

## **Determinants of Profitability of Real Estate Companies: FGLS approach employed.**

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### **Abstract**

*The purpose of this research:* The aim of this scientific work is empirically investigate the firm specific and macroeconomic factors that influence the financial performance of real estate companies in the US & UK.

*Originality of the research:* The contribution of this empirical work is twofold. First of all, it is the first study where specific and macroeconomic variables are used to determine profitability of the real estate companies in US and UK, after global financial crisis period. Secondly, up to our best knowledge there is no study that employed political stability variable to determine profitability.

*Methodology:* To empirically investigate the relationship between the dependent and independent variables, we conducted regression analysis. To correct for autocorrelation and heteroscedasticity, feasible generalized least square (FGLS) model is employed.

*Findings:* Capital adequacy and capital structure, as well as management efficiency and corporate tax rate, were found to have a strong and significant impact on the financial performance of the real estate companies.

*Keywords:* Profitability, Real Estate companies, FGLS regression, Macro variables, Firm specific variables.

## **1. Introduction**

The real estate industry affects the living and employment levels of residents, improves the development of cities and drives the rapid development of relevant enterprises, and is also an important source of national financial revenue. Real estate defined as an asset form with limited liquidity in contrast to other types of investments. Real estate activities or investments are categorized as follow: the purchase of property, ownership of the property, after sale management of rent, purchase or rent of land. Generally real estate property covers all property classes comprising commercial, residential, hotel type, resort properties and so on. Real estate growth plays significant role in contribution into development of the country as whole. It is very crucial to investigate the factors that affect the financial performance of the real estate companies. The real estate sector has substantial influence on a nation's economic development. The segment of the real estate adds significant value in the economic growth of a country by creating extensive investment opportunities. As it has been stated by Edison [10] that construction turn out to be the basic input for socio-economic development.

In the United States and the United Kingdom, Real estate assets account for a large amount of the national wealth. It is a very profitable market because it prompts governments to improve inbound infrastructure by infusing the economy with foreign direct investment. Investors are more concerned about the profitability, liquidity, solvency, and efficiency of market actors when they consider the major incentives for investing in real estate. Investors can receive a clear picture of financial performance and operational health by looking at profitability. In this research, the profitability of a company is determined by the firm specific determinants as well as macroeconomic determinants for US & UK.

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The contribution of this empirical work is twofold. First of all, it is the first study where specific and macroeconomic variables are used to determine profitability of the real estate companies in US and UK, after global financial crisis period. Secondly, up to our best knowledge there is no study that employed political stability variable to determine profitability.

To empirically investigate the relationship between the dependent and independent variables, we conducted regression analysis. To correct for autocorrelation and heteroscedasticity, feasible generalized least square (FGLS) model is employed.

Capital adequacy and capital structure, as well as management efficiency and corporate tax rate, were found to have a strong and significant impact on the financial performance of the real estate companies.

## **2. Literature Review**

There are many studies that empirically investigated the determinants of profitability of conventional banks, Islamic banks, manufacture companies, insurance companies and other industries. Up to our best of knowledge, there are few studies on profitability determinants of real estate sector. Most of the studies are based on static approach and ignored problems such as: autocorrelation, heteroscedasticity and multicollinearity. The studies are: [8], [9], [10], [11], [12],[13],[14], [15],[16] and so on. A company's financial performance is influenced by a variety of factors. These include the company's business situation, development trends, social situation, and policies, among other things. Firm-specific determinants that can affect a firm's profitability contain firm size, capital adequacy, liquidity, capital structure, management efficiency and ROE as indicators of profitability and macroeconomic variables that affect profitability are GDP growth, inflation, political stability, corporate tax rate and the time.

## **2.1 Efficient-structure theory**

According to efficient-structure theory, bigger profits come first, followed by more concentration, in terms of timing. In other words, better management and procedures lead to larger profitability, and there is a positive relationship between management efficiency and profitability. [7]

## **2.2 Dependent variable**

When it comes to evaluating a company's profitability, there are numerous factors to consider. Ratio analysis created from financial data are critical for accurately assessing a company's profitability. According to the literature, the profitability indicators ROA and ROE are extensively utilized financial measures by investors to evaluate a company's profitability. [3]

