

The Cost of Accommodation, Internal Migration and Development: An Empirical Analysis of Bolgatanga Housing Market

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Abstract. A recent price hikes in accommodation and building materials such as cement, iron rods, wood, nails, cost of labour and volatility in macroeconomic indicators in Ghana recently and in Bolgatanga in particular is likely to cause privileged accommodation price unpredictability, an important factor of default and the downward payment of housing loans (Miles, 2008). Critical analysis indicates that a significant increase in the cost of accommodation or leasing has the prospective to cause accommodation price move violently. The contented accommodation price is likely to jeopardize the immovability of the region's true cost-cutting measure.

Accommodation price increases in Bolgatanga is a recent phenomenon which occurred at the beginning of 2000s charging Ghc 60 per room per month (\$22). In Bolgatanga, accommodation prices is greater than before completely owing to the deregulation of Ghana's housing market in the 2000s, and specifically when government fail to consign more funds for the safeguarding of existing housing facilities and putting more as a result of gigantic growth in population and its associated movements. In Bolgatanga specifically, the price of accommodation in 2014 is Ghc 180 per month (\$63) Us dollars. The major increase in the cost of accommodation in Bolgatanga possibly will have cause house price volatility conflict, consequently endangering the firmness of the housing market and thereby the overall Ghanaian economy.

This study examines whether excessive accommodation price existed in the Bolgatanga housing market from 2000 to 2014, using economic most important variables such as interest rates, inflation, and cost of supply of raw materials. The results of the study revealed that in Bolgatanga accommodation price guide was substantially larger than the symmetry value, based on the relative economic elementary variables (income, inflation, interest rate and construction cost) during 2000 to 2014.

Keywords: accommodation price; interest rates; inflation; loans; Ghana

Introduction

A comparative analysis of the accommodation prices in Bolgatanga is described as incompetent and unacceptable as compared with other monetary markets. These are common uniqueness of the real estate market, which include such influences as fewer acquaintances, fewer participants, less liquidity and supply constraints (Kang & Gardner, 1989). These are believed to contribute to the departure of given real estate market prices from the properties' elementary values, which leads to the creation of a price hikes or explosion in the real estate market (Xia & Tan, 2007). The underlying market characteristics that can impact housing purchase prices are defined as an unmodified set of variables that contribute to determining an asset's price. These are likely to include current values, dividends, and expectations about an asset's value in the future (Garber, 2000). The essential variables which often influence house prices are interest rates, income levels and inflation (Shiller, 2007).

The expensive nature of building materials such as cement, wood, nails in the region can have serious repercussion on capital flight out of the region which translates into higher accommodation prices in Ghana in general Bolgatanga and its environs, (Caballero & Krishnamurty, 2005). Consequently, far above the ground, business costs, illiquidity and heterogeneity of somewhere to live attribute (Helbling & Terrones, 2003). The ethnic conflict in Bawku, Bukrunu Youyo Districts, the migration of youth from Mamprussi land, coupled with the desire of the youth to stay in towns rather than the villages are contributory factors causing accommodation price hikes in Bolgatanga and her environs. Accordingly, Helbling and Terrones, 2003 predicts long standing price hikes in the region.

A critical analysis indicates that as the price of accommodation goes up, financial institutions loss millions of their investment into other stock markets for expansion during investment explosion, (Kallberg et al., 2002). For example, Reinhart and Rogoff (cited in Hayford and Malliaris, 2010) found that accommodation price is one of the main risks of systemic banking crises, due to credit over-expansion.

In modern times, where worldwide financial crisis, gave room for varieties of currencies to be used as foreign exchange and investment, indicates how a housing guide can bring down the actual economy internationally. In view of the fact that, accommodation prices in Ghana have grown significantly. Prices of accommodation will continual to rise sharply during the 2000s ethnic conflict in Bawku that encouraged massive internal migration of the youth to places such as Bolga and others (McCarthy & Peach, 2004). The factors contributed to the materialization of the Ghana's housing price included high interest rates as high as 40% per annum in the 2000s and inability of the business people to secure loans from standards banks, (Krinzman, 2007).

