DETERMINING FACTORS OF HOUSING PRICE IN GHANA, THE CASE OF KUMASI

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DECLARATION

I hereby declare that this work is done by myself and submitted towards the attainment of M.Sc. Economics. It contains no material done previously or published by another person nor material which has been accepted for the acknowledgement of an award of any other degree or professional certificate of an Institute, College or University, except where due, recognition has been made in the text.

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DEDICATION

This body of knowledge is dedicated to my late mother, Madam Victoria Mensah, she was my pillar and a woman who is not to be forgotten in my upbringing, and may her soul rest in peace.

ABSTRACT

The study examines the determinants of housing prices in Ghana, with a specific case study of housing prices in Kumasi. Specifically, the study analyzes the characteristics of various housing types, their relations with housing prices, and the effect of housing characteristics on demand and supply of occupied dwelling units in Kumasi Metropolis. In addition, it identifies the extent to which inadequate housing attributes or characteristics results in social, health, and economic issues.

The Hedonic model is used to identify which characteristics of housing is the most significant at each point in time and strongly determines housing price. The study establishes with a graph how inadequate housing attributes pose a challenge to households' health and social behaviour, and in addition financially puts a burden on both households and the public at large.

The study recommends among others that policy makers and housing developers should gear their attention to building low cost housing with the adequate and necessary housing attributes. The main construction material is cement and concrete which increases the price of housing as developers increase the characteristics of housing; it is recommended that other quality construction materials are used. It further recommends that policy makers on housing should focus on pursuing various affordable housing programmes and place more importance on housing characteristics or attributes to raise utility for certain attributes. It is recommended that the hedonic model be used by housing policy makers to access household willingness for some characteristics of housing which will reflect the real price they pay.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

From GSS (2010), Ashanti region is currently the most populous region and has the highest proportion of houses. The average household size of the metropolis is 3.9 indicating more pressure on housing. Critically analyzing the demand for housing by households, households will rent or demand for dwelling units with some internal characteristics or attributes, like number of sleeping rooms, number of cooking space, available toilet and bathroom facility. Similarly the demand for houses will depend on the number of rooms an occupied dwelling unit comprises, neatness of the building, building materials used in finishing of the house, room and apartment, the availability of pipe borne water, a borehole, a tank or water reservoir, available separate meter and how private the apartment is from others.

The study identifies the availability of housing characteristics found among the types of occupied dwelling units in Kumasi which has a total of 520,234 dwelling units of which the main types are separate house (15.7%), semi-detached (9.1%), flat or apartment (12.4%) and compound house (55.2%). GSS 2010 report indicates that the main construction material are cement blocks or concrete (57.5%) utilised purposely for the fence of housing structures, followed with the use of mud bricks or earth (34.2%) and these influence cost of housing. The use of costly materials in the building and completion of dwelling units causes regional differences in housing prices and dwelling units. There are factors and characteristics of housing that determine housing prices and lack of such essential attributes can result in the disequilibrium in the demand for housing characteristics and supply of housing stock in the metropolis which gradually results in socio-economic and health effects. The hedonic model is

used to analyze the impact of demand and supply of housing attributes on housing stock or occupied housing units.

1.2 Problem statement

The development of housing is made without much emphasis on its attributes. In Ghana housing developers ignore the locational and environmental factors and concentrate much on structural attributes to arrive at housing price. Also much consideration is not given to the characteristics that come together to arrive at the nominal price of housing by both policy makers and housing developers. In Kumasi houses are put up to meet the growing population but the features of the house go unidentified which affects the value. This goes a long way to create disasters where government would have to come in to spend much to support the situation.

GSS 2010 report stated how the inadequate numbers of sleeping rooms with necessary characteristics is a major concern and has health and economic implications. Inadequate housing characteristics in Kumasi such as sleeping rooms can be related to the spread of communicable diseases and incestuous sexual behavior in the Kumasi metropolis. There is the need for much attention by every government that is in power and housing policy makers to provide better low cost housing for people in the Metropolis in order to reduce the overcrowding problem or pressure resulting from the high use of housing types such as compound houses. According to GSS, metal sheets are used for roofing of housing whiles cement blocks or concrete are construction materials of housing units. Due to its considerable quality, majority of fenced walls are constructed with cement and most floors of housing units are laid with concrete or cement materials. These materials currently are costly and determine the nominal price of housing through the attributes housing possesses. Most housing developers due to low cost reduce the quality of building materials and unaware of some necessary

characteristics, reduce the quality of occupied housing unit, making housing units unable to withstand torrential rains and other storms. These then render such poorly constructed housing units or dwellings not habitable, and compel households and affected ones to call for help which involves high public expenditures. Building developers, who use inferior construction materials, complain because of the expensive cost of building materials that is cement or concrete. According to GSS, it will be necessary for government and other housing developers to research on the rising cost of construction materials and to engage findings in the use of substitute materials such as earth and bricks made of mud.

Form GSS 2010 report about one-third of households in housing units resort to toilet facilities for the community. Close to two percent have limited or no access to good toilet facility, and therefore resort to unqualified areas or bush. The increasing trend in urbanization found in Kumasi metropolis, has resulted in households, using public toilets and without public toilets defecating indiscriminately in areas such as the bush and elsewhere which is unhygienic. There is therefore the need to identify such important characteristics and draw the attention of policy makers and housing developers to include in their planning. Also solid waste management is very challenging because a considerable proportion of households dump solid waste indiscriminately which is extremely unhygienic. The reason for this is that; it has a wider multiple effects on public health and for the environment.

According to BoG (2007) report, the total amount of housing structures from 2000 report compared with the number of households indicated overcrowding in most of the housing types. Ashanti region estimated the highest percentage of housing units (15.1%) and a corresponding high growth of population. There is therefore the need to build more affordable housing units to meet the ever increasing demand. The provision of low-income housing units with necessary housing characteristics was one of the aims of the First Medium-Term Development Plan of

Ghana's Vision 2020, 1997–2000. The housing units to be provided will be affordable and within the reach or purview of the poor to cause an improvement in their living or habitable conditions. Ministry of Water Resources, Works and Housing is presently targeting numerous affordable housing planning and programmes. This is done with the help of agencies such as the State Housing Company (SHC). Under National Housing Programme, apartments and housing units such as flats are currently being constructed in some areas of Accra, Tema, Tamale, Sekondi-Takoradi and Cape coast. Also the Ministry of Water Resources Works and Housing is currently pursuing various affordable housing programmes by adopting housing policies through agencies such as the Tema Development Company (TDC), and the State Housing Company (SHC).

There is the need for adequate planning of essential and necessary characteristics which can contribute to the development of housing units. Consideration should be placed on housing characteristics that are preferred by the populace at a particular location or geographical area and materials to be used should be made affordable and available to reduce the impact on prices. According to BoG (2007) there are determining variables or factors of housing prices which can be broadly identified as internal and external. But policy makers lack the main problem to identify which of the factors, that is either internal or external attributes affect the housing prices.

The reason for the study is to investigate housing attributes or features of occupied dwelling units; its effect on housing prices relative to Kumasi's housing market or the geographical location and the housing type of such dwelling units. Whether there is the need to pay much attention and investigate the relationship between housing characteristics and occupied dwelling units. The research is essential due to the fact that there has been only limited research into such issues and data used from the district can be applied to other districts in the Ashanti

region. Such research study on housing characteristics remain unnoticed and understudied', it is therefore important to understand these structural characteristics.

This will serve as a guide and help in the formulation of housing policies, and necessary interventions aimed at helping the housing industry. The research study will investigate the socio-economic and health issues that emanate from types of dwelling units with different attributes. Social vices and teenage pregnancy a result of overcrowding in dwelling units and indecent behavior, health problems from overcrowding in sleeping rooms, using of the same cooking space and same toilet and bath facility. Economic issues as a result of financial burden on government and individuals finances when disasters occur from bad buildings or deterioration of buildings.

1.3 Research objectives

The main objective of the study has to with identifying major attributes of occupied dwelling units influencing housing prices in Kumasi Metropolis. Specifically, the study will:

i. Analyze the characteristics or attributes of various housing types and examine the relationship between housing characteristics and housing prices

ii. Determine the impact of housing attributes or characteristics on demand and supply of occupied dwelling units in Kumasi metropolis

iii. Find the extent to which lack of such housing attributes results in social, health and economic issues.