## **Independent variables**

### **2.2.1 *Firm-specific determinants***

*Firm size:* The size of a firm is an essential indicator of its profitability. Devi, A. & Devi,S. and Khaled,M.J.& Samman.H predict a positive relationship between company size and profitability because bigger companies have better access to resources, resulting in higher profits in accordance with literature show the significant and positive relationships of profitability and firm size). However, Mang'ong'o,N.M., Githui,T. & Omurwa showed the opposite result and found insignificant relationship between size and profitability.[1][2][5]

*Capital adequacy:* Capital adequacy was tested in the study of Mang'ong'o,N.M. which examine the impact of capital adequacy on KPDA-registered real estate enterprises using the sales to equity ratio. The results reveal that increasing the sales to equity ratio by one unit leads to an increase in registered company profitability, showing a positive relationship between capital adequacy and profitability.[5]

*Liquidity:* The relationships between liquidity and firm profitability was examined by several studies. They all confirmed that the liquidity is insignificant connection with profitability.[3][4][5]

*Capital structure:* Devi, A. & Devi,S., estimated firm profitability using OLS technique to collect and assess panel data in Pakistan. The study implies that a company's capital structure, as defined by debt ratio, has a significant negative impact on its financial profitability.[1]

*Management efficiency:* Better management and processes result in more profits, there is a positive correlation between management efficiency and profitability as examined in an earlier study.[7]

### **2.2.2 Macroeconomic determinants**

*GDP growth:* Some possible determinants influencing firm profitability are macroeconomic variables including GDP growth, inflation, government debt and time. Surveying Muscat securities market Khaled,M.J.& Samman.H was found that GDP growth positively affects profitability. Similarly, other studies Pervan,M., Pervan,I. & Ćurak,M. observed positive association between profitability and GDP growth. Favorable economic conditions increase demand for a company's products, resulting in more sales and, ultimately, improved profitability.[2][4]

*Inflation:* Inflation has been noted to have a positive and statistically significant impact on profitability. To increase revenues by adjusting product prices, as well as to take steps to ensure that operational costs are kept below the firm's income, resulting in improved profitability.[4]

*Political stability:* Political stability has a significant impact on the profitability of firms as it was found in a study of banks in Yemen. According to the findings of the study, political instability had a positive impact on the profitability (ROE) of banks.[6]

*Corporate Tax:* Corporate tax rates also have a potential effect on profitability as examined by a study that looked at the impact of tax rate variable effect on profitability in companies of Tehran Stock Exchange from 2004 to 2010. The result shows that tax has significant negative impact on profitability.[7]

### **2.3 Hypotheses of the study**

Based on the aforementioned literature, the following hypotheses are proposed in order to analyze the relationships between the dependent and independent variables:

H1: Total assets have positive impact on probability of real estate firms.

H2: Capital adequacy has positive influence on the probability of real estate firms.

H3: Liquidity has negative impact on probability of real estate firms.

H4: Capital structure has significant negative influence on the probability of real estate firms.

H5: Management efficiency has positive impact on probability of real estate firms.

H6: GDP growth has positive influence on the probability of real estate firms.

H7: Inflation has positive influence on the probability of real estate firms.

H8: Political statistic has negative impact on the probability of real estate firms .

H9: Corporate tax has negative influence on the probability of real estate firms.

H10: Time dummy has positive influence on the probability of real estate firms.

### 3. Data and Methodology

#### 3.1 The Data

This study makes use of financial statements from market beat-listed companies as well as data from The World Bank. The information was gathered from four companies for a ten-year period between 2011 and 2020. We used firm-specific and macroeconomic determinants of firm profitability in this study. A model was created with the goal of examining the correlations between the dependent and independent variables, as well as possible relationships between and among the variables. Panel data statistics was used to obtain a result due to the data's series format.

#### 3.2 Methodology

We utilized FGLS (feasible generalized least square) to conduct the regression because it corrects for autocorrelation, heteroscedasticity, and cross sectional dependency. We utilize this model if ( $N < T$ ), as we used four companies ( $N$ ) over a 10-year period ( $T$ ). The regression model used is as follows:

$$ROE = \beta_0 + \beta(TA) + \beta(TETA) + \beta(LIQ) + \beta(D/E) + \beta(DTI) + \beta(GDP) + \beta(INF) + \beta(PS) + \beta(TAX) + \beta(DUMMY)$$

Where,

**ROE:** Return on equity as measure of profitability of firm

**TA:** Total assets as measure of the size of firm

**TETA:** Total equity to total assets as a proxy of capital adequacy.

**LIQ:** Current Assets/Current Liabilities as measure of liquidity of firm

**D/E:** Total debt/Total equity as measure of capital structure

**DTI:** Cost to income ratio as a measure of management efficiency

**GDP:** GDP growth

**INF:** Annual inflation rate

**PS:** Political statistic index

**TAX:** Corporate tax rate

**DUMMY:** crisis year (2020)

### 3.3 Theoretical test

Efficient-structure theory, according to previous literature, shows that management efficiency and profitability are positively correlated. In this study, we performed a theoretical test to see if the results were consistent with previous research.

