions, traced back to higher migration costs that come about with a longer distance. The average income per capita in the destination region has a positive impact on its inflow of migrants, while the effect on income in the region of origin has no statistically significant effect on inter-regional migration. The effect of urbanization is different for the region of origin and destination region. For the region of origin, an increase in the rate of urbanization by 1 % decreases the outflow of inter-regional migration by 1.105 %. On the other hand, the urbanization rate in the region of enumeration fosters migration, as an increase in the urbanization rate by 1 % leads to an increase of 0.966 %. The empirical results prove that the average income earned and the degree of urbanization in the destination region drive inter-regional migration, as these factors pull migrants from other regions. In contrast, the distance between two regions and the degree of urbanization in the birth region have adverse effects on the size of migration flows.

Nonetheless, it is crucial to take these empirical results with caution due to the simplicity of this analysis and the limitations caused by the used population census and household survey data. Furthermore, more external variables, such as education, unemployment or the poverty level of each administrative region, could be addressed in the model. To conclude this paper, it can be stated that internal migration in developing countries is a matter of great importance and high topicality, but still a rather understudied field.

References

Ackah, C., & Medvedev, D. (2012). Internal migration in Ghana: Determinants and welfare impacts. International Journal of Social Economics.

Adaawen, S. A., & Owusu, B. (2013). North-South Migration and Remittances in Ghana. African Review of Economics and Finance, 5(1), 29-45.

Alagidede, P., Baah-Boateng, W., & Nketiah-Amponsah, E. (2013). The Ghanaian economy: an overview. Ghanaian Journal of Economics, 1(1), 4-34.

Arthur, J. A. (1991). Interregional migration of labor in Ghana, West Africa: Determinants, consequences and policy intervention. The Review of Black political economy, 20(2), 89-103.

Awumbila, M., Owusu, G., & Teye, J. K. (2014). Can rural-urban migration into slums reduce poverty? Evidence from Ghana.

De Brauw, A., Mueller, V., & Lee, H. L. (2014). The role of rural–urban migration in the structural transformation of Sub-Saharan Africa. World Development, 63, 33-42.

Ghana Statistical Service. (2013). 2010 Population & Housing Census: National analytical report. Ghana Statistical Service. https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/2010_PHC_National_Analytical_Report.pdf

Ghana Statistical Service. (2014a). 2010 Population and Housing Census Report: Migration in Ghana. Ghana Statistical Service. https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/Migration%20in%20Ghana.pdf

Ghana Statistical Service. (2014b). Ghana Living Standards Survey: Report of the Sixth Round 2012-2013. Ghana Statistical Service. https://www.statsghana.gov.gh/gssmain/fileUpload/Living%20conditions/GLSS6_Main%20Report.pdf

Greenwood, M. J., & Hunt, G. L. (2003). The early history of migration research. International Regional Science Review, 26(1), 3-37.

Lewer, J. J., & Van den Berg, H. (2008). A gravity model of immigration. Economics letters, 99(1), 164-167.

Molini, V., & Paci, P. (2015). Poverty reduction in Ghana—Progress and challenges.

Molini, V., Pavelesku, D., & Ranzani, M. (2016). Should I stay or should I go? Internal migration and household welfare in Ghana. Internal Migration and Household Welfare in Ghana (July 20, 2016). World Bank Policy Research Working Paper(7752).

Poot, J., Alimi, O., Cameron, M. P., & Maré, D. C. (2016). The gravity model of migration: the successful comeback of an ageing superstar in regional science. Available at SSRN 2864830.

Ramos, R. (2016). Gravity models: a tool for migration analysis. IZA World of Labor.

Saghir, J., & Santoro, J. (2018). Urbanization in Sub-Saharan Africa. Meeting Challenges by Bridging Stakeholders. Washington, DC, USA: Center for Strategic & International Studies,

Sulemana, M., Ngah, I. B., & Majid, M. R. (2015). Rural-Urban Migration in Ghana: A Menace or Blessing? Current Politics and Economics of Africa, 8(4), 597-616.

The World Bank Group. (2020a). GDP growth (annual %) – Ghana https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=GH

The World Bank Group. (2020b). GDP per capita (current US $) – Ghana https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=GH&name_desc=false

The World Bank Group. (2020c). Urban population growth (annual %) – Sub-Saharan Africa. https://data.worldbank.org/indicator/SP.URB.GROW?locations=ZG

Todaro, M. P. (1980). Internal migration in developing countries: a survey. In Population and economic change in developing countries (pp. 361-402). University of Chicago Press.

Todaro, M. P. (1997). Urbanization, unemployment and migration in Africa: Theory and policy.

United Nations Conference on Trade & Development. (2018). Economic Development in Africa Report 2018: Migration for Structural Transformation. In. New York, NY: United Nations.

United Nations Department of Economic and Social Affairs, P. D. (2019a). Probabilistic Population Projections. In. New York, NY: United Nations.