1.4 Methodology

Hedonic pricing model is used in the study which adopts cross-sectional design as a research approach. Cross-sectional data are data on several variables gathered at the same point in time. The study will rely on secondary sources from GSS data on district analytical report.

The units of analysis are housing units located in Kumasi which is categorized under three major residential classes, first class residential, second and third class residential housing and suburbs within the metropolis.

The hedonic pricing model will primarily utilize data gathered per the attributes from housing units. It classifies attributes into locational, structural and environmental factors. This is because housing units need to be decomposed into its corresponding characteristics to know the contribution of each attribute to market value of housing units. Particularly attributes such as the number of occupied rooms, toilet and bath facility, cooking space, property location; material for outer wall or fence; and material for construction of building will be used. The data for the housing characteristics will be regressed against the nominal housing prices gathered from the data through the use of OLS holding other determining factors constant. Ordinary Least Square (OLS) method and bar graph will be used to show the effect of housing attributes or characteristics on socio-economic and health situations in Kumasi metropolis such as, overcrowding, social vices, broken homes, vulnerability to fire outbreak and other effects. This will be done through secondary data gathered from the GHS 2010 report and street children report, and the data will be estimated with the use of OLS.

1.5 Scope of study

The study investigates the factors determining housing prices, the characteristics of housing or occupied dwelling units in Kumasi metropolis in relation to predominant materials used in construction of housing and the impact of these factors and characteristics on socio-economic situations in the metropolis.

The research will mainly focus on aspects of both internal and external factors like high demand for attributes, predominant materials for building dwelling units in the metropolis, availability

of land, location, income and other factors, determining price of dwelling units that is the most volatile variable and less volatile variable in relation to shocks in the economy.

1.6 Significance of study

The study will help policy makers to achieve the purpose of the National Housing Policy, NHP launched in Accra (March, 2015) and also establish the relationship that exists between housing characteristics and price of dwelling units. The study will also guide housing developers since housing is a composite and heterogeneous commodity, identifying the relationships that exist between occupied dwelling units, physical and locational housing attributes, amenities and other features. It will provide important information to sellers and buyers of housing, and planning authorities. The environment and neighborhood amenities affect the housing market through several macro-economic variables and spatial characteristics of community structure. The study will also serve as a guide to the housing market in developing both internal and external factors that determine price of occupied housing.

1.7 Organization of the study

The research work is organized into five chapters. Chapter Two discusses empirical and theoretical literature relevant to the study. Chapter Three discusses the methodology of the study, a brief information and background of the study area which included the history, physical and demographic characteristics and the housing situation in the Kumasi Metropolis. Chapter Four presents and analysis the data collected from the various sources involved in the study. Chapter Five presents a summary of findings, recommendations and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter involves the discussion of theoretical and empirical literature significant to the study.

2.2 Theoretical literature

Housing is postulated as a heterogeneous and composite good or commodity. There are several macro-economic variables, spatial and environmental differences, attributes of housing, community features or structural units, and community amenities that influence housing market (Kim and Park, 2005). It is established through studies that housing attributes or characteristics influence socially the well-being of the individual or household positively or negatively. A research done by Zandt, McCarthy, and Rohe (2001), establishes why individuals with satisfactory homes and community are effective and productive at work. Standard theories of Keynesian, neoclassical, and subsequent modern theorists regard any form of wealth as owning a house. According to the neoclassical or modern theories, just like any other form of wealth, housing wealth will drive consumption. Therefore as utility increase for the consumption of housing so as the increase in maximizing consumption and wealth. The provision of adequate housing is essential, necessary and involves the integral part of the needs of every society and has enormous impact and value for households, individuals, communities, families, and society at large (Opoku and Abdul-Muhmin, 2009).

It is identified that construction cost of new housing units also play a vital role in determining housing values (Jacobsen et al., 2005). Roland and Adam (2009) attest to the fact that construction costs include the nominal price of building materials. The higher financial cost of construction will decrease construction of housing stock and affect its attributes. Karol (2009) studied the transmission and channel of construction cost in buildings found in the Swiss house. He stresses that the result of an increase in construction or building costs will cause housing

prices to appreciate. This then reveals the strong idea and will power of estate or housing developers in transferring the burden of construction costs onto buyers.

Construction cost is a flexible factor, which has strong positive influence on housing prices. There are other factors that determine housing prices, and such are commonly investigated, as housing quality and demographic factors. Demographic factors are identified to be important and a contributing factor in determinants of housing prices (Holly,1997; Girouard et al.,2006; Égert, 2007).

There is a relationship that exists between housing type and its characteristics as revealed from a study by Lancaster (1966). Lancaster discussed the utility-bearing characteristics of a good or commodity, and a further extension of the study work which included a market between buyers and sellers to obtain an understanding of equilibrium-implicit prices of the housing characteristics was done by Rosen (1974).

2.3 Empirical literature

Rosen's approach has been predominant in the housing sector often used in most housing demand literature. The relationship that coexists between housing characteristics or attributes and the housing type can be represented as:

$$H = H\,(z_1, z_2, .., z_i) \qquad (1)$$

Where H represents housing types and z represents various housing attributes. In line with literature, it is assumed that housing price is a function of the attributes of the house. The more utility-bearing attributes a house offers, the more consumers are willing to pay for the house. Hedonic price analysis of the housing market assumes a relationship between attributes of the housing unit and price of the housing unit. If a well-specified function is used, it is possible to

attain the influence of housing attributes on the price of a particular housing type. The hedonic function though is a preferred one has its challenge in the selection of a well-chosen or appropriate functional form (Dubin and Sung 1990).

UN recommended definition of housing is "a structurally separate and independent place of abode such that a person or group of persons can isolate themselves from the hazards of climate such as storms and the sun''. The explanation, include any type of housing, such as separate houses, semi-detached houses, flats/apartments, compound houses. Separate housing is separate living quarters that define a housing unit as those where households live and eat separately from other households in the same structure or building and have direct access to the house from an exterior common hallway, a semi-detached house is a house with two units sharing a common fence wall, often each house's layout is a mirror image of the other. A compound house is a single or multi-storey structure with suites of occupied single rooms that can be accessed from an unroofed square or rectangular courtyard (Awanyo, 2009). Normally a staircase is provided in the courtyard to give access to the unit on the top or upper floor in a multi-storey compound house. Most compound house in Ghana is a one-storey structure with a square or rectangular open courtyard surrounded by a series of single units (Sinai, 2001; Korboe, 1992). Apart from occupation of the unit, every facility such toilet, kitchen, solid and liquid disposal is shared by all households in the housing. In Ghana a type of residential estate or a self-contained housing unit that occupies only part of a building is a flat or apartment is (GREDA).

The study explains the variables and housing types in determining price of housing in the Kumasi Metropolis, identifying which housing characteristics strongly has an impact and effectively relates with housing prices. The effect of housing characteristics on demand and supply of housing for dwelling in Kumasi Metropolis and to find the extent to which imbalance

in the demand and supply of housing characteristics has multiple effects on social, economic and health problems, such as marriage, broken homes and the rest. This is to help estimate and establish the magnitude, direction, relationship and influence of housing attributes on estate or housing prices.

2.3.1 Determinants of housing prices

From BoG (2007), Internal determining factors can be on the demand side while external determining factors can be traced to the supply side. The internal demand factors determining housing prices include number of sleeping rooms, number of cooking space, toilet and bathroom facility, materials used in construction of outer walls, floors, ceiling and other recognized features. Traditionally the external determining factors which determines demand for housing is residential location of housing, closeness of apartment to any central business district, type of road to the housing unit or estate in question. Other factors are availability of some essential amenities like hospital, clinic or a police station or post office, income of the individual and choice.

In another dimension internal factors that determine the supply of housing inadequately can create shortage, which affects housing prices. Variables of the internal determining factors on the supply side of housing include land acquisition, regulatory frameworks such as building permit, and cost of building materials. Variables of external determining factors on the supply side are macroeconomic variables affecting housing price. The relationship between income, GDP, and the housing market has been examined in the literature, Iacoviello and Neri (2008). They examined the response of GDP to housing market fluctuations. Mikhed and Zemcik (2009) concluded on their findings that in advanced countries like USA a decline in housing prices affected negatively consumption and GDP. Füss and Adams (2010) identified that GDP growth has an increasing influence on the housing market, housing value or price. Such

macroeconomic factors can be taxes, interest rate on loan acquisition, inflation, employment and demographic, which can affect prices.

