



## Low-Cost Housing in Sabah, Malaysia:

### A Regression Analysis

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#### Abstract

Low-cost housing plays a vital role in the development process especially in providing accommodation to those who are less fortunate and the lower income group. This effort is also a step in overcoming the squatter problem which could cripple the competitive drive of the local community especially in the state of Sabah, Malaysia. This article attempts to look into the influencing factors to low-cost housing in Sabah namely the government's budget (allocation) for low cost housing projects and Sabah's total population. At the same time, this study will attempt to show the implication from the development and economic crises which occurred during period 1971 to 2000 towards the provision of low cost houses in Sabah. Empirical analyses were conducted using the multiple linear regression method, stepwise and also the dummy variable approach in demonstrating the link. The empirical result shows that the government's budget for low-cost housing is the main contributor to the provision of low-cost housing in Sabah. The empirical decision also suggests that economic growth namely Gross Domestic Product (GDP) did not provide a significant effect to the low-cost housing in Sabah. However, almost all major crises that have beset upon Malaysia's economy caused a significant and consistent effect to the low-cost housing in Sabah especially the financial crisis which occurred in mid 1997.

**Keywords:** Low-cost housing, Regression analysis, Stepwise, Sabah

#### 1. Introduction

The Asian economic growth indicator in the 1980s and early 1990s depicted Malaysia as a country capable of recording an average economic growth of over 8 percent. In addition to this, Malaysia's economy will continue to be influenced by the behavior of the world economy due to its open economic standard which was high and it is this open nature that has been the character of Malaysia's economy since the initial stage of its development until today.

Even so, uncontrolled economic growth and erratic economic crisis can lead to the fragility and instability of the economic system especially during crisis that could cripple the nation's economic competitive edge at the global stage. Sabah's state development in this context is not exempted from the impact of such an economic phenomenon. Amongst this, is the low-cost housing development project which increasingly plays a vital role especially in the development process to tackle social issues. These issues include the ever rising squatter problems which dwindle and could possibly cripple the competitive drive of the local community especially in the state of Sabah. Currently, the buying and selling of ready-built houses especially in the urban area is a norm. Purchasing houses in this area is cheaper and more profitable compared to buying a site and then building one's own home on the said site. According to Mohd. Ali (1991), it is customary for a house to be classified into one of three types according to its cost which include: low-cost house, medium-cost house and high-cost house. Generally, the construction of low-cost housing is more welfare-motivated than medium and high-cost housing and which are more motivated by profit. In Sabah for example, the Urban Housing

Development Board (LPPB) has been entrusted to develop and monitor low-cost housing projects. The board is also responsible to enforce the law or rules relating to low-cost housing projects which are developed by housing contractors.

Undoubtedly, housing is an important wealth component to most people (Grimes et al. 2003, Case et al. 2005). Housing trends affect the welfare of the people whether directly or indirectly and housing construction is an important component in economic activity (Grimes et al., 2003). Usually the state of one's residence reflects the wealth status and their current economic situation. Apart from that, the income and composition of their local community is linked to their local economic situation. One may have the intention to migrate from the economical stresses of a lesser developed area to another area which is more developed.

In his study, Malpezzi (1999) explains that the stock market and bond is reputed to be more effective than the housing market. According to him, in a very well-functioning market, the increase in demand also depicts an increase in supply to which housing prices remain unchanged. However, in the market that is not functioning very well, the increase in demand is not balanced by an increase in adequate supply. Therefore, the price will tend to be raised for a certain period of time and will eventually close the imbalance. This situation would definitely cause a huge negative impact especially on the less fortunate and lower income groups.

