

A Quantitative Investigation into Determinants of House Prices in Namibia

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Abstract

The purpose of this paper was to empirically examine determinants of property or house prices in Namibia. Results show that it is only land supply that has a significant impact on property or house prices in Namibia. Government intervention is needed to stem the increasing house prices in Namibia. First, it should be made mandatory for a serviced plot in town to remain idle only for a period of up to 5 years beyond which the piece of land can be taken over by a local authority. Second, government should pump more funds via local authorities so that huge amount of virgin lands in local authority areas can be serviced. Thirdly, the construction industry should be properly regulated to prevent buyers from being exposed to high prices of houses by builders who charge anything, in labor cost, as a proportion of total cost.

Keywords: House Prices, Determinants, Namibia, Quantitative Investigation.

1. Introduction

There are several markets that one finds in any economy. One of these is the property market or sometimes referred to as the housing market. The literature shows that housing market has unique characteristics compare to other markets. These include housing as both an investment and consumption good. Another important characteristic of housing, according to the reviewed literature, is that in many countries it is the most preferred form of collateral for bank loans.

The need for housing or shelter is one of the basic needs that each human being should have access to. Other basic needs include but not limited to air and water. There is no way that poverty in a developing world can be eradicated without also addressing housing challenges. This implies that housing should rank highly on a priority list of each developing nation if the quest for poverty eradication or human development is to be achieved.

The purpose of this paper was to empirically examine determinants of property or house prices in Namibia using cointegration and error correction modeling. Quarterly time series data is from 2007 through 2013. In terms of modeling, the dependent variable is house prices. Independent variables include bank credit, land supply, foreign direct investment and prime interest rate.

The paper is comprised of several sections. Apart from the introduction, section two deals with the Namibia property market with the literature review covered in section three. The empirical model appears in section four and section five discusses the results. Conclusion and policy implication appear at the end.

2. The Namibian Property Market

There are laws and policy documents related to housing or property market in Namibia. The Constitution of the Republic of Namibia 1990. s.98 (1), as amended, provides that the economic order of Namibia shall be based on the principles of a mixed economy under different forms of ownership. In terms of who sells land in a local authority area, the Local Authority Act 1992. s.30 (1) (t), as amended, empowers local authorities to sell or dispose immovable property. In Namibia, local authorities service plots or portions of land in the form of installing water, electricity and other services after which plots are sold to buyers. The National Housing Development Act 2000. s.9 (a) establishes the Regional and Local Housing Revolving Fund, which is used to grant loans to persons for the purpose of constructing or acquiring low cost residential accommodation, or for the purpose of acquiring land, in geographical areas.

In addition to the above, the Namibia National Housing Policy advocates the imperative of aggressive mobilization of domestic savings, government subventions, exploring alternative building materials and technologies, and supporting people housing processes to enable Namibia to provide more and affordable housing to her people (Government of the Republic of Namibia, 2009: 5). Vision 2030 says that one of the strategies to reduce poverty by 2030 is to ensure access to adequate housing (Government of the Republic of Namibia, 2004: 105).

Although there are laws and policies to make housing or property affordable, property or house prices have continued to increase in Namibia in recent years. High prices have been felt in bigger cities and towns in central and coastal areas. The end result is that low income earners are finding it difficult to own property as

prices are beyond their means. Kaira (2014: 1) shows that the increased disparity between supply and demand is driving prices upwards so much so that Namibia had the second highest house price increase after Dubai. It is further indicated that recent land sales around Windhoek, the capital city of Namibia, show that individuals have little chances of buying land as most of it is bought by property developers.

The sentiment out there in Namibia is that house prices are high and at an increasing rate. It is interesting to know, from an empirical standpoint, factors that can be used to explain house price changes in Namibia. These determinants can only be known after a literature review is done after which appropriate empirical model is developed. The literature review follows next.

3. Literature Review

There are several markets that one finds in any economy. One of these is the property market or sometimes referred to as the housing market. It is mentioned in the literature that housing has unique characteristics compare to other markets (Stepanyan, Poghosyan and Bibolov, 2010: 3). In this regard, housing is viewed as both an investment and consumption good. Another important characteristic of housing, according to the authors, is that in many countries it is the most preferred form of collateral for bank loans.