2.3.2 Determining characteristics of different occupied housing units in Kumasi

GSS (2010 census) indicates the total number of occupied dwelling units were 1,126,205 of which Kumasi has a predominant occupied dwelling unit types that include separate housing, semi-detached housing, flat or apartment and compound housing. These housing types are classified under mainly three residential classes. The different housing types possess different attributes or characteristics that determine their real pricing. The occupied dwelling units also negatively or positively relate with housing prices. The housing stock of Kumasi comprises of separate housing (15.7%), semi-detached house (9.1%), flat or apartment(12.4%), compound house rooms (55.2), buildings on same compound (0.6%), huts or buildings on different compound (0.2%), tent (0.2%), improvised home such as kiosk or container (2.9%), living quarters attached to office, shop or similar structure(0.5%), uncompleted building (3.0%) and other housing unit (0.2%).

These housing types have attributes which determine occupied dwelling unit price, such as construction materials for outer wall (wood, concrete or cement blocks, earth or mud brick, metal sheet or slate and asbestos, stone, burnt bricks. Others include bamboo/palm leaf or thatch, raffia or grass, land Crete, and other materials), floor materials (cement or concrete, earth or mud, stone, burnt brick, wood, ceramic or porcelain or granite or marble or tiles, vinyl tiles or terrazzo tiles and other tiles). There are also material for roofing (cement or concrete, mud or mud bricks or earth, wood, metal sheet, slate or asbestos, bamboo, thatch or palm leaf or raffia roofing tile, and other materials).

Number of occupied rooms (one to nine rooms), cooking space (a separate room for private use of household, separate room shared with other households, no cooking space) is also important. In addition, structure without walls and roofing, enclosure without roof, hall/living room or bedroom, verandah, open space in compound and other spaces for cooking), bathing (own bathroom for exclusive, private open cubicle, sharing separate bathroom in same house, also count. Finally, bathroom in another compound or house, open space around, river, stream, lake or dam, available toilet facility, liquid and solid waste disposal and sources of drinking water are necessary (see GSS, 2010).

2.4 Internal and external demand – supply factors determining housing price.

The determinants of housing prices in nominal terms can be categorised under many factors. Wilhelmsson (2000) realises four major factors that can have an impact on demand for housing units and its price. Namely it involves the location or neighbourhood amenities relative to the housing unit, its structural attributes, the environmental factors and macroeconomic factors example inflation and interest rate. However, for microeconomic study and individual analysis the research will adopt internal procedures and determinants. It will then concentrate on individual choices on demand for housing rather than the supply of housing in a macroeconomic study. The independent determining factors are limited to structural characteristics of the housing unit, accessibility and location in terms quality neighborhood (Bowen et al., 2001).

GREDA (2007) analysed two major findings relative to, housing conditions and the underlying causes of the continuous rise in housing values. Critically analyzing, findings from the research work showed that, cost of construction materials and land acquisition are the major forces influencing the continuous increase in housing prices. The study made additional concern, where remittances play an important role in the housing market. Funds are transferred from

most non-resident Ghanaians either directly or indirectly purposely for building or purchasing a house. The study identified some favorable economic conditions, that is domestic and international which has direct impact on the housing market through interest rate movements. But these are macroeconomic factors and external factors which not need to be considered much when it comes to the microeconomic variables affecting price of housing.

Though there are disagreements that exist on the direction and magnitude of influence, strength and weakness on how some selected housing characteristics have an effect on housing prices. Quite a number of housing attributes are derived internally, constantly and ordinarily accepted in the review of literature. Such include the locational characteristics and accessibility of the community; the physical characteristics (availability and presence of bathrooms, available toilet facilities, number of bedrooms and sitting rooms, size of compound. Others include age of building, type of building material, distance to CBD, other social amenities, like hospitals and clinics, school, market, entertaining source, broker fees also as agent fee and others). Finance for housing has been a major challenge over the years with one of the main reasons being the large capital that is needed to either purchase or rent a house. Financing has been described as the core of the housing dilemma and it permeates all levels of income groupings (Robinson, 1976). Zhang (2000) indicates that "the way houses are built reflects the way they are financed because the methods of financing determine the modes of construction". Housing is therefore found to depend on the structure and financial mechanisms put in place (Zhang, 2000).

Cost of building materials is so high that natives of Kumasi prefer renting to save some income. If one wants to build a two bedroom apartment with all attributes like kitchen, toilet and bath and other facilities, it involves a lot, household will prefer to rent apartment with such facilities since acquiring land to even start construction is costly and expensive. This is the reason why

there is so much demand and pressure on the few apartments available causing rising prices of housing. Therefore increase in demand too is a determining factor of price of housing.

The issue of location has been a consensus among estate developers and valuers where location of housing unit is an important factor in the estimation of its market value (McCluskey et al., 2000). The significant role that location plays is clear from facts gathered that, location physically identifies a special estate or housing property and thence defines its distance from some features such as commercial, leisure and transport facilities. This then raises the concern of closeness to Central Business District. Sirmans et al. (2005) identified that the age of housing influences the price of the estate mostly in the opposite direction. It is so because as the age of a housing units increases, the market value of the estate diminishes which causes the satisfaction that is attained from the property to decrease. He also raises the concern of the presence of rooms such as public rooms, bedroom and bathrooms, which strongly affect housing price in a positive direction. It then signifies that the housing price changes as the quality and number of rooms' changes.

2.5 Effects of housing attributes on socio-economic and health issues

There is a growth rate of 2.7 percent per annum (GSS, 2010) showing an increase in population of the urban (urbanization). The increase is from about 1.85 million in 2000 to about 2.89 million in 2010, showing that Kumasi Metropolis is the most urbanized district in the region. Increase in urbanization puts so much pressure on housing amenities and the demand for housing.

2.5.1 Social and health issues

Data from GSS, 2010 population census indicated percentage of households in occupied housing units in Ashanti region that use public toilets (43.3 percent), and no toilet facility (6.3 percent). The problem is that it can cause health issues in the region since the mass usage by

both men and women breed health related diseases like staphylococcus, streptococcus, shigella and E. coli bacteria, hepatitis A virus and the common cold virus. Close to one-fifth (20.6%) of households in the country are in the Ashanti Region and that the average household size in 2010 is 4.2 persons, indicating how still there is an overcrowding in our rooms (GSS, 2010).

NPC (2013) indicates there are health problems due to lack of adequate ventilation, also teenagers are attracted to conversations and sexual relationships that go on by their parents or guardians which results in teenage pregnancy. The report states teenage pregnancy cases in 2013, recorded 67 deaths as a result of teenage pregnancy. Also teenagers sleep around due to lack of rooms to sleep in, resulting in social vices and other deviant behaviours. This goes a long way in creating high arm robbery cases and high HIV cases in future for the metropolis and a treat to development. Inadequate sleeping rooms also create easily communicable or airborne diseases such as TB which result in deaths.

2.5.2 Economic issues

The use of inferior materials for constructing houses also causes financial and social burden in case of unfavorable weather conditions and fire outbreak. From GSS report (2010 housing census) material for the construction of housing units in Kumasi that are gradually gaining massive acceptance is cement blocks/concrete used for construction of outer fence walls and pavement of floors, and metal sheets for the construction of roofing. They are indications of upgrading in the structural quality of housing units. It is a way of strengthening the housing units to be able to stand heavy rains and other form of storms that can cause poorly constructed housing units not habitable. This then compel households and inhabitants to call for help from government and other organisations which entail an increase in public expenditures. People in the rural areas complain of high cost building materials thereby using inferior building materials. It is necessary to identify rising cost of some construction materials and then find

substitutes of such materials and use them, materials like bricks made of earth. Development of housing invites growth in new jobs in a community, area, suburb, township, city, district or metropolis and causes the movement of new workers with their family, and creates adequate market for produced goods, which boosts employment. As there is growth in the employment sector the income population affects the community in various ways including demand for more housing, construction services, and health care services, educational and recreational services.

Traditional compound housing type is gradually fading; it is now hardly being built though 55 percent of people in urban areas in Ghana occupy rooms in compound housing type whiles 24 percent occupy other forms of multi-occupied residential buildings. A lot of housing in the urban areas of Ghana is built in cement blocks with asbestos sheet, long span sheets and corrugated metal sheets for roofing. The informal housing type in Ghana is about 90 per cent, that is it is built without the control of local authorities such as City engineers' authorization, Town and Country planning and building permit from the local district or assembly. During the growth of cities, there is considerable extension or expansion in the central areas, adding new rooms to existing houses.

