Factors Affecting the Amount of Real Estate Loan in the Philippines

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Introduction

Real Estate is a significant component in an economy. The rise and fall of its market usually determines the economic situation in a given country. According to a study by Sornette and Woodward (2009), it has recently triggered the economic recession of the USA which was said to be the worst since the great depression. This was because of the uncontrolled growth of the loans that were given to the unqualified borrowers. What happened has alerted the world especially to everyone involved in the industry.

In the Philippines, the real estate sector is growing like never before. The industry has benefitted the improved economy of the country and significantly contributed to the growth of the economy. It has been reported by the National Statistical Coordination Board (NSCB) in the 1st quarter of 2012 that the said industry outgrew most of the major industries in the Philippines. Together with the increase of the industry is the increase in the real estate loan amount. These loans were generally used to finance the construction and repair of the houses and buildings. The amount of these loans reaches new level each year which indicates the increase in the industry. During the 1st quarter of this year, about P524 billion of outstanding loans have been recorded which is roughly 21 percent higher than the amount recorded for the same period last year. This is said to be the highest recorded level in the industry and was achieved albeit the tightened rules of Bangko Sentral ng Pilipinas (BSP).

There are a lot of factors that drives the growth of the real estate industry. According to an article written in September 2012, one consensus factor is the constant increase of the Overseas Filipino Workers (OFW) and their money remittance. It is reportedly driving the increase in the low-end to mid-end residential property. One of the prominent real estate companies recently reported that around 17 to 18 percent of their sales were attributed from the OFWs and predicted the figure to double in the coming years. Another company accounted the OFWs for 55 percent of their sales and reservations. Other factors stated to have affected the growth include the low interest rate, the increase in housing, and the increase in renting. Another article from UK, cited the affordability of houses and employment as key factors.

There were numerous studies conducted regarding the real estate situation in various places. For one, a study of Messah (2011) which focuses in the factors that influences the property

prices in Kenya revealed that income of the buyers has been a major factor. Another study in Hongkong by Chui and Chau (2005), shows that GDP and real estate investment has no significant relationship which is quite contrary to the assumptions in other economies including the Philippines. It is however clarified that the lack of significance between the two does not mean that real estate has no impact in the economy. Additionally, a study was conducted by Larsen (2004) which focuses on the impact of loan rates on direct real estate investment. He stated in his study that low interest rates are attractive for the buyers or investors. However, the low rates may result in an investor to pay at a higher amount on the property.

In this study, the focus is diverted into the effects of some of the stated factors by recent articles in the amount of loans. These factors include the OFW remittance, number of building constructed, the interest rate (average bank lending rate), consumer price index in housing and renting, employment rate, and the value of residential buildings per square meter.

Methodology and Data

First, the Ordinary Least Squares (OLS) Regression Analysis was used to study the implications of the factors to the real estate loan amount. Then, based on the initial results, a stepwise regression was used to come up with a better model. The goal is to obtain a model to be derived from this analysis by focusing on the selected factors. The data was acquired from various Philippine agencies, namely NSO, NSCB, and BSP, and was consolidated for this study. It ranges from the first quarter of 2003 to the last quarter of 2010 covering around 32 observations. Other factors were excluded due to lack of sufficient data.

Since the data gathered were of very large quantities, it was transformed by performing a natural logarithm in all entries. The Regression Equation representing the objective becomes:

$$lnY = \beta_0 + \beta_1 ln(X_1) + \beta_2 ln(X_2) + \cdots + \beta_6 ln(X_5) + ln\,\varepsilon$$

Where:

Y = amount of real estate loans

X_1 = OFW remittance

X_2 = interest rate

X_3 = employment rate

X_4 = consumer price index for housing and renting

X_5 = value of residential building per square meter

X_6 = total number of building constructed

The following are the assumptions of the Regression Model for this study:

1. $Y_t = \beta_0 + \beta_t X_t + \varepsilon_t$
2. $E(\varepsilon) = 0$
3. $E(\varepsilon^2) = \sigma^2$
4. $Cov(\varepsilon_i, \varepsilon_j) = 0$

OLS Regression Analysis

The main problem of this study is to show the relationship between the amounts of real estate loans to the selected factors namely, OFW remittance, interest rate, employment rate, value of residential building per square meter, and the total number of building constructed. The data were obtained during the period of Quarter 1 – 2003 through Quarter 4 – 2010. The initial expectation is that the loan amount increases as the interest rate decreases. This is due to the traditional assumption that demand is stimulated if the interest rate for borrowing is smaller. On the other hand, there is no clear expected result on the other factors. A summary of the regression analysis is presented in Table 1 below.