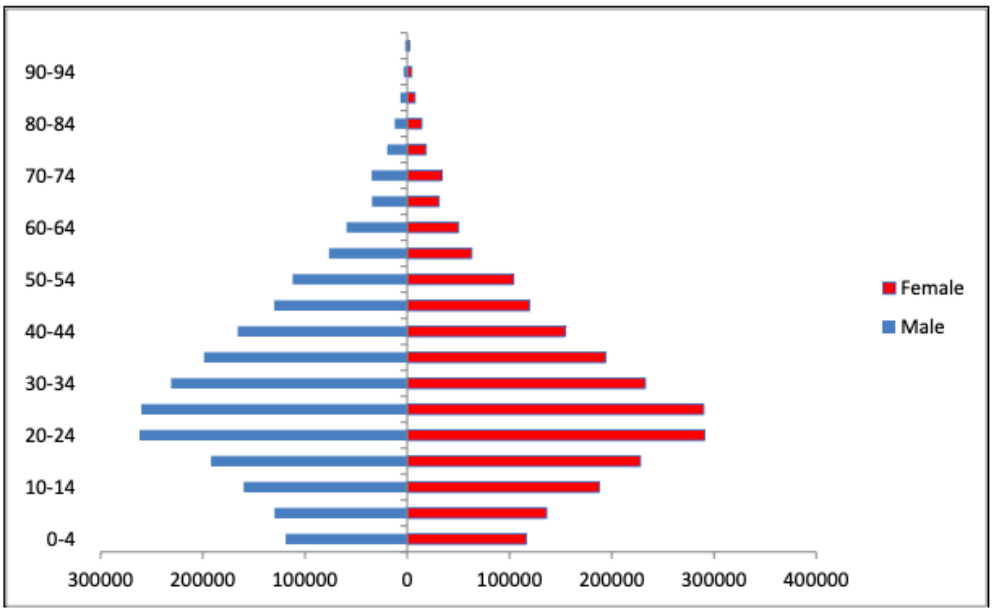
United Nations Department of Economic and Social Affairs, P. D. (2019b). World Population Prospects 2019. New York, NY: United Nations Retrieved from https://population.un.org/wpp/Download/Standard/Population/

Yankson, P. W. K., & Bertrand, M. (2012). Challenges of urbanization in Ghana. In E. Ardayfio-Schandorf, P. W. K. Yankson, & M. Bertrand (Eds.), The mobile city of Accra: Urban Families, Housing and ResidentialPractices. Council for the Development of Social Science Research in Africa.

Yankson, P. W. K., & Gough, K. V. (1999). The environmental impact of rapid urbanization in the peri-urban area of Accra, Ghana. Geografisk Tidsskrift-Danish Journal of Geography, 99(1), 89-100.