2.6 Significance of the use of hedonic model in housing characteristics

The marginal willingness to pay for delineated spatial amenities is estimated with the widely accepted model the hedonic pricing model. Hedonic model is a way of estimating demand or value. Hedonic model disintegrates an object under study into its corresponding

characteristics, after which it attains estimates of the corresponding value of each attribute of the object. Hedonic price model identifies that price of housing reflects its characteristics valued by some implicit or shadow prices. It is identified empirically through works that; the implicit prices of housing characteristics are coefficients that correlate values and attributes in

a model regressed. This study adopts the linear form of hedonic to analyze the effects of housing attributes on pricing. The model has assumptions in which, product prices are regressed on their attributes to reveal household ‟ willingness-to-pay for a marginal change in a persistent characteristic of a differentiated product" (MWTP).

For an estimation to be conducted on the housing types, the hedonic model will have to be the choice. The various housing types consist of separate houses, semi-detached house, flat of apartments, Compound Housing, housing on same compound, housing units on different compound. The various types of dwellings will be grouped into residential classes. From the United Nations Human Settlements Programme (UN-HABITAT), 2011 report clearly states that there are numerous housing types, which includes single-family house or hut, a flat of apartments (self-contained); compound house; several buildings on the same compound; several buildings on different compound.

Hedonic model will show whether significantly housing prices is influenced by the locational factor of suburbs within the first class residential areas which is characterized with quiet environment and various accessible amenities. They are also very close to the Central Business District, making access to transport very easy to the CBD. Crime and theft rate in such residential areas is often low compared to other suburbs within the region. Some of the housing types in such residential areas are single family detached. The occupants of those areas are often dominated by politicians, high public service officials, the rich and the elites in society (Kumasi Lands Commission, 2010).

The second class and third class residential areas are dominated and characterized by a combination of residential estates like semi-detached, flat, and multi-family housing usually known to be traditional compound houses in Ghana. Compound housing type located, is typically of two-storeys with 10 to 15 bedrooms and basic amenities like schools, hospitals are

easily available and accessible. It is realised that the residential areas in the third class are often packed, overcrowded and not quiet environment. Comparing crime statistics in the second and third class residential areas it is more in the third class towns. All the classes of residential areas have housing types such as compound houses, separate houses, flats or apartments and semi-detached houses, housing units on same compound, housing units on different compound and other type of buildings. Hedonic model will be used to estimate the effects of these housing types on determining housing price and how the rate of urbanization influence the demand for dwelling units.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents a detailed understanding into the procedures that were applied in the study. It carefully adopts the hedonic model as the study design and method for the research and the reasons for adopting such a method in the research. It also adopts Ordinary Least Square, OLS in estimating for the impact of housing characteristics on social, economic and health life of households. It explains the procedures that were used in collecting and analyzing the data for the study.

3.2 Research design

Research design controls the entire research project. It turns the research into a testable project which is seen as the logical sequence that links the empirical data to the research problem and ultimately the conclusion. The study adopted a cross-sectional design, which involves the observation of the whole population or a subset of the population used as a representative at a specific point in time. Data is collected in order to make inferences about the population of interest at a particular time or period. This design is used to take snapshots of the population

about which data is gathered from the GSS report (2010 Census) thereby generalisations of findings can be made. The study looked at determinants of housing prices in nominal terms.

3.3 Data source

From the research study, data collection relied on included the secondary data sources. The secondary data sources included data from GSS (2010 Population Census) and other secondary data taken from BoG housing report (November, 2007) and GREDA(field survey report march, 2007) and other sources, thus data already in existence and has been collected already for other similar purposes. This involves a review of the important reports and documents from literature which is related to determining characteristics and attributes of housing price. These included research materials, journals, government and private development plans and other documents on housing development, housing systems and the housing market.

3.4 Profile of study area

Presently in Ghana, Kumasi is said to be the second largest city. Kumasi is an administrative and political capital city of the Ashanti Region. Lots of trades, commercial, economic and social activities in the northern sector of Ghana are carried out in the city. From GSS, 2010 housing census housing market type in Kumasi is characterized by renting similar to what pertains in other cities. The market for housing in Kumasi is grouped residentially under three major classes according to the Town and Country Planning Department, namely; first, second and third class residential.

Table 1.0 Residential class in Kumasi

First class residential

Category	Number of suburbs
A	**5**
B	**8**
C	**5**

Source: Kumasi Lands Commission

Second class residential

Category	Number of suburbs
A	**45**
B	**n/a**
C	**n/a**

Source: Kumasi Lands Commission

Third class residential

Category	Number of suburbs
A	43
B	**n/a**
C	**n/a**

Source: Kumasi Lands Commission

Areas in the first residential class are sub-categorized into three. The first class residential areas have suburbs that are usually characterized with necessary amenities and have accessible factors that make living conducive. They are very close to the Central Business District, Adum and Kejetia, which makes it very easy for vehicular and pedestrians to get access to the CBD. The theft and crime rate in most of the areas is also very low compared to other suburbs due to presence of adequate police patrol team in some of the vicinities within the suburb. Precisely the areas are predominantly occupied by the rich and the elites in society, politicians and top public service officials. On the average, land prices in those areas range from GH¢600,000 to GH¢1,000,000 per acre (Kumasi Lands Commission, 2010). The second class and third class residential areas are also characterised by a combination of different housing types like flat, semi-detached and multi-family properties often known in the country as the traditional compound housing type, which has been dominating for ages. The compound houses located here are typically storey buildings with close to 10 and 15 occupying rooms. The areas have basic social amenities like hospitals, community centers and schools which are available and

can be utilised. Often the residential vicinities in the third class are normally packed, overcrowded and noisy. The crime rate in the third class residential areas is also higher compared to the second class vicinities. The second class residential areas have higher land prices or values than in the third class residential areas.

Kumasi Metropolis is one of the thirty (30) districts in Ashanti Region. Nine subMetropolitan District Councils are found in Kumasi namely tafo, asokwa, suame, oforikrom, bantama, nhyiaeso, subin, manhyia and kwadaso. There are five categories of housing types in the Metropolis, namely block of flats, single storey traditional compound type of housing, government –built detached for workers, government built semi-detached for low-income public servants, single household houses built on large plots and multi-storey compound houses. Even though the Government of Ghana provides certain amount of housing delivery in the Metropolis, housing provision in Kumasi is dominated by the private sector. Private entities that own housing facilities in the Metropolis comprise private individuals and estate agencies. Kumasi is the backbone of the Metropolis, and it is characterized with a lot of petty trading dealing in all kinds of items ranging from food stuffs to clothing, stationeries, smallscale mechanical shops and beverage manufacturing industries.

The hedonic pricing model is employed as a technique or tool to bring out the implicit prices of housing attributes or features. Hedonic pricing model analyses corresponding price or market value of a commodity determined through the utility which the various attributes of the product in question possesses. Value of the housing unit in question is regressed on the various housing attributes, therefore the empirical impact of the coefficients of the various features; characteristics or attributes constitute the hedonic prices of the known characteristics (Wilhelmsson, 2009, Rosen, 1974; Fan et al., 2006). The will power and readiness to purchase housing attributes, influences the nominal price of the housing unit. With the estimation of real

housing prices in hedonic models, numerous studies have found out that the use of distances or travel times to multiple job centers is an efficient measurement of location and predictor of housing prices. A lot of these studies compare the measurement to a simple distance relative to the CBD and this has been found to be superior.

Most research works have utilised hedonic model in determining housing values but took a different approach. It traditionally focused and emphasized on making findings about values of different housing attributes that are not observable which include public amenities such as access to schools, hospitals, quality of air and level of noise at the airport(Janssen et al. 2001). The hedonic pricing model is used to assess the influence of traffic noise level on the value of single family houses in Sweden Wilhelmsson (2000). Research works of Wilhelmsson (2009), Ong et al. (2003) and Berry et al. (2003) all have stretched their research to cover structure of housing types physically and those include the number bathrooms and rooms for sleeping, living areas and others. Also it is comprehended that to identify households demand for quite a number of housing characteristics, there is the need to construct the housing price indices, which with the help of hedonic model can be done so (Sheppard, 1999; Can, 1992; Wilhelmsson, 2000; Clapham et al., 2006). There are numerous of tests using hedonic model that have not supported the idea of monocentric negative price gradient, with estimates of either significant positive relationships or non-significant relationships Bender and Hwang (1985).