Table 1. The estimated effects of the selected variables on the real estate loan amount, 2003 Q1 – 2010 Q4.

Variables	*Coefficients*	*Standard Error*	*P-value*
Constant	-5.92413231	3.081161664	0.065982
OFW remittance	-0.44741727**	0.186633481	0.02431
Interest rate (bank lending rate)	-0.47543934**	0.132888507	0.001452
Employment rate	-0.380676394	0.724776192	0.604049
CPI for housing and renting	3.18280435**	0.88829074	0.001433
Value of residential building per sq. meter	0.422647635**	0.188349469	0.033933
Total no. of building constructed	0.174544427**	0.0788262	0.036153
R Square	0.959930099		

F-statistic	99.81828444		0.0000
Standard Error	0.0463847		
No. of observations	32		
** indicates significant at 5 % level			

The result shows that employment rate does not have a significant relationship with the loan amount. Also, the intercept is insignificant which means when other factors were held constant, the estimated loan amount is equal to zero. All other estimators however are significant at 95 % level of confidence. For instance, the following interpretation is clear by investigating the result:

- The loan amount decreases by 44.7% for every 1 % increase in OFW remittance holding other variables constant.
- The loan amount decreases by 47.5 % for every 1 % increase in interest rate holding other variable constant.
- The loan increases by 318.2 % for every 1 % increase in the CPI of housing and renting holding other variables constant.
- The loan amount increases by 42.2 % for every 1 % increase in the value of residential building per square meter holding other variables constant.
- The loan amount increases by 17.5 % for every 1 % increase in the number of constructed buildings holding other variables constant.

Stepwise Regression

On the next step, the employment rate was removed from the model since it is insignificant. The Akaike Information Criterion was used to justify that this move has a better result. Another result is obtained upon performing the regression without the employment rate. Below is the new model.

Table 2. The estimated effects of the remaining 5 variables to real estate loan amount.

Variables	*Coefficients*	*Standard Error*	*P-value*
Constant	-7.408019569**	1.212315192	0.0000000
OFW remittance	-0.485988059**	0.169172561	0.0079977
Interest rate (bank lending rate)	-0.490880158**	0.127778508	0.0007056
CPI for housing and renting	3.270124466**	0.860357383	0.0007841
Value of residential building per sq. mtr.	0.403623865**	0.182242036	0.0357456
Total no. of building constructed	0.186267574**	0.07454	0.0191052
R Square	0.959487936		

F-statistic	123.1568284**		0.0000
Standard error	0.0457343		
No. of observations	32		
** indicates significant at 5 % level			

All of the coefficients are significant at 95 % confidence. By removing the employment rate we have also lessened the standard error value. Below is the interpretation for this result:

- The loan amount is -7.4 if all variables are held constant.
- The loan amount decreases by 48.6 % for every 1 % increase in the OFW remittance holding the other variables constant.
- The loan amount decreases by 49 % for every 1 % increase in the interest holding the other variables constant.
- The loan amount increases by 327 % for every 1 % increase in the CPI for housing and renting holding the other variables constant.
- The loan amount increases by 40.4 % for every 1 % increase in the value of residential buildings holding the other variables constant.
- The loan increases by 18.6 % for every 1 % increase in the number of buildings constructed holding the other variables constant.
- About 95.9 % of the change in the loan amounts can be explained by the change of the given variables.

Testing of the Parameters

It is important to know the significance of this model. Hence a hypothesis testing is conducted to see the fitness of it. An F-test is used for this test and the following are the results obtained. Table 3 shows the result for the ANOVA.

$H_o: \beta_1 = \cdots = \beta_6 = 0$

$H_1: at\ least\ one\ of\ the\ \beta_s\ is\ not\ equal\ to\ zero$

$\alpha = 0.05$

Decision Rule: Reject Ho if p – value is lesser than α.