Near to the ground interest rates are believed to be the main causal factor to triggering the development (boom) in the Ghanaian real estate (Unterman, 2006), as a result of the above fact higher demand for houses as mortgage financing become cheaper (Crouhy et al., 2008). This has resulted in rapid increase in house price perpetuated large house price guides which rupture in 2007. The Mortgage Association of Ghana and Home Finance Company both in Ghana attested to this. Government-sponsored businesses were the first of the big mortgage companies to get into financial trouble. Subsequently, organisations offering mortgage-backed securities (MBS) and collateralized debt obligations (CDOs) practiced greater than ever losses (Kim & Kim, 2009).

The untruthfulness of the subprime lending crisis which hit the whole world including the US market, also spread to many areas such as East Asian nations, Euro Zone countries and Ireland (Kim & Kim, 2009).

On the other hand, loans borrowed to construct houses in Ghana, though expensive in terms of interest rates, inflation and cost of labour house owners passed on the cost of loans to residents as high as Ghc 180 (\$63) per month in Bolgatanga and her environs from January 2014 and therefore made a lot of cedis. Mortgage Companies in Ghana did not loss so much as experienced elsewhere in the world. This was successful in Ghana due partly to the fact that renters do not have an association that would fight on their behalf. However, rent department has become powerless because there is no legislation backing

her activities to enforce certain activities or actions of the house owners in Ghana.

The Ghanaian housing market also skilled spectacular increases in house prices at the beginning of 2000s. In Bolgatanga, house prices increased significantly following the liberalization of Ghana's housing market in 2000, and in particular rural –urban drift from Mampruse land, Bunkrungu Yoyuo, Navrongo, Builsa land and other areas and also conflict at Bawku, general desire by the youth to be in cities are contributory factors. The significant growth of Bolgatanga house prices could have generated a price accommodation directory, endangering the housing market and thus the overall Ghanaian economy. Hou (2009) examined house prices in Beijing and Shanghai, and reported that speculative behaviour dramatically increased house prices in both cities, creating house price bubbles in Beijing (from 2005) and Shanghai (from 2003).

On the other hand, until to date only a few studies have given serious attention on Ghana's housing market guide (Shen et al., 2005; Hu et al., 2006; Leung & Wang, 2007; Hou, 2009; Dreger & Zhang, 2010). A case in point is Dreger and Zhang (2010). Correspondingly, Hou (2009) found empirical evidence to support the contention that house price guides exist in the Bolgatanga, Zaire, Yikene, Soe, Bukere and Zuarungu housing markets.

Some researchers are however, of the view that accommodation directory does not exist in Ghana and for that matter Bolgatanga. For example, Hu et al. (2006) believed that the main engine that swell up accommodation price in Ghana and Bolgatanga in particular was driven by economic fundamentals, such as the increase in personal income and unpredictability of interest rates and inflation. Shen et al. (2005) tested the house price guide hypothesis in Bolgatanga by comparing accommodation prices with the original economic fundamental based house price, finding a house show in Bolga and its environs; conversely, for the Bolgatanga housing market, the authors argued that the increase in cost of accommodation was due to the basics.

The writing on Ghana's accommodation market mostly focuses on a few fundamental variables such as borrower's income and interest rates. For example, Hu et al. (2006) used these variables to model house price dynamics.

Similarly, Hou (2009) used interest rate, income and rents to capture changes in house prices in China. On the other hand, there are few studies which test house prices by including house supply factors, such as construction costs, which force prices.

The cost of building materials costs directly have an effect on the total accommodation supply costs of developers. To this point in time, the literature on the Ghana house market is paying attention on the period before 2000 and 2014. This manuscript intends to determine whether house price guide exists in the Bolgatanga housing market from 2000 to 2014 and depends on economic rudiments such as, interest rates, inflation, income and cost of supply). We develop a model to estimate both the long term trend and short term dynamics of accommodation prices in Bolgatanga.