From a demographical perspective, Sabah ranks number three in population density after Selangor and Johor (Department of Statistics Malaysia, 2007) where there are as many as 3.06 million people recorded in the year 2006 and this number has shot up to 3.13 million in the year 2008 based on the estimated by Malaysia's Department of Statistic. The population density in Sabah is also due to migration especially from neighboring countries such as Indonesia and Philippines, and the mass entry of illegal immigrants. Based on the statistics in 1970, Sabah's population was 697 900 compared to Sarawak's 1 million. However, in the year 2004, the total of population in the state of Sabah hit almost 3 million people while Sarawak had only 2.3 million people at the time. The issue of illegal immigrants in Sabah has been present for a long time. Various efforts have been made to tackle the issue but this problem continues to exist to this day. It is estimated that a third of Sabah's population in the year 2006 is made up of illegal immigrants. This flooding of illegal immigrants has resulted in Sabah having to put up with high expenses on a daily basis that can be seen from three aspects namely through health care cost, prevention cost and eviction and logistics costs in the detention camps located all over this state. It is estimated that the Sabah state government spends over one million ringgit each day on food alone for illegal immigrants staying in temporary detention camps all over Sabah (Kasim & Mori, 2008).

This situation has also resulted in the existence of several squatter areas such as in the vicinity of Kota Kinabalu, Tawau, Sandakan and several other areas especially in the urban districts. Apart from that, the cleanliness of the city and several towns in this state is also dilapidated while the defiance to present law is on the rise. The occurrence of rapid urbanization in Sabah is also a factor influencing the migration of people into the state.

Generally, there are several factors that can influence housing supply such as price of land, production cost, firm's objective, possible alternative product, total population, government's allocation to housing projects, and government's policy and so on. Nonetheless, the main objective of this study is to see whether there is a significant link in the government's allocation and the total population in Sabah to the low-cost housing in the state. Apart from this, another objective is to analyze other factors which may affect the provision of low-cost housing in Sabah such as the influence of development and economic crisis.

This study is divided into various parts. Part 2 shall discuss the relationship between the economy and low-cost housing. Part 3 explains in detail through data set, theory and models specification. The analysis and empirical decision will be discussed in part 4, and part 5 is the deduction and conclusion.

## **2. Economic and Low-Cost Housing**

Malaysia has gone through five major crises since attaining its independence. These crises include the oil crisis in the year 1971 – 1973, the second oil or commodity crisis in the year 1980 – 1981, the electronic crisis in the year 1985 – 1986, the financial crisis in the year 1997 – 1998, the world electronic demand crisis in the year 2000 – 2001, and 11th September 2001 incident in United States. The causes or the reasons to the crises mentioned are not the same and are distinguishable. The financial crisis in the year 1997 is different with past crises not only because by the significant impact of the financial crisis 1997 on the Malaysian economy compared to past crises but also due to the cause and management for such crises are different (Cheng & Hossain, 2001; EPU, 2008). Hence, economic instability often instigates challenges to permanent economic growth. Most of the property market has recovered with the end of the 1997 financial crisis. This development not only spells opportunity but also a challenge for policy makers and law enforcers from the perspectives of various financial sectors and the low income household group (Chiquier, 2006). When the crisis occurred in 1997, the financial funding system for housing was affected with the rise in interest rates, the rise in house prices, increase in unemployment rate and drop in revenue. Meanwhile, the quality of property in relation

to loan collateral (housing developers' debt) received a larger negative impact compared to individuals having loan through mortgage.

There are reports explaining the way that imperfect real asset financing system (property) has caused the crisis to worsen including myopia amongst lenders (lenders myopia), loan guaranteed with collaterals, inaccurate assessment method, incomplete property market and price information, fragile financial law, absence of supervision indicators such as unsold stock inventories, job vacancies and price of land.

According to Chiquier (2006), in order to improve the ability and capacity for financing housing funds, other funds and credit products need to be created with improvements and adequate support to meet the demands of the informal sectors' needs and that of the lower income group.

The mid-term review of the 2nd Malaysia Plan (1971 – 1975) for example show that low-cost housing construction is aimed at upgrading the standard of living for the poor who are staying in the urban area. The target groups are those who are staying in squatter areas, where the squatters are relocated and provided with various modern facilities in an integrated manner (Mohd. Razali, 1984).

