Profitability Variations Across Construction Firms in the UAE: Assessing Industry Contributions to National Economic Growth

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The study establishes relationships between profitability in the UAE construction industry and determines its contribution to economic growth. It sought answers to the problems of significant influence, independence, and how strongly profitability variations predict economic growth. Profitability rates of fifty construction firms in UAE used in the study, for a period of ten years. Findings reveal significant influence of profitability variations on economic growth. There is high degree of influence of construction tender price on economic growth and low positive correlation of industry output and labor rates. Profitability variations significantly influence economic growth and are not independent of each other.

1. Introduction

Profitability is a financial metric utilized in the assessment of the firm's ability to generate income compared to costs and expenses, over a specific period of time and is measured by the ratio of price to earnings. Economic growth in the UAE shows robust performance due to contributions from the construction markets. Projections reveal that market outlook of the UAE construction industry for the long-term is poised for continued growth and increased performance (Financial Stability Report, 2014).

The UAE construction industry is highly sensitive to industrial developments in the macroeconomic conditions, with the nation's banking and financial institutions having exposures to the industry. The industry is self-sufficient and do not receive any government subsidy according to the Agreement Establishing the World Trading Organization (WTO) 1994, (Ossman, 2006, 1999 & 1998). Recording a share of 8.4% of the total GDP in the first quarter of 2014, Dubai construction industry records the 5th largest sector in the UAE economy.

The study determined the significant influence of profitability variations variables in the construction industry on UAE economic growth, the independence of the two variables from each other, and how strongly profitability variations variables of industry growth, construction tender price, and labor rates movement predict UAE economic growth. The study is limited on the influence of the three variables of profitability variations and how strongly these variables predicted the achievement of UAE economic growth. It is deemed significant in the provision of insights to UAE policy makers for the enhancement of economic and financial policies that will successfully increase the level of economic

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performance.

Findings of the study serve as a guide to students in understanding the profitability strategies currently affecting the economic performance level in UAE.

The research contributes to the existing body of knowledge by providing information to employees of the respondent industry on new trends of survival and competitiveness through profitability techniques. Results of the study are significant to all organizations in the global environment, and can be used to build a framework for profitability that can lead to increased level economic performance. Other interested parties like future researchers interested in the same topic, may use this study as a reference in their research understanding.

Previous studies give emphasis to profitability variables of revenue, costs, and assets and their impact on firms' performance, making the present study different as it focuses on profitability variables in the construction industry and its contributions to the overall economic growth of UAE. The focus on relevance of profitability variations variables on UAE economic growth makes the study original and entirely different from previous studies. With the establishment of construction industry as an important component of UAE non-oil economy, the researcher is motivated to uncover the elements of profitability and their influence to the overall economic growth of the country.

The research paper is organized starting with the introduction which contains a brief discussion of the variables of profitability variations in the construction industry, the UAE economic growth, summary of the statement of problem and the null hypotheses, scope and limitations of the study, its significance, contributions to the existing body of knowledge, and comparisons with similar previous studies. The second section of the paper shows literature review and presentation of the theoretical and conceptual frameworks of the study. The third presents the methodology comprising research design, sample and sampling design, and the research instruments and techniques used in the study. Findings of the study are presented in the fourth section of the paper followed by the conclusions of the study.

2. Literature Review

The literature review describes and evaluates previous studies relevant to the problem investigated. Previous researches explored key drivers of profitability in various industries in areas of revenue, costs, and assets and their relationship with organizational performance and industry competitiveness. The present study deals with variables of industry growth, construction tender price, and labor rates movement and their relationships with economic growth, which have not been covered by past researches. Findings of the study are significant in explaining the influence of profitability variables to economic growth, specifically in UAE.

Wetzel, Hammerschmdt and Zablah (2014) concluded that strategies of customer prioritization focusing on customers can improve profitability, but undermine profitability through inducement of customers in becoming overly demanding. A comprehensive strategic model can be used to manage profitability, Mohamed and Jones (2014). Findings of the study revealed that comprehensive profitability model containing assets, cost, and revenue techniques is a better predictor of profitability than alternative models with combination of the two variables. The research of Khanna and Rivkin (2014) developed a

chart showing direction and existence of correlation between average profitability in various emerging-markets. It investigated the effects of IT on improving a firm's profitability and compares its effects with advertising, research and development. Mithas, Tafti, Bardhan, and Mein Goh, 2012 found that the effects of IT investments on profitability and sales are higher than discretionary investments in terms of research, development, and advertising. Business firms can achieve higher profitability utilizing IT-enabled revenue growth than through IT-enabled cost reduction.