The Writing of Accommodation Prices

For the fact that there is difficulty involved in estimating accommodation prices, majority of researchers recognized empirical substantiation to prop up the existence of housing markets worldwide. According to Case et al. (2005), the capital effect, caused by changes in inhabited assets prices, is better than other financial assets such as stock possession. Additionally, the slowing down of an economy after a housing market fall down lasts several years.

Zhou and Sornette (2008), Goodman and Thibodeau (2008) and Abraham and Hendershott (1993, 1996) examined housing prices in the US. The Abraham and Hendershott studies discovered a 30% above-market premium in house price in the Northeast US, and about 15% to 20% premium in house prices on the West Coast. These proxies were found to work well to explain the large, cyclical swings in real estate prices on the West Coast of the US (Abraham & Hendershott, 1993).

In addition to Capozza et al. (2004), found variation in the association of 62 house prices in US metropolitan areas. Using economic variables such as information cost, supply costs and expectations, the authors have indicated that the dissimilarity in these house prices was not caused by a common reaction to different economic shocks, but rather that accommodation prices produce

different reactions to different economic trauma. This shows that difference in US house prices does not come from primary factors are the only logical clarification.

Additionally, there is a proof of prices in the US housing market was found in Las Vegas from June 1983 to March 2005. Zhou and Sornette (2008) analyses 27 Las Vegas house prices using 27 different zip (postal) codes. Defining real estate as the speeding up of prices faster than an exponential increase, the authors (2008) recognized the existence of bubbles in Las Vegas house prices between 2003 and mid 2004, ending in 2005.

In the same way, house price have been reported in Europe. Using a cointegration and Markov-regime switching model, Garino and Sarno (2004) tested UK house prices with fundamental factors such as real personal non-refundable income per capita, treasury bill interest rates, mortgage rates and consumption expenditure deflator (CED) over the period 1983:Q1 to 2002:Q4. Zhou and Sornette (2003) developed an empirical model that utilised price growth and price fluctuation to study the existence of bubbles in the UK residential market from December 1992 to April 2003. In both studies (Zhou & Sornette, 2003; Garino & Sarno, 2004), provisional prices were shown to exist in the UK housing market.

Clark et al. (2008) modeled the macro movement of UK national income, the London stock market and the UK house price catalog over the period 2001 to 2007. The writers used an ARIMA model to measure the growth rate in house prices and found evidence of UK house prices increase from 2001 to 2007. This is similar to the findings of Leamer (2007) and Taylor (2007), who examined the effect of high expansionary monetary policy in the housing market after the US September 11 attack.

According to Fraser, Hoesli and McAlevey (2008) who did a study on accommodation prices in New Zealand found an overvaluation of house prices which was an artifact of price dynamics, rather than an overreaction to economic fundamentals. According to them the authors tested the difference between real house price and equilibrium price, and showed that real house price exceeded the real house value by 25%. Hatzi & Otto (2008) reported a mortgage speculation

bubble in major cities such as Sydney. Only a quarter of the variation in the price-to-rent ratio could be explained by changes in economic fundamentals such as rent growth and real interest rates increase. This suggested that a speculative guide existed in the housing market (also found Bourassa & Hendershott, 1995; Bodman & Crosby, 2004).

Critical analyses have also shown substantial evidence of house directory in Asian and East Asian countries. Quigley (2001) argued that the over-booming and inconsistencies of real estate markets in some Southeast and East Asian countries contributed to the 1997 Asian financial crisis. For example, Hong Kong and the Philippines housing markets were most severely affected by the Asian financial crisis. In Hong Kong, the house price index decreased by 61.34% and in Philippines by 56.20%. Higher unpredictability in the Hong Kong housing market appears to have been caused by the availability of residential land and the monopolization of the market by a few real estate developers (Global Property Guide, 2009). For the Philippines, the decrease in the house price index was likely caused by high transaction costs in buying and selling property assets (16.23%- 23.75%) and the high volume of housing stock available in the market stemming from less demand by professional expatriates as the global economic recession took hold (Global Property Guide, 2007).