Population growth has increased the demand for low cost housing. For example, in the year 1999 alone, there were as many as 114 994 squatter houses all over Malaysia with an estimated total number of squatter residents at 557 679. From this number, as many as 31 394 squatter houses were in Sabah and the numbers of squatter residents were 150 290. Based on another study in the same year, Sabah was ranked second place after Selangor, while Kuala Lumpur ranked third place, in having the most number of squatter houses and number of squatters in Malaysia.

Ghani and Lee (1997) define a low-cost housing as a house which has a sales price of RM25 000 or less. However, this definition is not precise and is not suitable in today's current period due to the increase in the cost of raw material also the changes in the standard of living. Sulong (1984) on the other hand defines low-cost housing as public housing, government housing, cheap housing and flash housing.

The Ministry of Housing and Local Government has set the guidelines on various categories of low-cost housing namely (i) target groups with a household income of more than RM750 one month, (ii) type of house which include flat, terrace house and longhouse, and (iii) surrounding space of 550 to 600 square feet, two bedrooms, one guest room and one wash room or toilet. According to Ghani and Lee (1997), the main problem faced by private developers in the implementation to the construction of low-cost housing projects is their increasing debts as a result of the rising cost of raw material, employees' wages and also land price. The cost to build a low-cost housing is higher than the ceiling price which has been prescribed by the government. As a result, the private developer has to shoulder the burden of high costs which is higher than their acquired profit.

Table 1 shows the number of low-cost housing built in Sabah during five terms of the Malaysia Plan which starts with the 2nd Malaysia Plan (1971 – 1975) to the 7th Malaysia Plan (1996 – 2000). The low-cost housing supply trend is increasing each year, from 1 079 units in the 2nd Malaysia Plan (2MP) to 6 681 units in the 7th Malaysia Plan (7MP). However, there was a drop in the number of low-cost housing supplied from 4 512 units in the 5MP to 2 938 units in the 6MP. This situation may have been caused by several factors.

First, the implication of the economic situation at the time where the government was taking precautionary steps while observing the sluggish economy encountered by neighboring countries especially Thailand and South Korea as a result of currency speculation. Second, the government's action in reducing low-cost housing may be caused by lower demand for such housing and lesser squatter problems.

The third factor may be caused by inefficiency in the management system for the supply of low-cost housing. This can be clearly seen in the statistics from Table 1 and Table 2 where the low-cost housing number is reduced to 2 938 units but the budget allocated for the low-cost housing is increased from RM116.9 million in 5th Malaysia Plan to RM142.9 million in the 6MP, even though the economic situation at that time was still stable.

The statistics in Table 2 shows that the government's budget allocation for low-cost housing projects in the five terms of the Malaysia Plan in the state of Sabah beginning from the 2MP to the 7MP. The budget for low-cost housing shows an upward trend throughout the five terms period of the Malaysia Plan which is from RM8.02 million in 2MP to RM322.64 million in 7MP. Even so, the positive increase in this budget is not parallel with the increase in the supply of low-cost housing.

### 3. Data and Model Specification

All data which includes the low-cost housing supply ( $SH$ ), government allocation to low-cost housing ( $G$ ) and total population ( $P$ ) are acquired from the Sabah's Urban Housing Development Board (LPPB), and the Sabah State Department of Statistics. Meanwhile, the Malaysia  $GDP$  was acquired from Malaysia's National Bank Annual Report and the International Financial Statistic (IFS), various issues. The data for the government's allocation for low-cost housing are classified within developmental expenditure.