The research of Aydilek and Allahverdi (2013) focused on the relationship between profitability, competitiveness, and make span of business firms. Computational findings show that one of the versions, with equal weights given to setup times, perform much better than others. Kotlar, Fang, De Massis, and Frattini, (2014) concluded that prediction of the profitability of the business is desirable in the design phase of business collaboration. They proposed techniques for assessing profitability, costs, risks, and revenues, and introduces modeling and prediction approaches with supporting software tool. Singhania, Sharma, and Rohit (2014) proved that the cycle of cash conversion is negatively correlated to profitability. Pai (2009) examined the profitability and efficiency of banks operating in India. Data analysis revealed significant variation in profitability and efficiency of the respondent bank groups. Beard and Dess (1978) found that the effects of inter-industry variation on profitability are significant and positive. Thomadakis (1977) examined industry organization traditional hypotheses in order to relate various aspects of market structure to cross-sectional variation of industry or firm profitability. Varying profitability within an industry or among firms are due to super efficiency in production, distribution and superior bargaining position of the firm.

Adams (1976) explained the variations of rates of return on investment across industrialized countries. His study revealed that relative profitability of a firm is dependent on market structure in which it operates, with variations in market structure across countries. Skitmore (1989) defined construction contract pricing as a process flow in which events are taken into consideration over a continuous time period, and pricing activities do not occur in simultaneous fashion. Flanagan and Norman (1989) recognized that a variety of pricing systems in the construction industry and determined by contractual relationship of the client and contractor. Schill (1985) concluded that risk distribution between contracting parties is essential in contract pricing. Akintoye (1991) identified the various factors when making decisions on construction bid price. For cost models development that are logically transparent and explanatory, Beeston (1983) stated that understanding construction price movements is one of the paradigm shifts. Bowen and Edwards (1985) revealed the need for future cost modeling approaches and forecasting of price for construction projects in order to accept a continuing need for historically derived data in the exploration of cost trends and relationships.

Construction and real estate industry in UAE achieved a double-digit annual growth and 15% share of the country's GDP. Unprecedented growth is mainly contributed by Abu Dhabi and Dubai, with the highest growth record of construction projects, making the two cities the hub for some of the world's biggest construction companies, with the UAE account of 23% of the economy of the GCC region (Kumar, Agarwal, & Khullar, 2010). Massive boom in economic activities is apparent in UAE with the construction sector growth of 25.6% in 2007 (The Allen Consulting Group, 2013). When cost is not the only criterion used in tender price evaluation, the process is considered to be dependent on subjective judgment (Nguyen, 1985). The paper of Enshassi, Kumaraswamy, and Al Najjar (2014) revealed that lack of materials in markets, delay of material delivery to site, strikes, border

closures, cash flow problems during project execution, and poor management of site are the most significant causes of time delay.

## 2.1 Theoretical Framework of the Study

**Figure 1: Theoretical Framework of the Study
"Drivers of Enterprise Value"(Schneider, 2014)**

Figure 1 presents a profitability model which indicates three main drivers of the value of an enterprise. Profitability is the most essential measures of success of a business firm and its ultimate value. Sources of profit growth are highly dependent on assumptions in capital markets, potential growth of clients, acquisition of new client households, and profit sustainability. The Framework also includes ensuring that the fee level is in line with the firms' services being offered. The model discusses assessment of profitability, where revenue matters, and the concept that business organizations cannot have value without having profits.

2.2 Conceptual Framework of the Study

**Figure 2: Research Paradigm
Relationships of Independent and Dependent Variables**
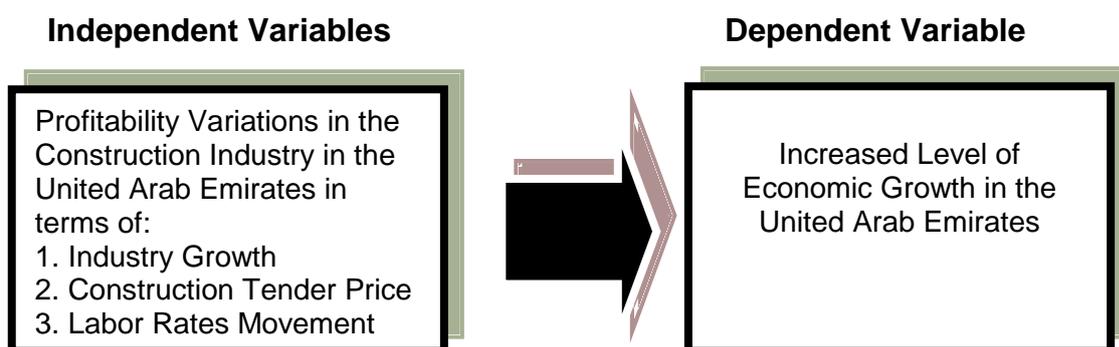
The study assumes the influence and contribution of profitability variations to the dependent variable. It adopts the notion that variations in profitability of the construction industry in areas of industry output, construction tender price, and labor rates movement lead to increased level of UAE economic growth. The research identifies the independence of construction profitability and economic growth, and determines which of the profitability variables predict the UAE economic growth. A profitability model is formulated to provide

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increased profitability in the construction industry and contribute to national economic growth.