There are advantages of the hedonic pricing model in estimating housing values. It is often used for purposes like rating of estates which identifies both the cost of the land on which the house is situated and the value cost of the building itself. This is done by retrieving the locational attributes and the prices of the housing unit implicitly, and this can be achieved through a data of already transacted and valued houses. Emphatically, some methods are ignored to save time such as the replacement cost method. Precisely cost involved in replacing the building is

ignored whiles the market value or cost of the land on which the housing unit is located becomes the major concern.

The hedonic pricing model is an effective determining instrument in assessing the effect of the various housing attributes in which the physical land is also considered. This helps in raising the price or value of the housing type and then the correct figure to impose on the property as tax. Countries such as Denmark and Poland adopt hedonic pricing model to assess the correct value of estates or properties for tax purposes. Also Sweden, Latvia and Netherlands employ a computerised method with the aid of the hedonic model for the purposes of raising tax through an estimation of the housing unit. Although there have been some identified advantages of utilizing the hedonic pricing model for housing valuation and pricing, countries such as Czech Republic and other developing nations like Ghana often use the cost method. Ghana uses the cost method to estimate housing properties in raising revenue for the assemblies like property tax or property rates (KMA).

3.5 Choice of explanatory variables

The choice of explanatory variables indicates that in the short run there is a consensus in the reviewed literature where housing prices are primarily affected and determined by some instruments of aggregate demand (Ahearne, and others, 2005; Poterba, 1984; Annett, 2005). The idea of Wilhelmsson (2002) empirically dominates because his study identifies the influence of noise from traffic on single-family houses in the municipality of Stockholm. He identifies in his work that a single-family housing type priced 975 000 (SEK) can be sold less for 650 000 (SEK). The reduction is on the condition that the estate is found within or near a zone of highly noisy environment precisely a noisy road. Some studies also have examined the strong environmental effects that is, the impact of the environment on the attributes or features

on housing prices and estimated the willingness to pay for or compensate for any externalities. Such studies are identified in the works of Palmquist (1992), Hughes and

Sirmans (1993), and others.

There are physical and structural characteristics where physical attributes deals with the location and accessibility to the house or property determines price and the structural features deals with the age of the estate or building, accommodation size and materials used in building. Area or Community amenities are necessary and attract individuals to buy or rent at any price, this is so because it is a fact that life will be comfortable for the households or inhabitants there. Supposedly an area found in a suburb which has good and adequate level of amenities such as schools, hospitals and clinics, shopping centers, recreational parks, road and other motorable networks, will definitely be a pleasantry area to live. This will be chosen above other areas with less amenity level. Though there are qualitative factors it is clear that it can be determined by different individuals and different preferences. It is then obvious that expectedly a high price will be given out to live within an area or community with such attributes, Brigham (1965).

Adequate security of an area or community to curb or reduce crime and other deviant activities is a determining factor of the housing price (Gallimore et al., 1996). Therefore areas with police post and high security level will have higher housing prices than those of low security level which leads to high levels of crime. In this case all other things being equal households will be ready to pay higher premiums to rent and purchase housing at such city at a high price.

The materials like cement, quality paints, floor tiles, quality roofing sheets, and other materials that goes into finishing of a building also raises the price of the house. The value of residential accommodation is affected by other structural and physical improvements such include the availability of garage, a small garden, a swimming pool, a strong fence wall and other structures. All other things being equal an estate buyer or household will pay higher price for

a building with those structures and amenities. In age wise or years the condition of a housing type will also have an impact on the price paid for the particular house. Estimating the factors which are often involved in hedonic models and identifying its effect on housing prices, the neatness of the structure is important, location of the house either in a residential area or not. Even if the property is old there are some renovations and maintenances that keep it in an intermediate new building which can raise its price high.

3.6 The hedonic price model

Housing is heterogeneous and therefore the reason for the usage of hedonic model. The hedonic model is used to estimate demand for value. It disintegrates the object under study into its corresponding attribute, and then records the estimated contributory value of each characteristic. The model assumes that the price of housing is reflected in an embodied housing attribute valued by some implicit prices. Studies done empirically show that such implicit prices of housing attributes are the coefficients that correspond to nominal prices and attributes in a regression model. A house under study is assumed that it can be decomposed into corresponding characteristics such as number of occupied rooms, distance to any city center or central business district.

The model can be expressed in the following form:

$$P = f(s, l, e) \quad 3.1$$

Where p is price, s represents characteristics of the house structurally, l refers to the locality or neighborhood, and e represents environmental characteristics.

The analysis employs either the first stage or second stage. The first stage includes a regression technique used to estimate the Hedonic Price Function of housing. Already explained the

function will correlate the prices of housing attributes in the same housing area to any different characteristics.

The price function:

$$P = f(s_1, s_2, s_3, \ldots s_i;\ l_1, l_2, l_3, \ldots l_i;\ e_1, e_2, e_3, e_i), \quad 3.2$$

When housing characteristics change, the housing prices may change either way due to the hedonic function being linear. Hedonic price function is differentiated with respect to identified housing characteristics or attributes, the implicit price function for that identified characteristic is estimated. Price is assumed implicit since the price function is indirectly identified by what households or buyers are willing to pay through their satisfaction. This is done in order to obtain the best of quality housing characteristic or attribute.

In Stage two the implicit prices are estimated relative to the actual quantities or qualities chosen by the buyer or household to attain the satisfaction to pay for the attributes. The recorded estimates of the analysis will identify the changes in housing prices or market values for a change in each attribute, considering that all other housing attributes remain constant and not changing.

For the purpose of our study where general prices from a secondary data will be used it is proper to go by with the second stage. The general prices for the dominant types of housing in Ghana will be used as data for the regression. This research work employs the hedonic model of the form:

$$P = \beta_0 + \beta_1 H + \beta_2 L + \beta_3 E + \varepsilon \quad 3.3$$

In which P is a vector of nominal housing prices, H is an independent variable of housing or structural characteristics, L is an independent variable of area or locational characteristics, and

E is an independent variable of environment. Where location is the site or position where the housing is situated, structural characteristics involve the arrangement, parts and materials used in organizing and constructing the housing. An environmental characteristic explains the surroundings and the atmosphere in relation to the housing. The β_0 is a constant term, β_1, β_2, and β_3 are corresponding parameters, and ε is an error term. This hedonic model for housing is the widely-used specification. Data from PHC report is used and estimated using Ordinary Least Squares (OLS). The study area is Kumasi Metropolis where data on housing around areas in Kumasi were used. The data on housing types and structural house characteristics are all records of data gathered from the 2010 Population Census.

CHAPTER FOUR

ANALYSIS AND PRESENTATION OF DATA

4.1 Introduction

Data collected is analyzed and presented in this Chapter. The chapter begins with an analysis of demographic data. It then discusses the Hedonic regression results and then discusses the effects of housing characteristics on socio-economic and health issues through the use of bar graph.

4.2 Types of occupied dwelling unit and determining housing characteristics

Table 4.1 shows estimated figures of various types of dwelling units preferred by the population in the Kumasi metropolis.

Table 4.1 Types of occupied housing unit in Ghana

Type of Dwelling Unit	Percentage	Actual amount
Separate Houses	15.7	81,677
Semi- detached House	9.1	47,341
Flat or Apartment	12.4	64,509
Compound House	55.2	287,169
Huts/Buildings same compound	0.6	3,121
Huts/Buildings different compound	0.2	1,040
Tent	0.2	1,040
Improvised home(kiosk, container, e.tc)	2.9	15,087
Living quarters attached to office or shop	0.5	2,601
Uncompleted building	3.0	15,607
Other buildings habitable	0.2	1,040

Source: Statistical Service (Ghana), 2010 census

Table 4.1 shows various types of dwelling units that are preferred by the population or households of the metropolis. Ghana Statistical Service report shows that households who occupy only one room are 44.5 percent; those who occupy two rooms are 24.8 percent and 11.6 percent occupying three room. This shows why households who sleep in single rooms recorded 54.4 percent, 24.3 percent sleep in two rooms whiles close to 10 percent sleep in three rooms. The case of households sleeping in four or more rooms is 11.2 percent. In Ashanti region about 60 percent of households sleep in single rooms. Most households occupying one or two rooms will use one as sleeping and may use any extra room as a living room, kitchen or both. Such households generally are prevalent in compound houses and this is where the social and health problems of housing characteristics emanate from.