## 4. Empirical Results

Table 4.1. Descriptive Statist

| Variable    | Obs | Mean     | Std. Dev. | Min      | Max      |
|-------------|-----|----------|-----------|----------|----------|
| ROE         | 40  | .1439248 | .0760763  | .0135279 | .3702609 |
| TA          | 40  | 18174.22 | 11748.02  | 3932.6   | 47233.5  |
| TETA        | 40  | .3038681 | .0964783  | .0967195 | .4765302 |
| LIQ         | 40  | 1.033796 | .2524352  | .465368  | 1.490177 |
| TDTE        | 40  | 2.719639 | 1.607841  | 1.098457 | 9.29275  |
| CTI         | 40  | 4.712777 | 4.760342  | .923283  | 14.91862 |
| GDP         | 40  | .0117    | .0287805  | -.098    | .031     |
| INF         | 40  | .01945   | .0095728  | .007     | .056     |
| PS          | 40  | .49585   | .0692297  | .335     | .581     |
| Tax         | 40  | .245255  | .0397485  | .19      | .2931    |
| _IYear_2020 | 40  | .1       | .3038218  | 0        | 1        |

Table 4.1 contains information on descriptive statistics including observation, means, minimum, maximum, and standard deviations. The standard deviation, which gauges a variable's variability, can be used to assess fluctuation. The profitability of real estate companies are relatively stable, as can be observed from the descriptive statistics table, because the standard deviation of ROE (0.076) is lower than the mean (0.143). At the same time, because their standard deviations are below the mean, the total asset, capital adequacy, liquidity ratio, capital structure, inflation rate, tax ratio and political stability, it can be assumed that the volatility is not particularly high. The cost to income ratio and GDP growth rate, on the other hand, has a high volatility standard deviation (4.76) and (0.028), which is higher than the mean (4.712) and (0.012). The descriptive statistics table shows that all variables have a positive mean value over the study period, ranging from -0.098 for GDP growth rate to 14.92 for management efficiency ratio.

Table 4.2. Correlations among Variables

|             | ROE     | TA      | TETA    | LIQ     | TDTE    | CTI     | GDP     | INF     | PS      | Tax     | _IY~2020 |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| ROE         | 1.0000  |         |         |         |         |         |         |         |         |         |          |
| TA          | -0.2466 | 1.0000  |         |         |         |         |         |         |         |         |          |
| TETA        | -0.4559 | -0.4590 | 1.0000  |         |         |         |         |         |         |         |          |
| LIQ         | -0.2835 | 0.1065  | 0.2558  | 1.0000  |         |         |         |         |         |         |          |
| TDTE        | 0.6233  | 0.2685  | -0.8923 | -0.3446 | 1.0000  |         |         |         |         |         |          |
| CTI         | -0.1781 | -0.6287 | 0.6823  | 0.0936  | -0.5084 | 1.0000  |         |         |         |         |          |
| GDP         | 0.0396  | 0.3168  | -0.0815 | -0.0231 | -0.0373 | -0.2070 | 1.0000  |         |         |         |          |
| INF         | -0.2021 | -0.2169 | 0.2324  | 0.1016  | -0.2124 | 0.2833  | -0.7545 | 1.0000  |         |         |          |
| PS          | -0.2964 | 0.4520  | 0.1313  | 0.3429  | -0.2779 | -0.0682 | 0.2627  | -0.0092 | 1.0000  |         |          |
| Tax         | -0.1266 | 0.8164  | -0.5647 | -0.2403 | 0.4691  | -0.6580 | 0.2755  | -0.3197 | 0.0943  | 1.0000  |          |
| _IYear_2020 | 0.0973  | -0.2784 | -0.0771 | -0.1632 | 0.2384  | 0.0546  | -0.9172 | 0.5131  | -0.3699 | -0.1155 | 1.0000   |

The table 4.2 above shows high correlation between capital structure and ROE, capital structure and capital adequacy, management efficiency and total asset (firm size), management efficiency and capital adequacy, management efficiency and capital structure, inflation and GDP growth, tax rate and total asset (firm size), tax rate and capital adequacy, tax rate and management efficiency. Correlation between other variables is very modest. In addition, there is a negative correlation between variables, as shown in the table.