The housing market is traditionally studied from two sides, that is, supply and demand. According to Craig and Hua (2011: 7) the supply side variables derived from a model of property market supply are land supply and building costs. Land supply is negatively correlated with residential property price, while building costs should be positively correlated with the residential property price as they put pressure on property developers' margin thereby pushing up price. Housing demand is affected by GDP per capita, prime interest rate and bank credit. Higher household income, lower interest rates and accessibility of bank credit tend to improve housing affordability and availability thus raising demand. Stepanyan et al (2010: 3) indicate that most of the studies in empirical literature focus on the demand side when estimating house price determinants because the supply side of the market is rigid. Rigidity is as a result of shortage of land and time needed for new constructions to be completed.

Given the above theoretical literature, several authors have empirically investigated the determinants of property prices in different countries. Hirata, Kose, Otrok and Terrones (2013: 21) examined four shocks driving movements in global prices using quarterly data during 1971 through 2011. Recursive and sign restriction methods were employed. Four major results can be outlined. First, global interest rate shocks tend to have a significant effect on global house prices in most specifications. Second, global monetary shocks per se do not appear to have a sizeable impact on global house price movements. Third, neither productivity nor credit shocks appear to have a significant impact on house price movements. Last, uncertainty shocks tend to have a significant impact on global house price movements.

Ong and Chang (2013: 124) identified the macroeconomic determinants of housing market in Malaysia from 2000 until middle of 2012 using quarterly data. The dependent variable chosen is house price while independent variables are inflation rate, gross domestic product (GDP) and income incremental rate. The authors employed SPSS version 20.0 statistical package to carry out multiple regression analysis. In terms of the findings, the study points out that GDP has a positive and significant relationship on the dependent variable. Other variables showed insignificant relationship towards the dependent variable.

Craig and Hua (2011: 8) studied the determinants of property prices in Hong Kong SAR using quarterly data from 1997 to 2011 Q2. While dependent variable is property price, independent variables include real interest rate, real GDP per capita, real domestic credit, real construction costs, and land supply. The study employed co-integration and error correction modeling. Research findings show that real GDP per capita has the strongest long run influences on property prices followed by land supply with real interest rate, real construction costs, and real domestic credit having the weakest impact.

Stepanyan, Poghosyan and Bibolov (2010: 10) examined house price determinants in selected countries of the Former Soviet Union during 2000 through 2009. Dependent variable used is house price index and independent variables include real GDP, remittances and foreign inflows. Using a pooled mean group (PMG) of panel data analysis, the results suggest that real GDP, remittances, and foreign inflows have been significant drivers of house prices in the Former Soviet Union.

Vizek (2010: 47) employed cointegration and error-correction models to examine the long-run and short-run behavior of house prices in Eastern and Western European countries. Quarterly secondary time series data was used. The result of the empirical analysis suggest that, in the long-run, interest rate changes explain house price behavior in both groups of countries, while income changes are only relevant for Western European countries. Along with interest rates and income, house prices in both groups of countries react in the short-run to changes in the construction activity. Moreover, house price persistence is important for short-run house price changes in both groups of countries. Housing loan changes also affect the short-run price behavior, but this effect is limited to Eastern European countries.

Selim (2008: 75) carried out research on the determinants of house prices in Turkey as a whole using

data set containing 2004 Household Budget Survey Data. Ordinary least square method was employed in estimating the hedonic model. The results of the hedonic model reveal that water system, pool, type of house, number of rooms, house size, locational characteristic and type of the building are the most significant variables that affect the house prices.

Ge (2007: 90) developed house price forecasting models using multiple regression analysis in order to analyze the main determinants of house prices in the New Zealand market. Quarterly time series data for the period March 1990 to December 2007 were collected. The estimated model suggested that house prices falling in 2007, 2008 and 2009. In terms of the findings, migration plays an important role in determining house price fluctuation, so that a one-percent increase in migration arrivals is associated with approximately a 10 percent change in house prices with a one-year lag. Investment expectations, unemployment, mortgage rate and building permits are also the main determinants of price variations.

Mihaljek and Egert (2007:1) studied the determinants of house prices in eight transition economies of Central and Eastern Europe (CEE) and 19 OECD countries. The main question that they addressed was whether the conventional fundamental determinants of house prices such as GDP per capita, real interest rates, housing credit and demographic factors, have driven observed house prices in CEE. They show that house prices in CEE are determined to a large extent by the underlying conventional fundamentals and some transition-specific factors, in particular institutional development of housing markets and housing finance and quality effects.