A descriptive analysis of the variables used in the regression model which determine housing price is presented in table 4.2. From the study it is identified that separate housing, semi-detached housing, flat or apartment, compound housing and uncompleted building are predominant housing types in the metropolis. It records on the average 1.7 for materials for floor per dwelling indicating how housing on the average uses two materials for construction of floor. Material for floor records a minimum and maximum estimate of 1 and 3 respectively explaining how at least a house is made of earth, cement or concrete and other materials for the floor. Materials for outer wall record on the average 1.2 showing how one predominant construction material is utilized for the fence wall of the housing unit, it also estimated 0.2 and 1.5 minimum and maximum respectively showing how there can be housing unit without a wall and with at most 2 materials for outer wall.

Table 4.2 Descriptive statistics standard

Variable	Mean	Deviation	Minimum	Maximum
Type of cooking space	3.450	0.121	2.032	7.128

Number of toilet and bathrooms facility	3.022	1.872	1.025	8.132
Total number of occupied rooms	4.552	2.863	1.111	15.096
Material for Floor (cement or concrete, earth or mud, e.t.c)	1.671	0.859	1	3
Materials for building	2.34	1.132	1.436	2.561
Material for available outer wall	1.230	3.671	0.209	1.512
Materials used for Roofing (wood, metal sheet, slate asbestos, e.t.c)	0.784	0.234	0.801	1.549
Other Characteristics (Garage, Swimming Pool)	0.325	0.053	0.320	0.560

It is realized that a house or a dwelling unit has an average of 4.6 occupied rooms. There are houses with low as 1 room and high number of rooms of 15 respectively. These numbers were relevant to buildings raised in dwelling units of the type Separate Houses, Semi- detached House, Flat or Apartment, Compound houses and Uncompleted building. The average number of toilet and bathroom per housing unit is 3.022 associated with dwelling type. Cooking space termed kitchen on the average recorded 3 with minimum and maximum of 2 and 7 per housing unit.

Materials for roofing of housing unit recorded on the average approximately 1 indicating how on the average one material obviously metal sheet predominant in the metropolis is used for roofing, on the minimum recorded approximately 1 or a maximum of 2 materials for roofing of housing unit. Other characteristics such as garage and swimming pool on the average recorded 0.33 per dwelling unit showing 0.32 on the minimum and 0.56 on the maximum

respectively. It shows how some housing type does not even have garage and swimming pool therefore being insignificant in our analysis.

4.3 Hedonic regression analysis

Table 4.3 presents regressed results done empirically with the use of the hedonic pricing model. It shows estimated coefficients of the various variables presented with their corresponding *t* and p values in parentheses.

Table 4.3: Hedonic model estimates

Estimated variable	coefficient	t-values	Standard error	p-v lue
Private toilet facility(p_toilet)	0.287	2.33	0.051	0.002
Type of Cooking space (t_cooknspace)	0.249	8.49	0.042	0.000
Private bathroom facility (P_bathrm)	0.229	2.36	0.027	0.000
Total number of sleeping bedrooms (n_splnrm)	0.891	11.607	0.053	0.000
Type of construction material (t_mtrl)	0.956	6.39	0.071	0.002
Material for Floor (mtrl_floor)	0.251	2.051	0. 011	0.001
Material for outer wall (mtrl_outrwall)	0.132	5.1	0.024	0.000
Other attributes (source of drinking water, size of compound)	0.03	0.181	0.101	0.000
Adjusted R^2	**75.7**			

The functional form of the hedonic equation ($P = \beta_0 + \beta_1 H + \beta_2 L + \beta_3 E + \varepsilon$) is used to estimate the impact of housing attributes on housing price. The regression model in table 4.3 explains approximately 76 percent of the total variation in housing prices, where R^2 depicts so. This explains that close to 76 percent of the variations in housing value or price are specifically explained with the use of the hedonic model. Only 24% is left unexplained. It can then be emphatically concluded that, the hedonic model is a reliable model for this study and a good one for the estimation.

The model used housing prices on Accra gathered by BoG field survey report on 22 estate developers and established an average prices of housing. Table 4.4 shows the data used, which is linked to Kumasi because they are both densely populated and urbanized and has a lot in common in terms of being a metropolis. The average prices of various housing types is used as the nominal prices and regressed against the attributes of occupied dwelling units to arrive at the estimated figures in table 4.3

Table 4.4 Housing Prices in Accra

Housing type	Approximate floor area (m^2)	Average price in US dollars	Cedi equivalent
1 bedroom (can be expanded)	72	17500	161000000
2 bedroom (non-expandable)	96	25500	234600000
3 bedroom (non-expandable)	120	32000	294400000
3 bedroom (can be expanded)	140	36000	331200000

Source: field survey, March 2007 BoG report

All the estimated parameters except other attributes like garage, pool and so on are statistically significant at 5% significance level. This is because they have their *t*-values absolutely more than 2, which is the critical value for 95% confidence interval From the estimate it shows how the number of sleeping room, toilet and bathrooms, type of cooking space, material for floor, material for outer wall has positive variations expected. The number of sleeping bedrooms records 0.89, indicating how unit increases in the number of bedrooms, increases housing price on the average by 0.89. Number of private toilet facility records 0.29 and it shows that an increase in the unit of toilet facility increases housing price by 0.3 percent. A unit increase in private bathroom increases housing price by 0.23 which implies that an increase in the unit for bathroom increases housing value by an average of 0.2. Type of Cooking space records 0.25 indicating an increase in a unit of cooking space increases housing price on the average by 0.3. Type of construction material records a coefficient of 0.96 explaining the extent to which increase in the predominant material cement or concrete explains an increase in price by approximately by 1.

Material for floor estimates 0.25 indicate how materials of various types like ceramic, vinyl or tiles, concrete or cement, mud or earth, stone, porcelain, burnt brick, granite or marble tiles, terrazzo tiles and other materials determine housing price on the average by 0.3. Outer wall recorded 0.13 depicting how price or value of estate increases with a house with fence wall than a house without fencing. Other characteristics such as the presence of a garage and swimming pool influences pricing positively but not much, other housing attributes like sewage and liquid disposal, source of drinking water, compound of housing, all in one way or the other influences price, it recorded 0.03 implying how additional units of other determinants affect pricing by 0.03.

4.4 Health and socio-economic issues

This section explains social, health and economic problems that emanate due to lack of some selected housing characteristics. Figure 4.1 shows data on four major attributes, its influence on health cases and the social problems created.