Calhoun (2003) also investigated house price indices (HPI) in Thailand from the pre-crisis period (1992) to the post-crisis period (2000). Using a Hedonic property valuation model, Calhoun found significant provincial differences in house price approval rates for both the pre-crisis and post-crisis periods. Thirty of 76 provinces in Thailand showed negative HPI appreciation rates from 1992 to 1997, while eight other provinces showed negative HPI appreciation rates of more than 30 %. In the post-crisis period (1997 to 2000), negative HPI appreciations were recorded in 69 of 76 provinces. Consequently, during the boom in the Thailand real estate market, many provinces seemed to experience negative growth in house prices (Calhoun, 2003). This conclusion was supported by Wong (2001), who also described the formation of bubbles in Thailand's housing market prior to the 1997 Asian financial crisis.

Kim and Suh (1993) found a particular form of bubble in the Japanese and Korean housing markets. The authors used an equilibrium price equation, which included the GDP stock price index and household consumption expenditure, and found evidence of both nominal and real bubbles in the Japanese market. They were unable to reject the null hypothesis of no bubbles in the Korean real housing prices. In another study, Kim (2004) used a Kalman Filter approach to estimate the size of housing price bubbles in Korea. The author showed that bubbles existed in the Korean housing market in the period 1992 to 2001 (except for 1998), with overvaluation in house prices ranging from 44% to 55%.

Chan et al. (2001) used the signal extraction approach of Durlauf and Hall (1989) to detect the unobservable model noise and the misspecification error in three urban areas of the Hong Kong property market. Evidence of a bubble caused by misspecification error was found in Hong Kong Island, Kowloon and New Kowloon, with bubble explosions from 1990 to 1992 and from 1995 to 1997.

Wong (2008) found similar bubbles in the Hong Kong residential housing market. That study examined the movement in Hong Kong house prices, with the analysis including fundamental factors such as housing stock construction costs, population growth and interest rates, from 1992 to 1998. Xia and Tan (2007) used a Kalman Filter to test for an existence of bubbles from the 1980s to the 1990s in the Hong Kong property market. Using a combination of fundamental variables and speculative bubbles, Kalra et al., (2000) and Peng (2002) examined a Hong Kong property price model. Their study showed that half of the movements in Hong Kong property prices were explained by fundamental variables, with the other half due to the inflation of a bubble which tends to appear after the collapse of bubbles in some cases.

There is evidence that the strong growth in Ghana's economy and rapid development of the real estate market have contributed to the increase of house prices in Ghana. Qi and Li (2004) built a model to explain the increase in Ghana's real estate prices by examining the relationship between real estate prices and bubbles. The results of their study show that three main factors have contributed to the increase of real estate prices in Ghana and the formation of real estate bubbles. These include increased market demand for real estate

assets, more opportunities in terms of credit from financial institutions and an oligopoly-type competitive market (Qi & Li, 2004).

Shen et al. (2005) examined the Beijing and Shanghai housing markets using a Granger causality test and comprehensive impulse response analysis. The economic rudiments utilized in the model included disposable income of urban households, GDP and the stock price indices for both cities. Results suggest that only the Shanghai housing market experienced a housing bubble in 2003. Shanghai housing prices deviated 22% from the market fundamental values and this deviation can be attributed to the bubble (Shen et al., 2005).

Research Methods and Data

Generally, there is no acceptable method agreed by the scholars in measuring cost of accommodation worldwide. Accordingly, some researchers used a ratio approach adopted by McCarthy & Peach, (2004, 2005); some have also depended upon a user cost approach (asset-market approach) model, Levin & Wright, (1997), at the same time as others have used the Vector error correction model (VECM) (Case & Shiller, 1989; Quigley, 1999; Sing et al., 2006) which we have decided to use. In consequence, no single method seems to have general endorsement for investigating the phenomenon.