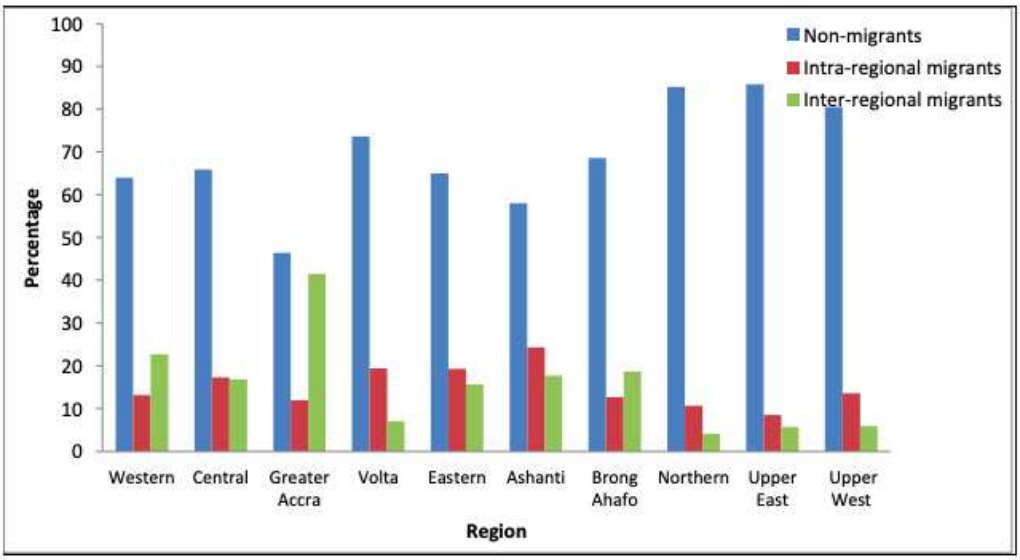
Appendix

Figure 5: Population pyramid for inter-regional migrants



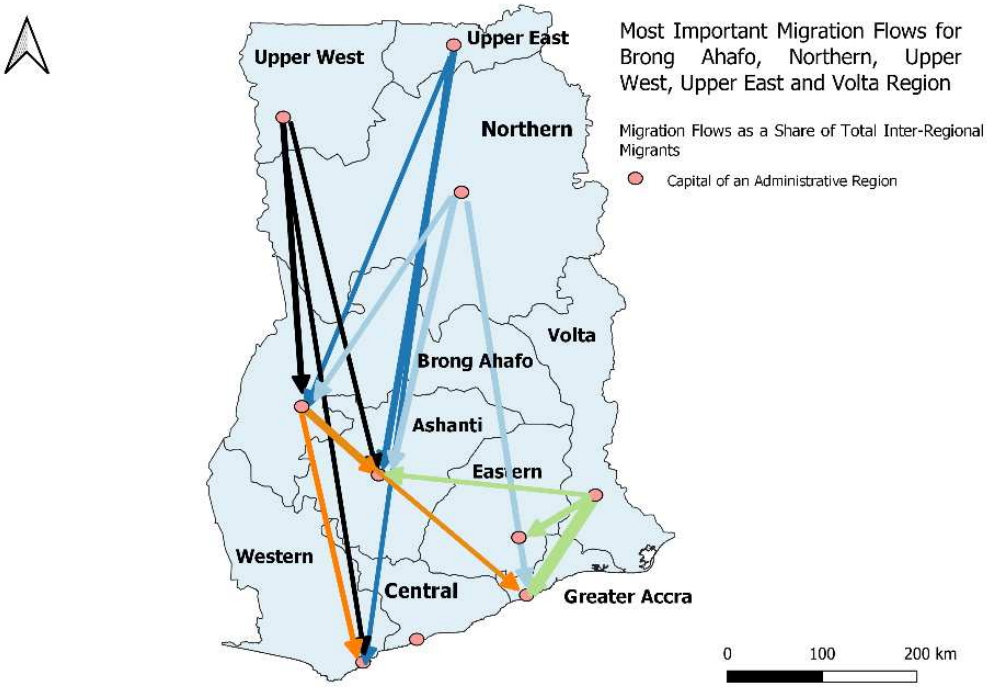
Source: Ghana Statistical Service (2014a, p. 27)

Figure 6: Migration status by region of residence



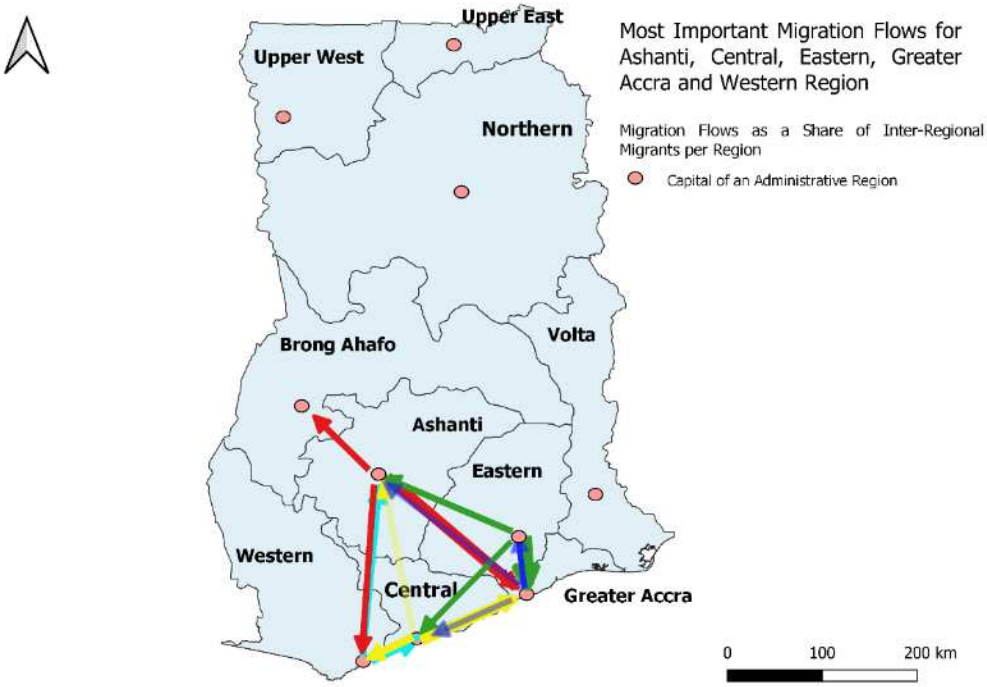
Source: Ghana Statistical Service (2014a, p. 30)

Figure 7: Most important migration flows for Brong Ahafo, Northern, Upper West, Upper East and Volta regions



Source: Own Figure based on 2010 Population and Housing Census

Figure 8: Most Important Migration Flows for Ashanti, Central, Eastern, Greater Accra and Western regions



Source: Own Figure based on 2010 Population and Housing Census