Figure 4.1 Bar graph indicating housing types and housing attributes

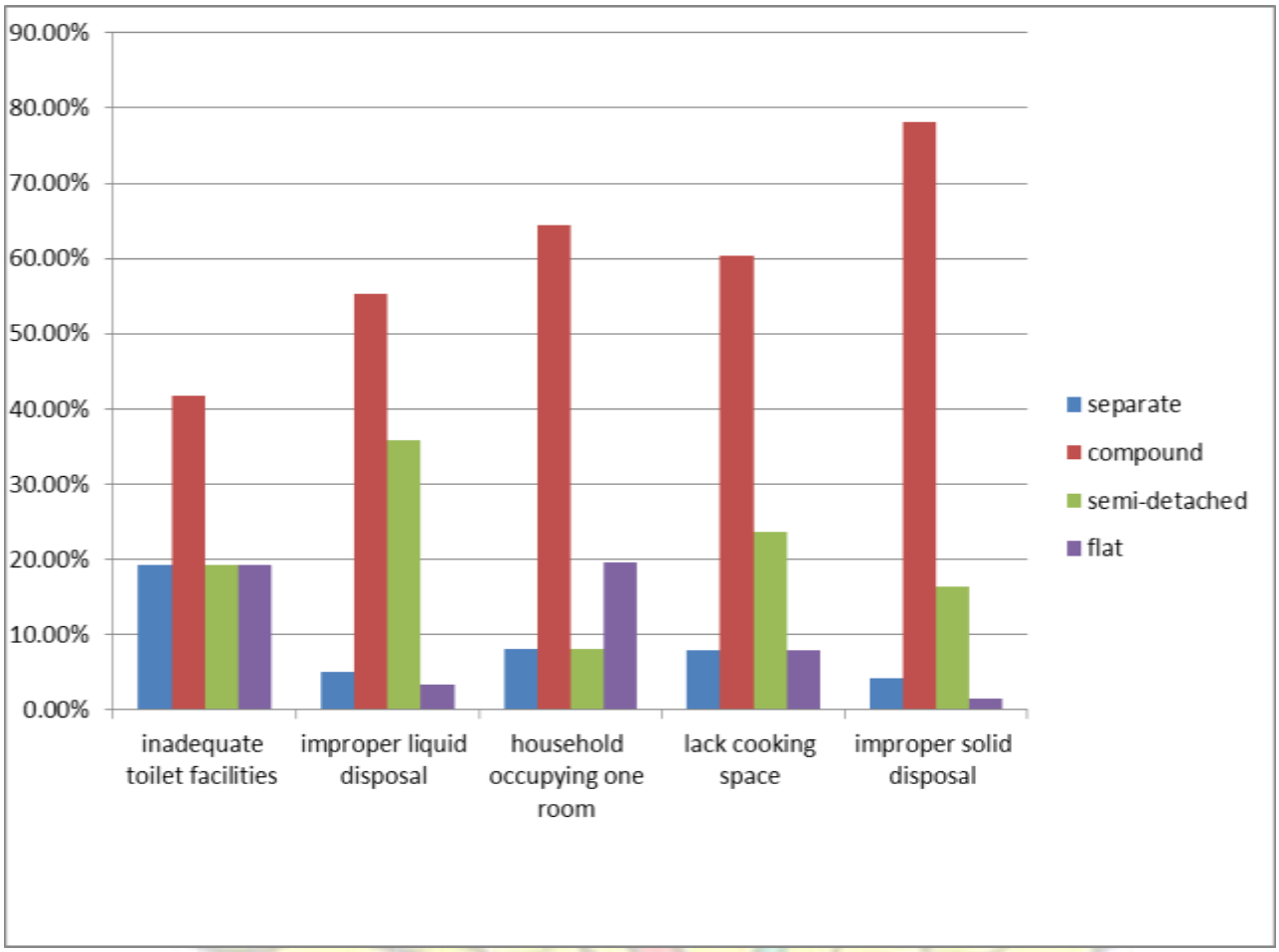
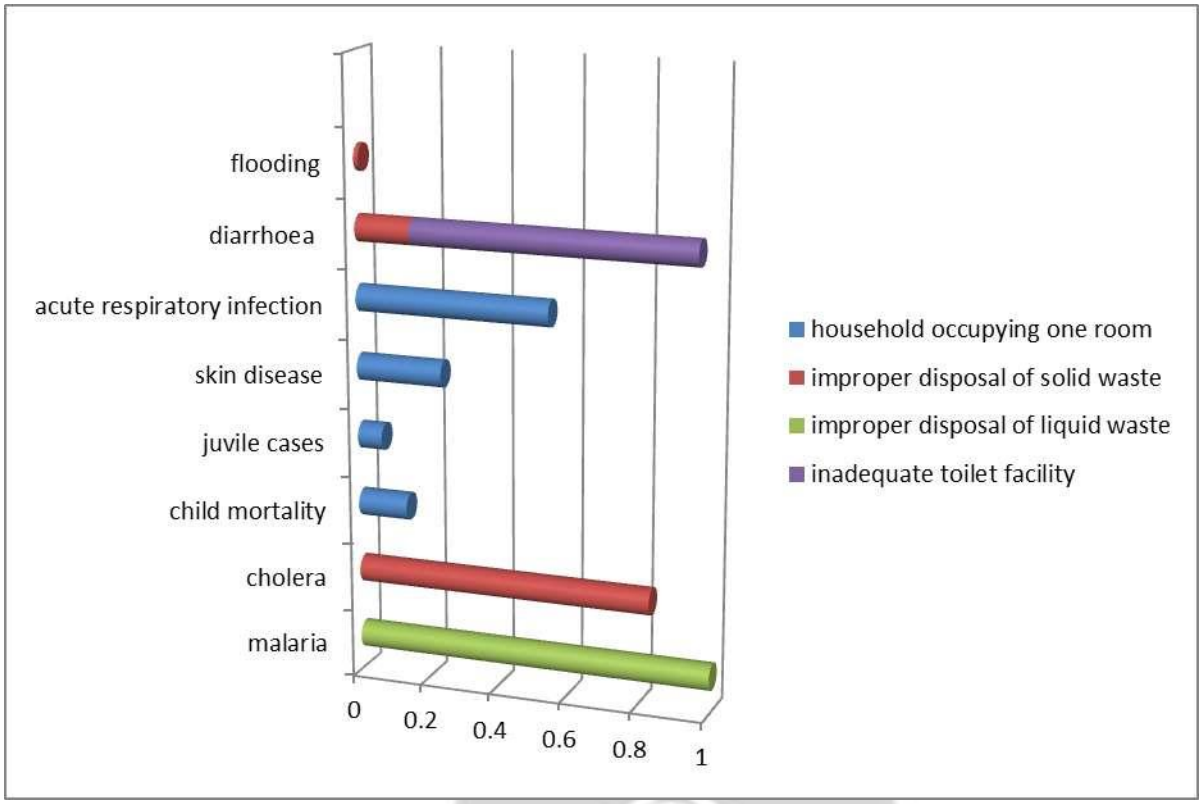


Figure 4.1 indicates the four major types of housing in Kumasi and the percentage lack of some housing characteristics. The lack of including the housing attributes then create social, health and economic problems to the metropolis. Improper solid disposal, improper liquid disposal, lack of cooking space, and households occupying one to two rooms have major influence on some prevalent diseases and social issues in the metropolis.

Figure 4.2 shows the percentage influence of these housing attributes creating social and health problems.

Figure 4.2 Bar graph indicating housing types, social and health problems.



From table 4.1 this study identified that there is a predominant usage of compound housing type by households in the metropolis due to its relatively low cost nature or it might be cheap compared to other housing types. As shown in figure 4.1 the improper solid and liquid waste disposal, inadequate cooking space where households will have to cook in an unclean environment, inadequate toilet facility causes households to use public toilet or indiscriminately defecating in unknown places and water bodies is predominant in the compound housing type.

From figure 4.2 the lack of or inadequacy of such of essential attributes causes increase in child mortality rate. Under five and infant child mortality rate per 1000 live births have worsened due to prevalent diseases in the metropolis like malaria, diarrhea, cholera, and pneumonia. In 2010 it was estimated that about 33000 children leave in the street. From figure 4.2 this can be blamed partially on the inadequate sleeping rooms, and other unfavourable conditions in the home. From figure 4.2 the inadequate sleeping rooms pose a challenge where children will sometimes sleep either outside or with friends. This then in the long run leads to parents lacking

maximum control over them. It then contributes to the number on the streets since they find it better to sleep outside thereby increasing reported juvenile cases.

From figure 4.2 there are improper ways of disposing waste which creates health related problems and other issues. It is therefore necessary to include proper ways of disposing such waste by prioritizing such characteristics in housing. From diagram 4.2 uncontrolled disposable of liquid waste can affect the community's health which can breed mosquitoes and cause the prevalence of malaria. Dirty water thrown outside the environment is inhaled as contaminants that volatize from heated water. Some join water bodies for domestic use which is absorbed through the human skin during bathing and washing. Plants usage and ingestion through consumption, and drinking such water by animals expose them to the polluted groundwater which is dangerous to the skin when handling such contaminated soil. The unhygienic disposals of liquid and solid waste can cause the death of livestock and ill-health in humans. The inadequate or lack of good toilet facility creates health problems such as diarrhea and cholera. The inclusion of toilet facility in housing reduces the health problems associated with it. This indicates the necessity of including or planning for toilet facility in housing characteristics in an occupied dwelling. Households occupying one to two rooms make households prone to communicable disease or air borne infections and other health related issues. Occupying one to two rooms in the figure 4.1 especially compound housing is found to have an impact on social issues such as under 5 and infant child mortality, teenage pregnancy per child mortality deaths (under 5), and teenage pregnancy per infant child mortality deaths

In Ghana, the air that we breathe inside our homes and other buildings are always seriously polluted daily. Such unclean and polluted air for the longest periods of time as a result of indoor air pollution can cause and expose households to some health problems. For instance the aged and children with chronic illnesses are normally the most defenseless when it comes to the effects of air pollution within occupied rooms. This then influences child mortality rate in the

metropolis. Most pollution released in the air is created indoors, and it emanates from sources that release particles in the form of gaseous states. Sources like particles of construction materials, insecticide and pesticide sprays create pollution always and this makes households prone to any outbreak of airborne disease. This goes a long way where government will have to subsidize drugs, find cure and vaccine for an outbreak and this is an economic burden on government because it increases government expenditure.