Zietz, Zietz and Sirmans (2007: 13) used the quantile regression approach to determine the relationship between housing characteristics with the selling price. The results show that purchasers of higher-priced homes value certain housing characteristics such square footage and the number of bathrooms differently from buyers of lower-priced homes. Other variables such as age are also shown to vary across the distribution of house prices.

Standish, Lowther, Grenville and Quick (2005: 46) analyzed determinants of residential house prices in South Africa during 1974 through 2003. Three models were developed. These are the national model (1974 – 2003), national model (1994 – 2003) and Western Cape model (1994 – 2003). The dependent variable as described in their study is the average house price defined as a smoothed average purchase price of new and existing houses across South Africa. It should be pointed out that overall findings are based on the short-term national model (1994 – 2003) as it provides a better fit. The authors said that a sudden drop in national (that would increase the ratio of household debt to income), a foreign direct investment stock, and/or a sudden drop in the real rand price of gold could bring down property prices. In other words, the ratio of household debt to income has a negative and significant impact on property prices while foreign direct investment (FDI) and rand gold price have a positive and significant impact on property prices.

The above literature review looked at determinants of property prices across authors and countries. Although there are several factors in the literature that can explain changes in property prices, significant variables that are often mentioned by different authors include GDP, foreign inflows or FDI, interest rates and housing loan or credit. These are all macroeconomic factors viewed from the demand side of the property market and not the supply side of the property market. This is in line with Stepanyan et al (2010: 3) who indicate that most of the studies in empirical literature focus on the demand side when estimating house price determinants because the supply side of the market is rigid. Given that Craig and Hua (2011: 7) say that the housing market is traditionally studied from two sides of the market. Land supply is also considered in the empirical model in this study.

4. Empirical Model

The reviewed literature influenced the empirical model for this study. Only variables that are significant, from the literature and for which data is available, form part of the empirical model. These variables were cited by several authors hence their inclusion. Land supply was only cited by one author but it was felt to include it because of availability of data and a perception in Namibia that shortage of serviced land has also been responsible for increases in property prices. The model to be estimated appears below:

$$HP = \beta_0 + \beta_1 FDI + \beta_2 BC + \beta_3 PIR + \beta_4 LS + \mu$$

Where:

HP is house prices as dependent variable. This is affected by a number of independent variables as described below.

FDI stands for foreign direct investment and sometimes referred to as foreign inflows. It is expected to have a positive impact on house prices as found out in other studies.

BC is bank credit and sometimes called housing loan or mortgage credit. There is a positive relationship between house prices and bank credit because a cut in credit to the private sector reduces credit available and hence lessens pressure on house prices.

PIR is the prime interest rate. This also called the prime lending rate and it is the rate banks use to lend money to their customers. A negative sign is expected as high interest rate leads to limited borrowing and likely fall in house prices.

LS is land supply and in this case number of plots or stands sold to the public in a local authority area. A negative sign is expected because limited land supply pushes house prices up.

This study used secondary and quarterly time series data from 2007 to 2013. Econometric package is Eviews. Statistics for the variables house prices (HP) and land supply (LS) were obtained from First National Bank of Namibia. Statistics for other variables, that is, foreign direct investment (FDI), bank credit (BC) and prime interest rate (PIR) came from Bank of Namibia.

5. Discussion of Results

5.1 Stationarity Test

It is a norm in econometric analysis to test for the order of integration before full regression is done. This is carried out by employing the Augmented Dickey-Fuller (ADF) test with the hypothesis being that the time series does not exhibit stationarity. The rule-of-thumb is that there is existence of stationarity of variables if calculated values are greater than critical values of the variables. The results for stationarity test or sometimes called unit root test appear in table 1 below.

Table 1: Results for Stationarity Test

Variable	Order of Integration	ADF Statistic	Critical Value	Level of Significance
HP	Level	-0.799718	-2.629906	10%
	I (1)	-8.234304	-3.711457	1%
FDI	Level	-2.096795	-2.627420	10%
	I (1)	-6.837775	-3.711457	1%
BC	Level	-0.706823	-2.627420	10%
	I (1)	-7.156306	-3.711457	1%
LS	Level	-3.940106	-3.699871	1%
PIR	Level	-3.207978	-3.004861	5%

The above table shows that, with the exception of LS and PIR, all variables are only stationary after first difference, that is integrated of order one, I (1).