Table 3. ANOVA TABLE

	Df	*SS*	*MS*	*F*	*p-value*
Regression	5	1.287989	0.257598	123.1568	0.00000
Residual	26	0.054382	0.002092		
Total	31	1.342371			

The table shows that F = 123.1568 with p-value = 0.000 which is lesser than $\alpha = 0.05$. Since p-value is lesser than α, it follows that the decision for this test is to reject H_o and conclude that at least one of the β_s is not equal to zero. Therefore, the model is fit. It is now safe to say that the generated model is:

$$\begin{aligned} ln\hat{Y} = -7.408019569 &- 0.485988059 \ln(\text{OFW remittance}) \\ &- 0.490880158 \ln(\text{interest rate}) \\ &+ 3.270124466 \ln(\text{CPI for housing and renting}) \\ &+ 0.403623865 \ln(\text{value of residential building/sq. meter}) \\ &+ 0.186267574 \ln(\text{total number of building constructed}) + \epsilon \end{aligned}$$

Test for Autocorrelation

Now that a model is generated, the next step of the analysis is to determine if there exist an autocorrelation of errors. This is to test if a multicollinearity is present. In conducting the test for autocorrelation, the following hypothesis is investigated. The results were obtained using the Shazam package.

$H_o: \rho = 0$

$H_1: \rho \; is \; not \; equal \; to \; 0$

Decision Rule: Reject Ho if p – value is lesser than α.

Table 3. Durbin – Watson Statistic

	p – value
Positive Autocorrelation	0.088481
Negative Autocorrelation	0.991152
** significant at 95% confidence	
Durbin - Watson Statistic	1.35619

Based on the Durbin – Watson statistic result, the p – value for both the positive and negative autocorrelation is insignificant at α = 0.05. Thus the decision is to reject H_o and conclude that there is no statistical evidence that an autocorrelation exists. Hence we will proceed to the next test.

Test for Heteroscedasticity

Here we would like to know if there exist a constant variance of errors in the generated model. The Goldfel-Quandt test is used to determine the existence of heteroscedasticity. Below are the result for this test using the Shazam package.

$H_0: \sigma_1 = \sigma_2$, homoscedasticity

$H_1: \sigma_1 \neq \sigma_2$

Table 4. Goldfeld-Quandt Test

variance for 1st half of the sample	0.0002481352
variance for 2nd half of the sample	0.0011632140
Goldfeld - Quandt value	4.687823412
F - tab at α = 0.05	2.5719

Since the value Goldfeld-Quandt is greater than the tabulated F, the decision is to accept Ho and conclude that there exist a heteroscedasticity. The best solution for this problem is to cure the data. An example for curing the data is to divide the values of the variables by the standard deviations of the respective halves of the sample. This technique was used to obtain the following result.

Table 5. Goldfeld-Quandt test for the transformed data.

variance for 1st half of the sample	1.0000000000
variance for 2nd half of the sample	1.0000000000
Goldfeld – Quandt value	1
F - tab at α = 0.05	2.5719

Here, the value for Goldfeld – Quandt is lesser than the tabulated value of F. Hence it is now safe to conclude that we have cured its heteroscedasticity. This obliges us to refine the model and proceed on performing a regression analysis on the new data. The results below shows the new model obtained from transforming the data.

Table 6. Final Parameter Estimates

Variables	*Coefficients*	*Standard Error*	*P-value*
Constant	-470.28000**	76.9600000	0.0000000
OFW remittance	-0.485988059**	0.169172561	0.0079977
Interest rate (bank lending rate)	-0.490880158**	0.127778508	0.0007056
CPI for housing and renting	3.270124466**	0.860357383	0.0007841
Value of residential building per sq. mtr.	0.403623865**	0.182242036	0.0357456
Total no. of building constructed	0.186267574**	0.07454	0.0191052
R Square	0.959487936		
F-statistic	123.1568284**		0.0000
No. of observations	32		
** indicates significant at 5 % level			

With the results obtained above, the model is refined. The final model for the real estate loan amount is:

$$\hat{y} = -470.28000 - 0.485988059(\text{OFW remittance}) - 0.490880158(\text{interest rate}) + 3.270124466(\text{CPI for housing and renting}) + 0.403623865(\text{value of residential building / sq. meter}) + 0.186267574(\text{total number of building constructed}) + \varepsilon$$

Conclusion

The result of this study indicates that out of all the six factors or variables stated only the employment rate is insignificant. This means that the demand for real estate loan amount does not have direct relationship with the number of employed person in the country, and people will still buy properties regardless of the situation in employment. The OFW remittance and interest rate on the other hand has a negative relationship with the loan amounts. The probable explanation of this is that the more money the OFWs send to the country, the lesser value of loan will they avail due to their improved capacity to pay even with a smaller amount of loan. Furthermore, it has been proven before that demand for loan is stimulated if interest rate is decreasing. The total number of housing, CPI for housing and renting and price of residential buildings has a positive relationship with the loan amount. The probable cause of this is that when builders and developers intend to

sell more properties for this particular time, the buyers will always be willing to buy at the current situation given that the interest rate is low.

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