3. The Methodology and Model

3.1 Research Design

Qualitative and quantitative techniques are used in the study. Econometric model of time series analysis with lagged variables is used to analyze historical data and predict future trends, in the long-term. The study deals with new variables significant to the UAE economic growth, hence, findings serve as new strategies for achieving industry profitability and economic growth.

3.2 Sample and Sampling Design

Data used in the study were obtained from documentary analysis of actual performance of fifty construction firms in the UAE from 2005 to 2015. Purposive sampling used to show that the sample size is representative of the total population.

3.3 Research Instruments and Techniques

Unstructured interviews conducted at random among employees in selected construction firms to elicit additional information, which supplemented the data that were gathered from secondary sources. Arithmetic mean is the measure of central tendency of data for the variables. Time series analysis with lagged variables was used to determine trends and to model the changes in profitability variations and economic growth over the ten-year period for which the variables were observed. Time series plots, lagged scatter plots, and autocorrelation functions were used as tools to assess the lagged correlation of the time series. Correlation analysis measures the degree of relationship between the profitability variations and UAE economic growth. The chi-square test of independence tests the hypothesis that categorical variables of profitability variations and economic growth differ from one another and are independent of each other. To measure how strongly each of the profitability variations variables predict the UAE economic growth, Regression Analysis was used.
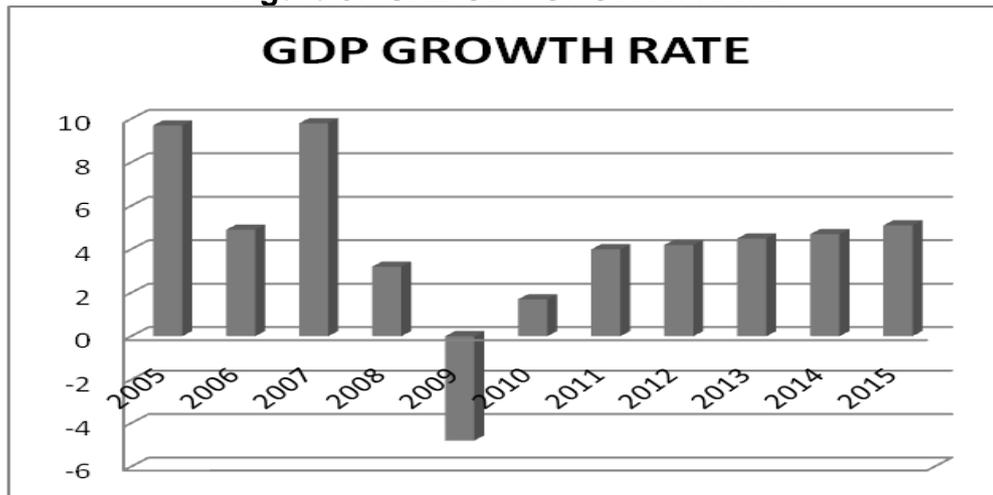
4. The Findings

4.1 UAE Economic Growth

United Arab Emirates strengthens its position as a primary trade center in the GCC region, and is considered as the third largest export center in the world. This is attributed to increased oil revenues, economic diversification, stringent government spending, and zero-deficit budget. The construction industry contributed about 12% of the non-oil GDP, and continues to be the key source of income, economic growth, and employment.

With strong signs of an upward trend in oil price, the economy grew at 4.2% in 2012 and 4.5% in 2013, and a strong recovery of 4.7% in 2014. Overall UAE GDP growth has been projected to head towards 5.1 % in 2015.

Figure 3: UAE GDP GROWTH RATE

GDP GROWTH RATE

(chart showing GDP growth rate bars for years 2005 through 2015, y-axis from -6 to 10)

(Source: Samba, IMF, IIF, National Bureau of Statistics, UAE)

4.2 Construction Industry Output

As presented in Figure 4, industry output records a 12% highest growth in 2005 and a low record of 8% in 2013. Output growth rate rose to 9% in 2014 and continues to rise to 11.1% in 2015.