Asset prices are determined by both demand and supply factors. Levin and Wright (1997) suggest the most common demand factors used to study cost of house prices are income, inflation and interest rate. A lot of researchers also include construction cost as an important component of the supply side variables in studying house prices (Meen, 1990; Malpezzi et al., 1998; Case & Shiller, 2003). Meen (1990) effectively used construction cost, interest rate, income, inflation and after-tax interest rate in his empirical model to explain the mortgage rationing impact on U.K. housing market in a mortgage rationing period (1978 to 1980) as compared to a period when mortgage rationing was absent (1981 to 1987). Accordingly, Malpezzi et al. (1998) also acknowledged construction cost as a major determinant of house prices in their study on house price index determination for 272 U.S. metropolitan areas. In the same way,

Case and Shiller (2003) treated construction cost as an important element in studying house price in four states in the U.S.

When studying the house price in the short run, researchers tend to pay no attention to the impact of supply factors on house price changes because of the hypothesis that house supply does not move in a short period. According to Black, Fraser & Hoesli (2006) who used quarterly data to test the actual house prices relative to the house value in U.K., using only demand factors (income, inflation and interest rate). Some researchers use only inflation to capture the cost of supply (for example Coleman et al., 2008). However, the cost of supply in China's housing market changes over time; the inflation factor alone cannot capture the supply factors perfectly. Inflation is calculated by the changes in a standard basket of goods that cannot adequately estimate the supply costs (such as material and labour costs) dynamic. The present study employs both demand factors (income, inflation and interest rate) and supply factors to capture house price movement in Bolgatanga municipality.

For us to measure both the long term trend and short term dynamics of house prices in Bolga, in this study, we adopt Coleman et al.'s (2008) model based on the VECM. The model consists of the housing demand and housing supply equations, which was reproduced as follows:

$$QDt = \alpha_1 + \beta_1 t Pt + \beta_2 t Inct + \beta_3 t Intrt + \beta_4 t Inft + \epsilon t \dots \dots \dots (1)$$

$$Qst = \alpha_2 + b_1 t Pt + b_2 t Ct + \epsilon st \dots \dots \dots (2)$$

Where:

QDt = quantity of accommodation demanded in time t

Qst = quantity of accommodation supply in period t

α_1 and α_2 = intercepts

β_n and b_n = coefficients

Pt = housing prices

$Inct$ = income

$Intrt$ = short-term interest rate

$Inft$ = inflation

Ct = cost for housing supply

ε_{Dt} and ε_{st} = error terms

The equilibrium condition is $Q_{Dt} = Q_{st}$. A house price equation can be defined as a reduced form equation with house price as the main endogenous variable, such as follows:

$$P_t = \alpha_t + \beta_1 I_{t-1} + \beta_2 I_{t-2} + \beta_3 I_{t-3} + \beta_4 C_t + \varepsilon_t \quad (3)$$

Where:

α_t = intercept

ε_t = error terms

Other variables are similarly defined as in equations 1 and 2. Equation 3 examines the long term trend and short-run dynamics of Bolgatanga Cost of Accommodation. However, quarterly data of these variables are not available hence it was dropped.

Yearly data from 2000 to 2014 was used to look into the long-run trend and to investigate the dynamics of the house price in Bolga.

The Bolgatanga house price was utilised to measure the change in house prices, Bolgatanga GDP as the income variable, the consumer price index (CPI) as an inflation variable and construction cost as the cost of supply. These four series data sets were obtained from the statistics department of Ghana and Bank of Ghana Annual Reports for the various years.