Table 4.3 Variance Inflationary Factor (VIF)

| Variable    | VIF   | 1/VIF    |
|-------------|-------|----------|
| GDP         | 30.16 | 0.033156 |
| _IYear_2020 | 19.95 | 0.050120 |
| TETA        | 8.87  | 0.112740 |
| TA          | 7.60  | 0.131544 |
| TDTE        | 7.53  | 0.132780 |
| Tax         | 6.32  | 0.158231 |
| INF         | 5.03  | 0.198987 |
| CTI         | 2.89  | 0.345867 |
| PS          | 2.01  | 0.497314 |
| LIQ         | 1.83  | 0.546098 |
| Mean VIF    | 9.22  |          |

We use the variance inflation factor (VIF) to detect multicollinearity. If mean VIF less than 10, then it is acceptable. We obtained mean VIF=9.22 in our model, indicating that there is normal correlation between the independent variables that does not necessitate further corrections.

Table 4.4 OLS regression

| Source   | SS         | df | MS         | Number of obs | = | 40     |
|----------|------------|----|------------|---------------|---|--------|
|          |            |    |            | F(10, 29)     | = | 7.49   |
| Model    | .162718106 | 10 | .016271811 | Prob > F      | = | 0.0000 |
| Residual | .062998359 | 29 | .002172357 | R-squared     | = | 0.7209 |
|          |            |    |            | Adj R-squared | = | 0.6247 |
| Total    | .225716466 | 39 | .005787602 | Root MSE      | = | .04661 |

  

| ROE         | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval] |           |
|-------------|-----------|-----------|-------|-------|----------------------|-----------|
| TA          | -1.05e-06 | 1.75e-06  | -0.60 | 0.553 | -4.63e-06            | 2.53e-06  |
| TETA        | .2950411  | .2303906  | 1.28  | 0.210 | -.1761607            | .7662428  |
| LIQ         | -.0337761 | .0400081  | -0.84 | 0.405 | -.1156019            | .0480497  |
| TDTE        | .053216   | .0127387  | 4.18  | 0.000 | .0271625             | .0792694  |
| CTI         | -.0048354 | .0026659  | -1.81 | 0.080 | -.0102877            | .000617   |
| GDP         | .4592949  | 1.424142  | 0.32  | 0.749 | -2.453403            | 3.371992  |
| INF         | -.0551478 | 1.747763  | -0.03 | 0.975 | -3.629724            | 3.519428  |
| PS          | .0429167  | .1528713  | 0.28  | 0.781 | -.2697401            | .3555736  |
| Tax         | -1.147355 | .4720275  | -2.43 | 0.021 | -2.11276             | -.1819508 |
| _IYear_2020 | -.020251  | .1097261  | -0.18 | 0.855 | -.2446662            | .2041641  |
| _cons       | .2441974  | .1783157  | 1.37  | 0.181 | -.1204991            | .6088939  |

Table 4.5 FGLS regression

|                                                               |   |    |  |                  |   |        |
|---------------------------------------------------------------|---|----|--|------------------|---|--------|
| Coefficients: generalized least squares                       |   |    |  |                  |   |        |
| Panels: heteroskedastic                                       |   |    |  |                  |   |        |
| Correlation: common AR(1) coefficient for all panels (0.1615) |   |    |  |                  |   |        |
| Estimated covariances                                         | = | 4  |  | Number of obs    | = | 40     |
| Estimated autocorrelations                                    | = | 1  |  | Number of groups | = | 4      |
| Estimated coefficients                                        | = | 11 |  | Time periods     | = | 10     |
|                                                               |   |    |  | Wald chi2(10)    | = | 100.50 |
|                                                               |   |    |  | Prob > chi2      | = | 0.0000 |