**Figure 4: UAE Construction Industry Output
Year: 2005-2015**

INDUSTRY OUTPUT

(chart showing industry output bars for years 2005 through 2015, y-axis from 0 to 12)
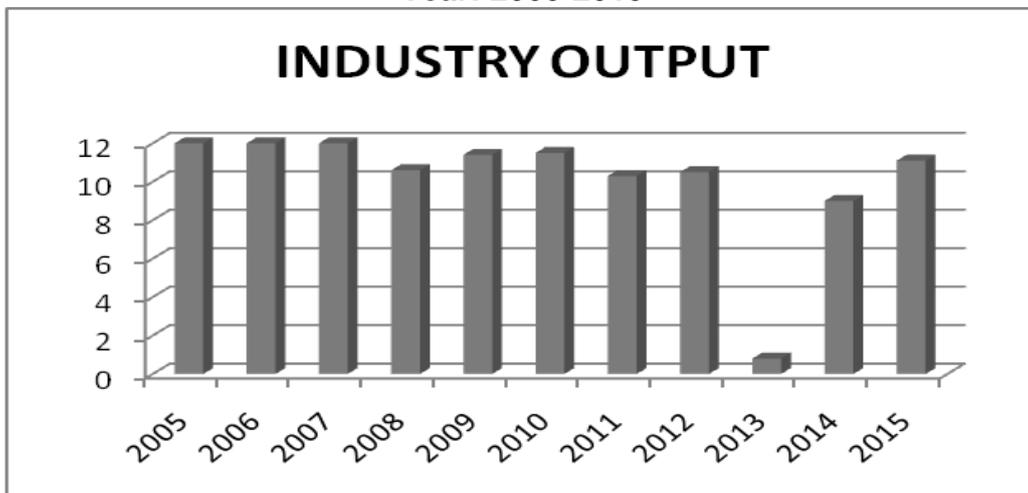
Source: NDB Sector Economics (2014)

4.3 Construction Tender Price

The tender price index uses data from accepted tenders, lowest or second lowest bids, and final accounts.

**Figure 5: UAE Percentage Change of Tender Price Index
Year: 2005-2015**
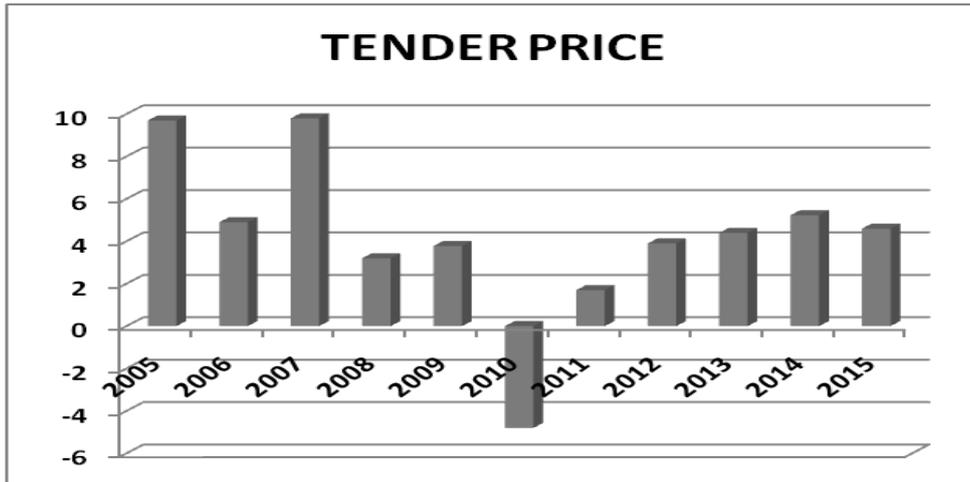
Source: International Monetary Fund (2014)

As presented in Figure 5, construction tender price records highest in 2007 at 9.8% and lowest at -4.3% in 2010. As construction output remains strong in UAE, tender prices continue to outstrip retail price inflation. With fluctuating commodities markets, limited availability of resources, and the demand driven construction market, costs of construction rose to 20% in 2008.