The difficulty in obtaining the most up-to-date data especially for  $SH$  and  $G$  has resulted in the use of annual data series from only the years 1971 to 2000 for this study. Empirical analyses were conducted by using the multiple linear regression method, stepwise (McClave & Sincich, 2003) and also dummy variable approach. A dummy approach was used in this study to see the impact of the economic crises which only occurred during the years 1971 to 2000. Therefore, the impact of the world electronic demand crisis which occurred in the year 2000 – 2001 and 11th September 2001 incident in the United States were not taken into account in this study. The variables description used in this study can be described as follows:

Dependent Variable:

$SH$  = Low-cost housing supply

Independent Variables:

$G$  = Government allocation (+)

$P$  = Total population (population) (+)

$GDP$  = Gross Domestic Product (+)

$D_1$  = 1 (If the crisis was in 1980 – 1981); 0 (Others) (-)

$D_2$  = 1 (If the crisis was in 1985 – 1986); 0 (Others) (-)

$D_3$  = 1 (If the crisis was in 1997 – 1998); 0 (Others) (-)

The equation to reflect the relationship among variables involved namely  $SH$ ,  $G$  and  $P$  is shown in following basic equation:

$$SH_t = f(G_t, P_t) \quad (1)$$

where  $SH$ ,  $G$ ,  $P$  are low-cost housing supply, government allocation to low-cost housing and population respectively,  $t$  represents the time period. The equation above can also be written as:

$$SH_t = \alpha_0 + \beta_1 G_t + \beta_2 P_t + \varepsilon_t \quad (2)$$

where  $\alpha_0$ ,  $\beta_1$ ,  $\beta_2$  are unknown parameters and  $\varepsilon$  is random error amounting to zero (white disturbance). If growth and economic crisis are taken into account, equation (1) can be expanded as follows:

$$SH_t = f(G_t, P_t, GDP_t, D_1, D_2, D_3) \quad (3)$$

where  $GDP$  = Gross Domestic Product,  $D_1$  = commodity crisis, 1980-1981,  $D_2$  = electronic crisis, 1985-1986 and  $D_3$  = financial crisis, 1997-1998. In short, the equations above may be written as:

$$SH_t = \alpha_0 + \beta_1 G_t + \beta_2 P_t + \beta_3 GDP_t + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_3 + \varepsilon_t \quad (4)$$

Meanwhile, the selection of a more appropriate model to reflect the key determinant factors to the supply of low-cost housing is shown in the following equations:

$$SH = \alpha_0 + \beta_1 x_i \quad (5)$$

where  $x = G, P, GDP, D_1, D_2, D_3; i = 1, 2, 3, \dots, k$ . Equation (5) can be expanded such as follows:

$$SH = \alpha_0 + \beta_1 G + \beta_2 x_i \quad (6)$$

where  $x = P, GDP, \dots, D_3; i = 2, 3, \dots, k$ . Then, equation (7) is derived based on equation (5) and equation (6).

$$SH = \alpha_0 + \beta_1 G + \beta_2 P + \beta_3 x_i \quad (7)$$

where  $x = GDP, D_1, \dots, D_3; i = 3, 4, \dots, k$ . The equations above can be expanded until equation (8) is obtained.

$$SH = \alpha_0 + \beta_1 G + \beta_2 P + \beta_3 GDP + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_3 \quad (8)$$

#### 4. Empirical Decision Analysis

The correlation analysis in Table 3 shows that almost all independent variables have significant positive correlations with the low-cost housing supply ( $SH$ ) except  $D_1$  and  $D_2$ . However, the correlation degree between  $P$ ,  $GDP$  and  $D_3$  with low-cost housing supply is relatively modest. Meanwhile, the correlation degree between the government's budgetary ( $G$ ) and low-cost housing supply ( $SH$ ) is fairly strong where it almost reached 84%.

The result of the multiple linear regression estimation and *stepwise* is shown in Table 3. Based on the multiple linear regression analysis, the F-statistic value = 17.481 shows that all independent variables have a significant link with low-cost housing supply.