  

| ROE         | Coef.     | Std. Err. | z     | P> z  | [95% Conf. Interval] |           |
|-------------|-----------|-----------|-------|-------|----------------------|-----------|
| TA          | -1.26e-06 | 1.41e-06  | -0.89 | 0.374 | -4.03e-06            | 1.52e-06  |
| TETA        | .3527976  | .1797941  | 1.96  | 0.050 | .0004076             | .7051876  |
| LIQ         | -.0133086 | .0320182  | -0.42 | 0.678 | -.0760631            | .049446   |
| TDTE        | .0513039  | .0116565  | 4.40  | 0.000 | .0284575             | .0741503  |
| CTI         | -.0060175 | .0019005  | -3.17 | 0.002 | -.0097425            | -.0022926 |
| GDP         | 1.038111  | .9924428  | 1.05  | 0.296 | -.9070409            | 2.983263  |
| INF         | 1.259132  | 1.224458  | 1.03  | 0.304 | -1.140761            | 3.659025  |
| PS          | -.0636774 | .095079   | -0.67 | 0.503 | -.2500288            | .122674   |
| Tax         | -.8139954 | .3791589  | -2.15 | 0.032 | -1.557133            | -.0708576 |
| _IYear_2020 | .0010353  | .0828436  | 0.01  | 0.990 | -.1613352            | .1634057  |
| _cons       | .1666082  | .1379831  | 1.21  | 0.227 | -.1038337            | .43705    |

Comparing the two regression findings above, we can see that the FGLS regression model provides more significant values and is more reliable. For FGLS regression analysis, we need to

pay attention to coefficient and P-value parts. We can determine whether the variables are

positively or negatively associated using the coefficient, and the significance can be determined using the P-value, which will be less than [0.01, 0.05, or 0.10]. The P-value of four variables TETA (0.050), TDTE (0.000), CTI (0.002), TAX (0.032) are less than 0.05, indicating a significant relationship with profitability determinant (ROE).

The results of the FGLS regression are summarized in Table 4.5 above which shows that firms with large number of assets do not necessarily have high profitability, it means firm size (TA) affecting negatively ROE and opposite to the findings in an earlier study by [1] and [17]. Capital adequacy (TETA) has strong significant positive correlation with ROE, well capitalized firms will have more money invested in projects and at the end of the day ROE will go up [5]. Liquidity (LIQ) has a negative impact on ROE. This may be due to the fact that the higher the level of liquidity, the less opportunities a company has to invest in new projects [18], [7], [5]. Capital structure (TDTE) has significant positive impact on ROE, this means that companies with high equity have better financial performance than businesses with low equity, but opposite to [4]. Management efficiency (CTI) has a negative and significant effect on the profitability of firms in this sector. Therefore, we can see that a company's management efficiency is inversely related to its profitability. Therefore, it is concluded in this study that the cost-income ratio has significant negative impact on the profitability of real estate companies statistically. This result is consistent with the findings of [3] but opposite to [8], it means efficient-structure theory is not supported. A positive link between profitability and GDP growth is preferable in general. Al-Jafari1 & Al Samman (2015) findings support the idea of a positive association between GDP growth rate and profitability. The increase in the inflation rate makes the housing price rise, which increases the income by adjusting the housing price, thus improving the performance of enterprises. Pervan et al. (2019), also shown that inflation (INF) has a positive effect on the profitability of companies. Political stability (PS) in the result indicate a negative relationship with ROE, and not having a significant influence on profitability of firms in this industry, it is different with [19]. The tax has a negative significant effect on the ROE, Perhaps due to the company's development stage and limited employment opportunities, some tax situations may have a negative impact on the company's profitability, which is consistent with study findings [8]. Time dummy indicator shows a positive relationship with ROE, but is not much correlate. Time variable (dummy) has positive impact on profitability but not a significant influence, which means the financial crisis caused by 2020 COVID-19 has not had a negative

impact on the profitability of the four companies we studied but has increased the profitability of companies.

## 5. Conclusion

The impact of firm specific, macroeconomic on the profitability of real estate companies in US & UK were investigated in this paper. For this analysis, we employed the panel data approach with World Bank data for four real estate companies between 2011 and 2020. We discovered that capital adequacy (TETA) and capital structure (TDTE) have significant positive relationship with profitability of real estate companies. Management efficiency (CTI) and corporate tax rate (TAX) have significant and negative impact on profitability of real estate companies.

As practical implications, the findings are expected to help managers, investors, academics, and policymakers gain a better understanding of real estate industry. Policymakers can use the aforementioned relationships for forecasting and stress testing purposes to prevent any potential financial turmoil.

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