4.4 Labor Rates Movement

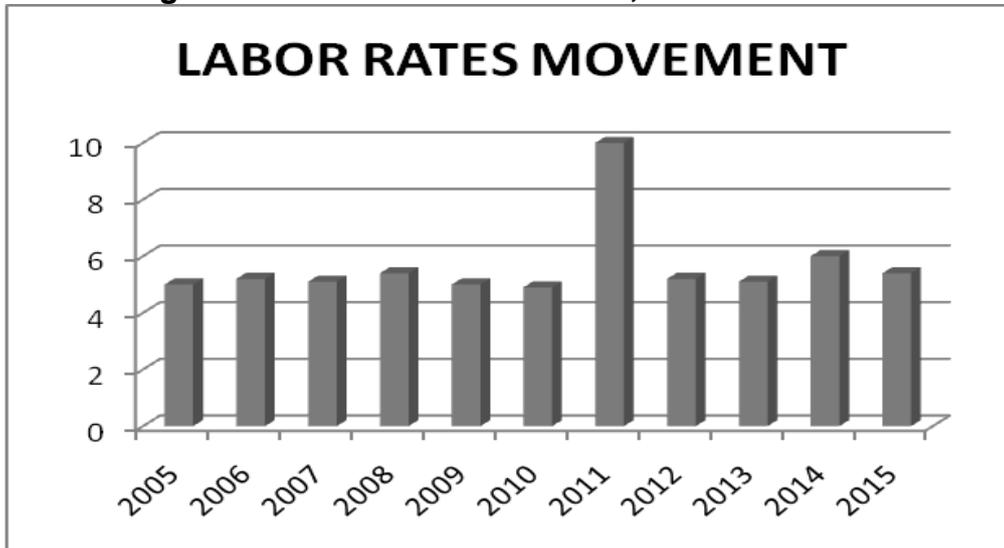**Figure 6: Labor Rates Movement, Year: 2005-2015**

Figure 6 records labor rates movement in UAE a high rate of 10% in 2011 and a low record of 4.9 in 2010. Labor rates movement shows steady growth at an average of 5.7% over the last ten years. The country economy experiences a steady rate of labor attributed to growth in industries and the continuing economic progress.

4.5 Significant Influence of Profitability Variations of UAE Construction Industry on Economic Growth

Table 1: Significant Influence of Profitability Variations of UAE Construction Industry on Economic Growth

Pearson Correlations with GDP Growth					
	Mean	**Std. Deviation**	**N**	**Pearson Correlation**	**Sig. (2-tailed)**	**Interpretation**
Industry Output	10.0800	3.18000	11	.302	.005	Low Positive Correlation
Tender Price	5.2800	8.33000	11	.850**	.001	High Positive Correlation
Labor Rates Movement	5.6600	1.47000	11	.175	.005	Low Positive Correlation

**Correlation is significant at 0.01 level (2-tailed)

As presented in Table 1, findings reveal significant relationships between industry output and construction tender price, indicated by the ρ value of .005 and .001, Sig(2-tailed), at 0.01 significance level.

There is high degree of influence of tender price on economic growth, and low correlation between industry output and labor rates movement on economic growth, indicated by the ρ value of 0.001 for tender price and 0.005 for industry output and labor rates movement. At 1% and 5% significance levels, the null hypotheses were rejected for all the profitability variations variables.

These findings imply that a change in the rate of industry output, construction tender price, and labor rates movement will lead to a change in the level of UAE economic growth. Gulf News (2015) reports that UAE Construction Industry rises to new heights with its market expected to grow at a compound annual growth rate of 9.5% until the end of 2016. The construction industry experienced enormous investment during the past years, and is projected to exhibit sustainable growth prospects in the next future period (Abu Dhabi Press News, 2015).

4.6 Chi-Square Test of Independence of Categorical Profitability Variations Variables and Economic Growth in United Arab Emirates

Table 2: Chi-Square Test for Independence of Variables

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	334.000ª	315	.236
Likelihood Ratio	109.789	315	1.023
Linear-by-Linear Association	.052	1	.821
N of Valid Cases	11		

The Chi-square test of independence is used to test the hypothesis that the variables of profitability variations and the UAE economic growth are independent of each other. Two-sided significance presented show Pearson Chi-Square value of 334.0 and ρ value equivalent to .236 greater than significance levels at both 5% and 10%. The null hypothesis

is accepted. Profitability variations variables and economic growth are not independent of each other.

Findings imply that changes in the rates of variables of construction industry output, tender price, and labor rates movement will cause a change in the UAE economic growth level. The UAE construction sector which demonstrated consistent growth over the last ten years led to significant increases in national economic growth.

4.7 Profitability Variations Variables That Predict UAE Economic Growth

Table 3: Model Summary for Test of Goodness of Fit of the Regression Model

Model Summary										
				Std.	Change Statistics					
Model	R	R Square	Adjusted R Square	Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.919ª	.844	.778	1.84741	.844	12.656	3	7	.003	2.263

a. Predictors: (Constant): Industry Output, Tender Price, Labor Rates Movement

Table 3 shows R values for assessing the overall fit of the regression model. R^2 value of 0.844 is the variance explained by the profitability variables of industry output, tender price, and labor rates movement. The value reveals that the overall variance of 84.4% of variation in economic growth is explained by the combination of the independent variables. The three predictors of economic growth account for 84.4% of the variance of economic growth.   Adjusted R^2 value of 0.778 adjusts for the number of explanatory profitability variations variables in the regression model.