However, individual test conducted based on  $t$ -statistics shows that not all coefficients for independent variable were significant. These results also show that the economic growth measure based on GDP did not give a significant impact on low-cost housing supply in Sabah. Apart from that, almost all major crises took a significant and consistent toll on

low-cost housing supply in Sabah especially the financial crisis in the year 1997. The coefficient of determination value ( $R^2$ ) which shows a variation of 82 percent in *SH* can be explained as the variation in all independent variable. The value is also indicative that the established model is quite befitting in describing *SH*.

But what is more interesting in this study is that although the second oil or commodity crisis which happened in the year 1980 – 1981 gave significant effect to low-cost housing supply, its coefficient's value is positive and its contrary to what was anticipated in the earlier part of this study (the value expected was a negative). Theoretically, this indicates that an increasing in crisis of a given period will increase the low-cost housing supply. If we look at the Table 1 and Table 2 and their relation with Figure 1, we can see that the impact of the existence of a crisis during the period is not so obvious. This might be because the critical stage of the crisis is not that high (refer to Figure 1) and is not suitable with the concept and definition of a real crisis in the case of Malaysia as founded in the study by Cheng et al. (2001) because during that period, the economic situation of Malaysia was fairly stable. Even so, the impact of the crisis for that period may be more obvious and significant in the case of developed countries (Figure 1).

The result of the analyses using multiple linear regressions was also supported by the result of multiple linear regressions using the *stepwise* method. This indicates that the government's allocation or expenditure for low-cost housing is a core factor in influencing the provision of low-cost housing in Sabah.

## 5. Conclusion

Governmental allocation for low-cost housing projects which is part of the government's development expenditure category is very important in ensuring that the development projects for the welfare and well-being of the people is continued and be continuous in the future. In fact, projects involving the government such as this are paramount in the provision of low-cost housing especially in the eradication of squatter problems which normally occurs in the urban areas. In addition, the government should also encourage and provide incentives to the firms or companies who are investing in housing market especially low-cost housing such as in giving subsidies and also tax exemption for a certain period of time. This is to ascertain that housing developers or contractors are not burdened with high costs due to the rise in expenses for raw material, labor and others costs involved in the housing projects. This is because, based on the market theory, and the supply and demand in the economic system, it is known that the private sector is more concerned towards profit while the government sector is more inclined towards providing for the welfare of the people.

Currently, low-cost housing has become a basic need and the changes in population number will definitely influence the pattern for low-cost housing supply. Apart from that, the government should be prepared to face the population policy challenge which is targeted at 70 million people in the year 2020 by providing more low-cost housing in the future and consequently, achieve the zero squatter status. Economic stability, the involvement and cooperation from all parties including the private sector, government, or individual are vital to avoid another crisis from striking again and rid of the existence of squatter problems in the future.

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Table 1. Low-cost housing based on five years Malaysia Plan in Sabah

	Total Units
2MP (1971 – 1975)	1,079
3MP (1976 – 1980)	2,826
4MP (1981 – 1985)	3,885
5MP (1986 – 1990)	4,512
6MP (1991 – 1995)	2,938
7MP (1996 – 2000)	6,681

Source: LPPB, Sabah

Table 2. Low-cost housing budget based on five years Malaysia Plan in Sabah

	Total RM
2MP (1971 – 1975)	8,029,000
3MP (1976 – 1980)	26,778,000
4MP (1981 – 1985)	89,886,000
5MP (1986 – 1990)	116,944,200
6MP (1991 – 1995)	142,902,300
7MP (1996 – 2000)	322,640,299

Source: LPPB, Sabah

Table 3. Correlation analysis

	SH	G	P	GDP	D1	D2	D3
SH	1.000	0.839**	0.517**	0.549**	0.030	-0.023	0.491**
G	.	1.000	0.756**	0.771**	-0.195	-0.084	0.710**
P	.	.	1.000	0.978**	-0.174	-0.086	0.449*
GDP	.	.	.	1.000	-0.167	-0.123	0.469**
D1	.	.	.	.	1.000	-0.071	-0.071
D2	.	.	.	.	.	1.000	-0.071
D3	.	.	.	.	.	.	1.000

Notes: \*\*(\*) are significant at 1%(5%) levels.