5.2 Cointegration Test

Testing for cointegration of variables involves two steps. The first step is to run a long-run regression. The second step is to test for the stationarity of the residual based on the long-run regression. This residual or error correction term forms part of Error Correction Modeling as seen in table 3 ahead. Cointegration results on the stationarity of the residual using ADF are shown in table 2 below:

Table 2: Results for Stationarity Test

Variable	Order of Integration	ADF Statistic	Critical Value	Level of Significance
Error Correction Term (-1)	1 Lag	-4.059305	-3.699871	1%

The above results show that there is indeed cointegration of depended and independent variables. In other words house prices are cointegrated with bank credit, foreign direct investment, land supply and prime interest rate. This is because the calculated ADF statistic is greater than the critical value at 1 percent level of significance.

5.3 Error Correction Modeling

The regression results, from error correction modeling point of view, appear in table 3 below. All variables are differenced as shown by the difference operator (Δ). T-statistics are shown in parenthesis. Signs for prime interest rate, bank credit and error correction term are as expected. Foreign direct investment and land supply have wrong expected signs. Attempts were made drop some variables but this did not alter the expected signs or significance of variables.

Table 3: Error Correction Modeling: Regression Results

Independent Variable	Dependent Variable: Δ HP
Constant	5359.676 [0.620]
Δ LS	665.340 [2.090]
Δ FDI	-0.675 [-0.757]
Δ PIR	-6306.543 [-0.687]
Δ BC	3.384 [0.779]
Error Correction Term	-0.881 [-3.685]
R ²	0.51
Adjusted R ²	0.40
F Statistic	4.52 [2.46]
Durbin-Watson Statistic	1.80

Land supply is the only significant variable on house prices in Namibia although with a wrong expected sign. The positive sign seems to be realistic for Namibia where the number of serviced plots are low year in and year out. For example in the fourth quarter of 2007 only 54 stands were sold and this improved slightly to 64 in 2013 during the same period. It is the scarcity of serviced land that pushed up prices of plots and consequently leading to the increase in house prices hence a positive sign recorded.

The impact of FDI on house prices in Namibia is negative. This could be because FDI into Namibia was not channeled for the construction of houses but rather into factories and other physical investments by foreign investors. This implies that funding to construct and acquire houses might have been through other sources such as mortgage/building loans and not FDI.

Prime interest rate has the expected sign but the impact is low as shown by the t-ratio, which is indicated in brackets. This means that prime interest rate is playing no significant role in influencing house prices in Namibia. The revelation should be accepted because of scarcity of serviced land in town and city lands in Namibia.

Bank credit also has the expected and positive sign. Its impact on house prices, although insignificant, is slightly greater than that of prime interest rate and FDI. Further, the impact of prime interest rate is smaller than that of land supply. This finding is surprising because bank credit grew significantly from NAD21 billion in the fourth quarter of 2007 to NAD61 million during the same period in 2013.

As indicated above, the error correction term has the expected negative sign. It indicates that there is 88 percent feedback from the previous year disequilibrium into the short-run dynamic process and that errors are corrected 88 percent in a year. The coefficient of determination, R², shows that the independent variables included in the model explain about 51 percent of changes in house prices in Namibia. The calculated F-statistic of 4.52 is greater than the critical value of 2.46 implying that all variables jointly explain changes in dependent variable. In addition, there is no serial correlation as measured by Durbin-Watson statistic.

6. Conclusion and Policy Implication

The purpose of this paper was to empirically examine determinants of property or house prices in Namibia using cointegration and error correction modeling. Results show that it is only land supply that has a significant impact on property or house prices in Namibia. House prices have been increasing as a result of shortage of serviced land in Namibia.

There are policy implications arising from this paper. First, it should be made mandatory for a serviced plot in town to remain idle only for a period of up to 5 years beyond which the piece of land can be taken over by a local authority. There is a tendency for some plots remaining idle undeveloped for a very long time. Second, government should pump more funds via local authorities so that huge amount of virgin lands in local authority areas can be serviced. The mass housing project launched in 2014 to construct at least 185000 for the next 17 years is a step in the right direction although this can be negatively hampered by availability of serviced land. Thirdly, the construction industry is not properly regulated, a surprising situation given that shelter is a basic human need. Builders can charge anything, in labor, as a proportion of total cost leaving buyers exposed to high

prices of houses in the process.

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