Table 4: Regression Coefficients of Profitability Variations Variables

Regression Coefficients							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	7.992	2.826		2.828	.025		
Industry Output	-.091	.186	.740	-.490	.002	.976	1.024
Tender Price	.434	.072	.230	6.048	.001	.954	1.048
Labor Rates Movement	-.909	.407	.031	-2.233	.001	.955	1.047

Dependent Variable: Economic Growth

Table 4 presents the regression coefficients of the independent variables and their significance. Industry output and tender price and labor rates movement are predictors of economic growth at 5% level of significance.

Beta coefficients of profitability variables reveal the economic growth model showing that 74% of industry output, 23% of tender price, and 3.1% of labor rates movement result in the achievement of targeted economic growth, sufficient to support UAE economic

sustainability over the long-run and maintain competitiveness in the global economic environment.

Multicollinearity test conducted, to determine the presence of highly intercorrelated predictor variables in the regression model and the possible effects to invalidate assumptions reveal low values 0.186, 0.072, and 0.407 standard errors in regression coefficients, indicating stable estimates of the true model parameters.

The Variance Inflation Factor shown in Table 4 shows that variables of industry output, tender price, and labor rates movement are linearly independent indicating no perfect linear relationship among the independent variables. The Variance Inflation Factor of 1.024 for industry output, 1.048 for tender price, and 1.047 for labor rates movement indicate the absence of multi-collinearity among the variables of profitability variations.

4.8 Econometric Method of Time Series Analysis

Time series analysis with lagged variables was conducted, consisting of sample size for ten-year period, over which the variables of profitability variations and economic growth were observed. The analysis explains further the relationship of profitability variations in the construction industry with UAE economic growth, reveals the trend, forecasts patterns and tests the impact of interventions over the ten-year period. It indicates that data points taken show absence of trends that need to be accounted for.

Figure 7: Time Series Plot of Independent and Dependent Variables
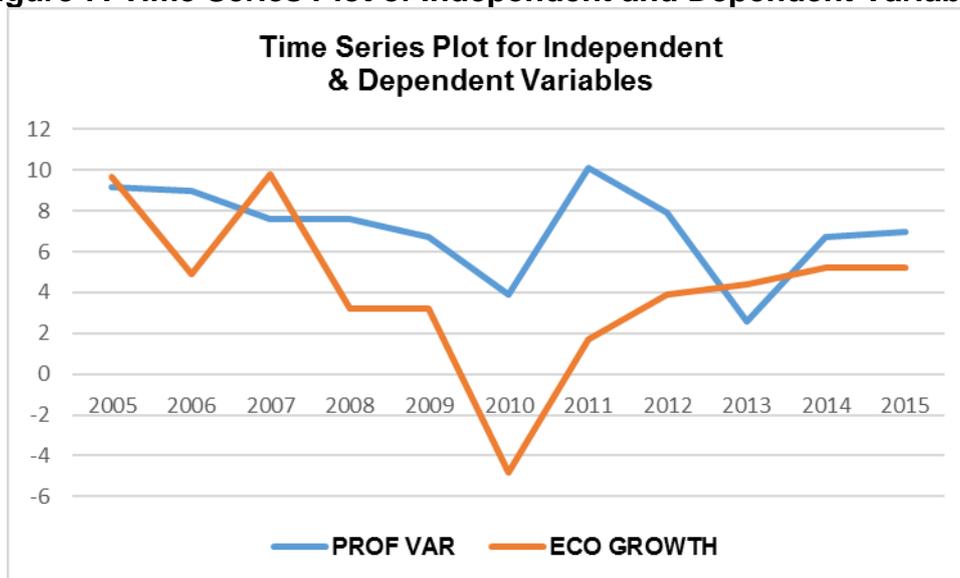
The time series plot presented in Figure 7 graphs the measurements of profitability variables and economic growth indicating a linear trend over the ten-year period. The variables have decreasing and increasing trend statistically distinguished from random behavior. It shows the absence of outliers which can have disproportionate effect on the time series model. Sudden shift of economic growth is shown in 2009, explained by the drop in economic growth due to low price of crude oil and global financial crisis, and associated with dramatic falls in global trade and industrial production. The trend line presents a slight curve in economic growth data, as increase in values accelerates over time, from 2010 to 2014.