Table 4. Multiple regression &amp; stepwise analyses

Parameter	Dependent Variable: SH	
	Multiple	Stepwise
$\alpha_0$	614.791 (2.571*)	322.063 (4.326**)
$\beta_1$	0.027 (5.486**)	0.017 (8.149**)
$\beta_2$	-0.486 (-1.772)	
$\beta_3$	0.002 (0.876)	
$\beta_4$	463.852 (5.432**)	
$\beta_5$	145.977 (1.853)	
$\beta_6$	-636.843 (-2.300*)	
F-statistic	17.481**	66.401**
R <sup>2</sup>	0.820	0.703
DW	2.169	2.085

Notes: \*\*(\*) are significant at 1%(5%) levels. Numbers in parentheses are t-statistics. DW = Durbin-Watson statistic.

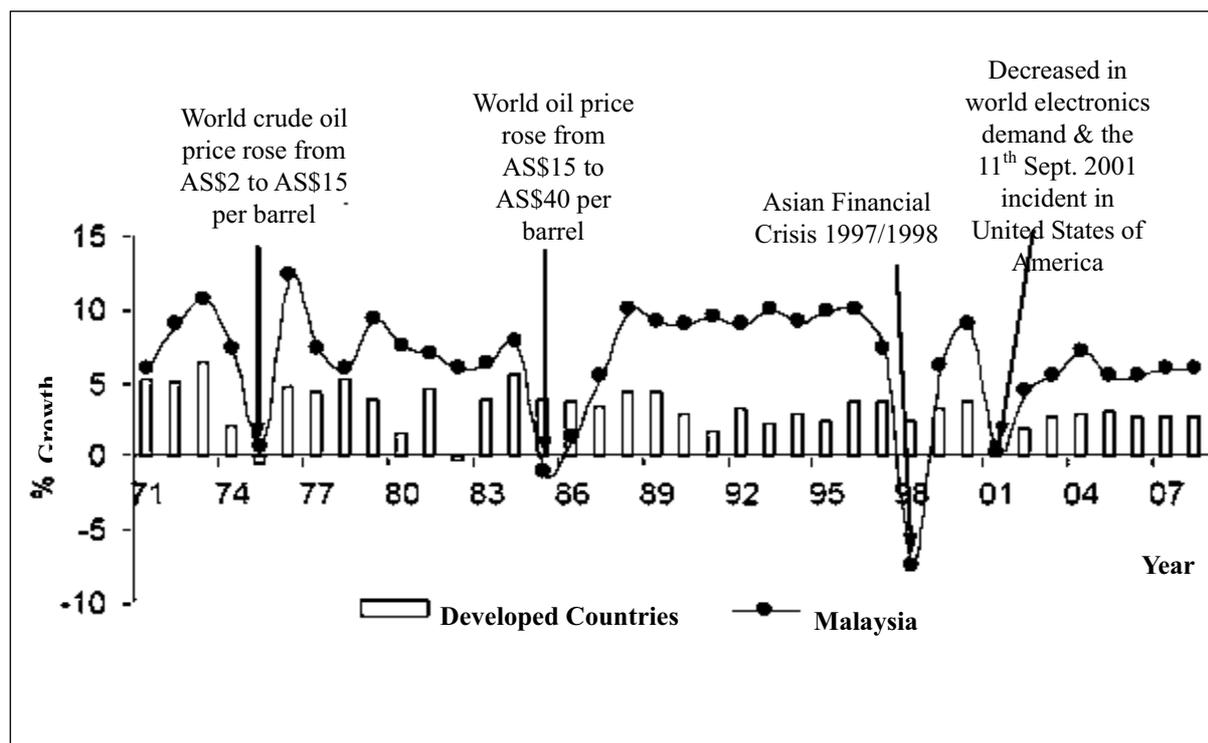


Figure 1. Economic growth and economic crises

Source: Economic Planning Unit, 2008.