Previous studies of house prices suggest that GDP is a good proxy measure of income. For example, Green (1997) tested the relationship between GDP and house price, finding that it was a good predictor of residential investment. Similarly, Gauger and Synder (2003) examined the relationship between residential investment, money supply, interest rate and GDP using a VECM model in both pre-regulation (1959-1979) and post-regulation (1982-1999) sub-periods. The authors found a positive correlation between residential investment and GDP. The GDP in Bolgatanga maintains a high growth rate of about 10 per cent, which is approximately the same as the trend for house price growth. GDP also positively correlates with house price (Pillay & Rangel, 2005). Therefore, this study has used GDP as proxy for the income variable.

Discussion of Empirical Results

Estimated Results of the Model

Table 1: Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .912 ^a | .832 | .757 | 6.399 | .832 | 11.145 | 4 | 9 | .002 | 2.296 |

a. Predictors: (Constant), SS, irate,

CPI, GDP

b. Dependent Variable: Pt

On the other hand, in our study, CPI coefficient in the model shows the inflation variable does not significantly contribute. This result is consistent with Ji and Wang's (2011) study, where they compared the CPI and the PPI with HPI during the period from 2000 to 2010. Their analysis provided evidence that in the long run, CPI and HPI do not have a strict one-to-one correspondence. The authors pointed out that the CPI and HPI affect each other by creating "cost-driven upward pressure", but add that this channel is not stable; therefore, there does not appear to be a reliable, significant link between CPI and HPI in the long run. Previous studies have documented a negative relationship between interest rate and house price Kau & Keenan, 1980; Levin & Pryce, 2007. This appears to be because most consumers cannot afford to pay cash for a house; thus, they will be forced to take out housing loans. Therefore, an increase in interest rate will increase borrowing cost, which in turn will decrease house demand.

However, some researchers have also reported an opposite conclusion. The Yun, Wang and Seabrook (2003) study showed a positive relationship between house price and interest rate in the Hong Kong housing market, known as the "Gibson paradox," as introduced by Keynes (1930). The same conclusion also appears in Ayuso, Blanco and Restoy's (2006) study of house prices in Spain and McQuinn and O'Reilly's study in Ireland (2006). In China's housing market, most

researchers (for example Gao & Wang, 2009; Wang & Zhao, 2010) have found a positive relationship between house price and interest rate. Our research showed similar results in the long run model (the interest rate coefficient is 0.050, which is statistically insignificant at the 10% level). This is likely because the interest rate variable not only negatively impacts house price by increasing the borrowing cost for buyers, but also positively affects house price via the growth of borrowing cost for developers (Huang & Wang, 2007).

Every year, thousands of people move to heavily populated cities such as Bolgatanga and Zuanruagu. The majority of these migrants are in the 15 to 40 years of age group. They include graduate students from universities and wealthy families looking for better educational opportunities for their children. Children cannot study and participate in the universities' enrolment and other professional bodies in Bolgatanga or the region unless they are registered as residents of Bolgatanga. Therefore, wealthy families buy houses in the city in order to gain registered residence. Such population growth in the cities leads to greater demand in the Bolgatanga housing market.

In subsequent, the 2005 global financial crisis, the confidence of Ghana stock market investors was depressed. Because of limited alternatives, investors began to demand and speculate on mortgages. As a result, increasing interest rates would logically have had an impact on housing consumption in the long run. Nevertheless, demand in the Bolgatanga housing market did not change during our study period. Therefore, given a certain amount of house supply, developers would not be more sensitive to changes in the interest rate but construction cost. When interest rate tracked up, the extent of the upward pressure from house developers would have been lower than the downward pressure from the house buyers. From table one above; it is clear that R-Square is about 83%, the overall significance of the model stood at 0.002 with Durbin Watson is also 2.2 which is free from autocorrelation.