Figure 8: Lagged Scatterplot of Time Series Model
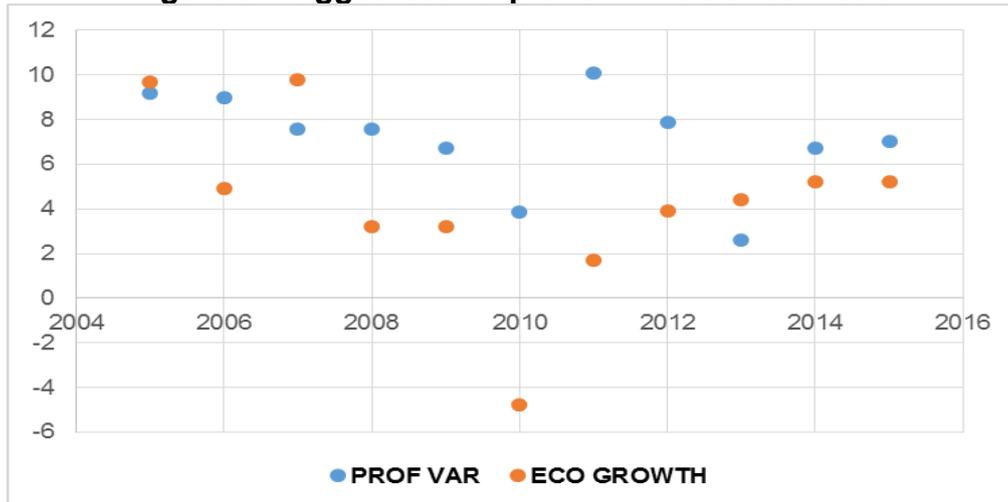
The lagged scatterplot in Figure 8 graphically summarizes the autocorrelation in the time series with random scattering points. With all correlations falling within the 95% confidence level, the plot shows random data with no significant correlations. This implies that the value at each lag is independent of the value at other times. The null hypothesis of corresponding population value equal to zero is accepted.

Table 5: Time Series Analysis for Profitability Variations Variables

Time Series Analysis of Independent Variables				
Series:	**PV**			
Lag		**Std. Error[a]**	**Box-Ljung Statistic**	
	Autocorrelation		**Value**	**Sig.[b]**
1	-.416	.274	2.31	.129
2	-.389	.258	4.58	.101
3	.473	.242	8.41	.068
4	-.139	.224	8.79	.066
5	-.037	.204	8.83	.116
6	.050	.183	8.91	.179
7	-.041	.158	8.97	.255
8	-.001	.129	8.97	.345

Modified Box-Pierce (Ljung-box) Statistic values of 2.31, 4.58, 8.41, 8.79, 8.83, 8.91, 8.97, and 8.97, for the profitability variables, at different lags presented in Table 5 signifies good fit of the time series model and reveals that observations in the time series are independent. Probability values greater than 0.05 show independence of profitability variations variables' residuals, hence, reveal that the model of independence is correct. Values of lags within the confidence limits between plus and minus one appear to have insignificant correlation.

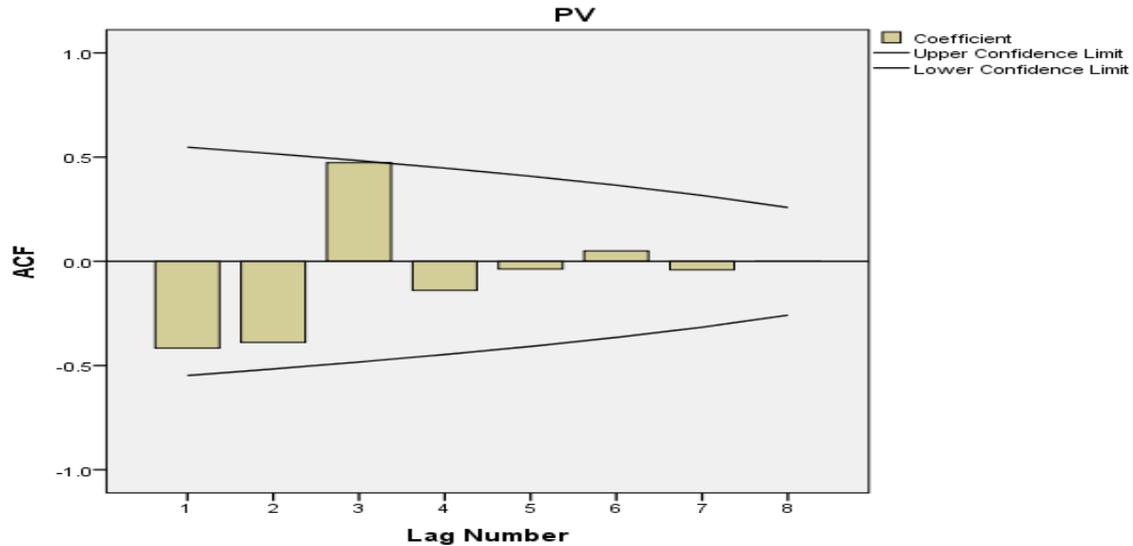**Figure 9: Time Series Plot of Independent Variables**

Figure 9 reveals no obvious outliers in the log-transformed observations. Autocorrelation Function of the residuals identifies the structure of the profitability variables time series data, showing correlations within the bounds for statistical significance, thus, the absence of significant correlations for any lag. The check for residuals shows no significant deviation from the lags and with confidence level not significantly different from zero. This further signifies that no level shifts have not been accounted for by the time series model.