Some common household pollutants particularly particulates such as dust or pollen pollute the air in the home. Formaldehyde, a common preservative and adhesive in furniture, carpets, particleboard, and plywood paneling can be a danger in the home. Breathing of formaldehyde fumes can cause rashes on the skin, uncontrollable irritation of the eyes, nose and throat, continuous headaches, dizziness, nausea and coughing. Products like personal care products, insecticides and pesticides, household cleaning agents, solvents, and domestic chemicals used by households can be irritating to the nose, eyes and the skin. Exposing households to dangerous chemical products can cause nausea, some allergic reactions, irritation of the skin and eyes, dizziness, lungs problem, cancer, rashes and other reactions. Also there are poisonous fumes produced from some cleaning products such as using strong paints. Fumes are given out during paintings which irritate the eyes, throat and nose. And sometimes when products fall apart with age they become dangerous to human health. The exposure of children to contaminated dusts can cause headache, dizziness, muscular weakness, and nausea. All these can affect the health of persons found in one to two sleeping rooms without open cooking space; bath and toilet facilities, separate room to keep other items and can be hazardous to the health of children. The loss of life through such indecent behaviour is economically a disadvantage as it reduces human resources or labour of the metropolis in the long run.

The management of waste from households done domestically is poorly controlled; especially solid wastes when not properly managed can be a hazard to the environment. The improper

damping can result in death as well as diseases to households in the Kumasi metropolis; example is the outbreak of dysentery, cholera and so on. The atmosphere can also be polluted and very harmful due to such wastes. The wastes which are improperly deposited into the environment often pollute the atmosphere which leads to the ozone layer being destroyed. This results in related diseases such as cancer and can also cause global warming. The formation of acidic rain is the result of air pollution. Acidic rain is dangerous to plant life due to its nature of removing soil fertility from the surface ground. The throwing of black polythene bags into the soil affects soil drainage and plants growth. Most of the solid wastes deposited in the soil are water proof which can block the aeration system of the soil, and this can generally affect agriculture. The flow of sewerage can be blocked to cause flooding due to improper management of solid waste.

4.4.1 Economic issues

From diagram 4.1 the improper solid and liquid disposal pollutes the environment and causes flooding, which causes reduction in fertile soil. It then affects the country's agricultural produce for exports. Waste produces toxic and when animals consume it becomes dangerous to their life and create a worst situation for them for instance waste deposited in water bodies are dangerous to aquatic life. Domestic waste which is managed poorly worsens the beautiful display of the environment. It creates an ugly scene in the environment affecting tourism in the country economically. Malaria is commonly breed when wastes like broken bottles are dumped anywhere. The bottles collect stagnant water in them (when it rains) and these become breeding grounds for such insects. It can also lead to human injury. The uncontrolled depositing of solid waste any how can result to the land being wasted in the sense that lots of land has to be used as depositing sites for refuse. Such lands are later abandoned by the inhabitants of the area. Presently the uncontrollable use of polythene bags for packing items has extremely worsened the negative impact of uncontrolled dumping creating very unsightly conditions.

In Ghana Government through NADMO give compensation to victims affected by disasters which all increases government expenditure. Also instances where settlement will have to be moved from one area to another due to the inhabitable nature of an area, households will have to be compensated and through all these increases government expenditure which has an economic impact on the metropolis and the country as a whole.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The chapter presents a summary of the findings discussed in the previous chapters, provides policy recommendations following from the findings, and finally concludes the entire study.

5.2 Summary of findings

Major determining factors influencing nominal housing price were structural and environmental factors. Housing attributes were either externally or internally affecting occupied dwelling units or housing prices. The Hedonic model is used to identify which characteristics of housing is the most significant at each point in time and strongly determines housing price. It is identified from the research that:

1. Significant and necessary characteristics where found to actually help certain housing maintain or increase their pricing or market value in the housing market.
2. The predominant materials for construction of a housing unit in Kumasi are concrete or cement and bricks. Demand for the construction materials is currently so high leading to high prices; this makes it costly to put up adequate attributes of some housing types such as compound housing.

3. The main types of dwelling in the metropolis are separate/detached, semi-detached and compound housing of which compound houses is the greatest. This is dangerous to health and other related issues since every facility in the house is shared.
4. There is the impact of dwelling units on social, health and economic issues, for instance health problems emanating from overcrowding, social problems as social vices and teenage pregnancy as a result of inadequate sleeping rooms, and economic problems such as increase in public expenditure in situations of collapsed buildings.

   The problem of street children has serious socio-economic implication on the country as a whole.
5. The increase in housing attributes increase the number of raw materials used in construction. This in the long run affects the nominal price of housing, which makes it difficult in owning a housing type with all necessary attributes.

5.3 Conclusion

There are other attributes of different housing types which might be identified in a different geographical area and can have greater impact on housing price from a different residential class but the research study identified the nature of demand for housing and the characteristics that determine housing price in Kumasi Metropolis. The study also identified the impact of housing attributes or characteristics of occupied dwelling units on social, economic and health situations of households.

It has been established that inadequate housing attributes pose a challenge to households' health and social behaviour whiles financially puts a burden on both households and the public at large. The demand for housing has been realized to be high as population of the metropolis is on the increase. All other things being equal, if a house or an estate has attributes which raises the utility of an individual he will pay any price for the building provided it meets his preferred choice. The cost involve in attaining necessary attributes preferred by households influence

nominal housing price and income of the individual which has been an external constraint to the household in choosing some housing characteristics and attributes.

Subsequent research works should be used to quantify and do proper analysis to get the real cost of housing prices in Kumasi metropolis. The research work talks on only Kumasi metropolis which is urban in nature and much can be achieved if the study is stretched to the rural and other urban areas. Even though the research work achieved a lot there is a shortcoming and need to have a wider coverage. It is recommended that a further research work is done to look beyond what is done or has been achieved by the study.

5.4 Recommendations

The research recommends that similar construction materials should be promoted to reduce the prices of cement. Cement as a construction material, sleeping room, toilet and bath facility, open cooking space, liquid and solid disposal as housing characteristics are identified to be significant, whiles source of drinking water, swimming pool, age of building, and others were found to be less significant in determining housing price. The use of cheap but quality construction materials will then reduce the cost on housing to a low value to meet demanders' expectation of market value. Housing developers should use prevalent and quality materials like concrete to meet consumer's expectation. Especially other quality substitutes like bricks, instead of cement can be used as alternative, which can reduce cost of housing.

Housing developers should understand the reason why households place maximum utility on certain characteristics of housing or occupied dwelling unit. Also further research should be conducted on different attributes through agencies and research departments to help understand the major determining factors in each geographical area.

This research recommends that Ministry of Water Resources, Works and Housing (MWRWH), State Housing Company (SHC) and other policy makers on housing to focus on pursuing

various affordable housing programmes and place more importance on housing characteristics or attributes. It is recommended that private developers and private builders through a pilot project or study choose a sector of the economy such as public workers and analyse their preference for certain housing attributes and start achieving the vision of providing affordable housing for all. Cheap but quality materials can be used in construction where market value of housing would be affordable and this can be spread over demanders' life time.

It is recommended that the hedonic model is given a wider outlook and advocated by developers to access if high or low income households are willing to pay more for characteristics of housing which will reflect the real price they pay. Housing developers, policy makers and country planners need to consider certain characteristics which include good toilet facilities, proper waste management and disposal, quality construction materials, good cooking space and other proper attributes. This will help housing developers to charge and rent such housing types at a higher rate or sell for good money; this is because the market value of the house in question has improved.

Private developers can reduce the pressure on housing market by building affordable or low cost housing types. This can be achieved through the use of less costly materials, such as low cost lands, cheap sand but quality and good cement for construction, which can be achieved for all by spreading payment over demanders' life time. Cost of maintaining such affordable housing units will also be less expensive since materials used for construction is less costly and does not involve a lot.

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