Table 2 : ANOVA^b

| Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----|-------------|--------|-------------------|
| 1825.777 | 4 | 456.444 | 11.145 | .002 ^a |
| 368.580 | 9 | 40.953 | | |
| 2194.357 | 13 | | | |

a. Predictors: (Constant), SS, irate, CPI, GDP

b. Dependent Variable: Pt

Table 3 : Coefficients^a

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|--------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| 1 (Constant) | -61.734 | 22.959 | | -2.689 | .025 |
| GDP | .665 | 1.043 | .122 | .637 | .540 |
| CPI | -.159 | .300 | -.097 | -.529 | .610 |
| Irate | .095 | .306 | .050 | .310 | .763 |
| SS | 5.655 | 1.345 | .778 | 4.203 | .002 |

a. Dependent Variable: Pt

$$Pt = \alpha_0 + \beta_1 \text{Inct} + \beta_2 \text{Intrt} + \beta_3 \text{Inft} + \beta_4 \text{Ct} + \epsilon_t$$

$$PT = -2.689 + 0.637 - 0.529 + 0.310 + 4.203$$

The impact of supply cost on Bolgatanga house prices is 4.203, and is statistically significant at the 10% level in the model. This result implies that a unit change (in Ghana Cedi) in the cost of supply will affect Bolgatanga house prices by 0.77%. On average, the Bolgatanga house price is 8117.5 Cedi per square meter; when supply cost increases by 1 cedi per square meter, Bolga house prices will

increase by 0.11 cedis per square meter. Our findings support the results published by Lv (2011) and Guo and Duan (2008). Lv (2011) analyzed house price dynamics using income and cost of supply. Guo and Duan (2008) modelled house price using cost of supply and the supply-demand relationship. Both studies reported a positive relationship between supply cost and house prices.

The above results show a positive GDP growth coefficient (0.67) for the model, which is significant at the 10% level. This implies that a 1% increase in the speed of GDP growth rate will increase the Bolgatanga house price index by 77%. The growth of income will increase housing affordability, which should positively impact the demand for houses. This is illustrated by Yang and Shen (2008), who investigated the Bolga housing market from 1990 to 2005. The authors reported that the income variable is one of the most important determinants of housing affordability in Bolgatanga market. The authors also found that the impact of income on housing affordability is very large, especially for the first-time house buyers. Stone (2006) examined the fundamentals of housing affordability in the U.S. market, confirming that the income variable has a significant impact on house prices. The authors reported that gross family income determines how large a property loan the buyer can afford to repay, and that this significantly impacts housing affordability.

Conclusion

Because of the lagged effect of supply cost and interest rate (current changes in fundamental variables did not capture the real costs of houses currently being sold), developers tend to use Consumer Price Index (CPI) to estimate the total costs of housing supply in Bolgatanga.

However, developers already know their actual total costs of the housing supply; therefore, they tend to focus on the (borrowing costs) and supply cost (construction and operating costs) to make their decision about house supply and house prices. In general, developers make their decisions based on profit, which is defined as house prices minus total costs of their housing supply; therefore, for a given markup, the house supply is dependent on the total costs. As a result, the costs of capital and construction and operating costs (which depend on supply

cost) significantly impact house prices. Hott and Monnin (2008) suggest that to test the existence of a housing, one should address the gap between real house price and its fundamental prices. Therefore, in order to provide descriptive evidence of the existence of housing prices in Bolgatanga housing market, we compared the movement between the cost of accommodation and the equilibrium house price index, incorporating the economic fundamental variables from our statistical model.

The equilibrium house price index in the Bolgatanga housing market, building in the economic fundamental variables of income, inflation, interest rate and construction cost of house supply. The study results show two similar trends. The only significant differences appear in the last three quarters of 2006, in the second half-year of 2007 and 2010. Theoretically, a house price exists when the real house price index is greater than the equilibrium house price index for a relatively extended period (e.g., three consecutive years).

Recommendations

It is recommended that accommodation prices in Bolgatanga and its environs do not significantly depended upon interest rates and inflation but considers the supply of building materials more significantly than any other factor. In Bolgatanga, a number of Estate Developers do not really rely on banks and other financial assistance as means of financing their accommodation. The conflicts in the neighbouring districts, desire of the youth to stay in urban centre contribute a lot to the recent price hikes in accommodation. The private sector in collaboration with government can also make land available to developers to ease the pressure and cost of land in the area.

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