Table 6: Time Series Analysis for Economic Growth

Time Series Analysis for Dependent Variable					
Series:	**EG**	**Durbin Watson : 1.392**			
Lag		**Std. Error[a]**	**Box-Ljung Statistic**		
	Autocorrelation		**Value**	**df**	**Sig.[b]**
1	-.385	.274	1.98	1	.160
2	.308	.224	3.88	2	.144
3	.000	.194	3.87	3	.275
4	-.317	.158	7.89	4	.096
5	.150	.194	8.49	5	.131
6	-.229	.224	9.54	6	.145

Modified Box-Pierce (Ljung-box) Statistic values of 1.98, 3.88, 3.87, 7.89, 8.49, and 9.54, for economic growth, at different lags presented in Table 6, signifies good fit of the time series model and reveals that observations in the time series are independent. Probability values greater than 0.05 show independence of residuals, hence, assure that the model of independence is valid. Probability values greater than 0.05 show independence of economic growth residuals, indicating that the model of independence is correct.

With the assumption that error deviations are uncorrelated, the Durbin-Watson test conducted reveals deviation values having no auto correlation components over the time period under consideration. The Durbin-Watson statistic of 1.392, greater than 0.80, indicates the absence of autocorrelation of residual values in the time series model. Hence,

appropriate periodic function was fitted to the periodic data and confidence intervals used in the time series analysis are valid.

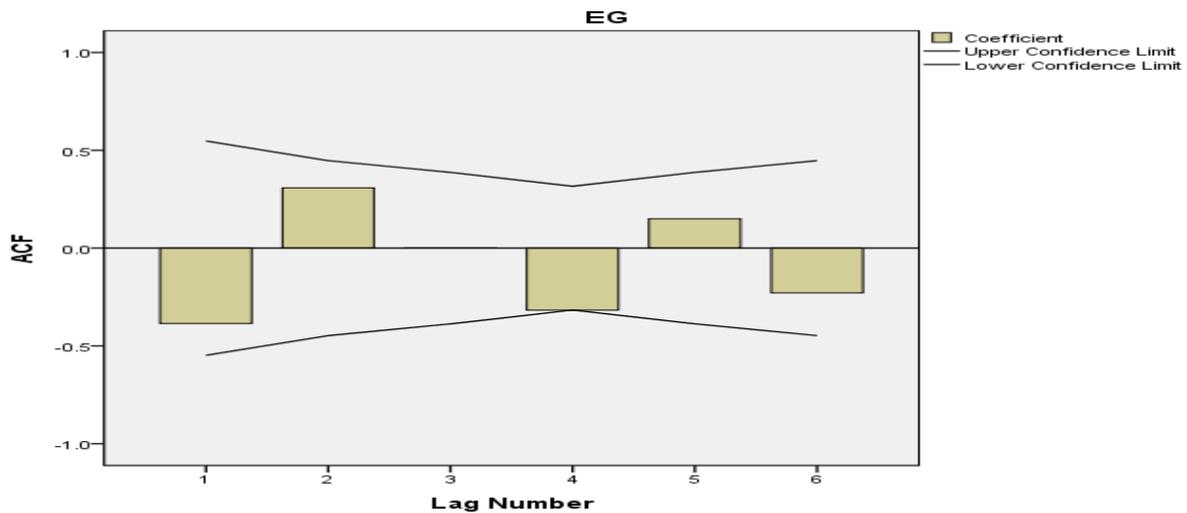**Figure 10: Time Series Plot of Dependent Variables**

Figure 10 reveals no obvious outliers in the log-transformed observations. Autocorrelation Function of the residuals identifies the structure of the economic growth time series data showing correlations within the bounds for statistical significance, thus, the absence of significant correlations for any lag. The check for residuals shows no significant deviation from the lags and with confidence level not significantly different from zero. This further signifies that no level shifts have not been accounted for by the time series model.

5. Conclusions

The economy is continuously growing driven by accelerated population growth, stable political environment, and renewed investments in service sector, manufacturing, and real estate as the largest contributors to economic growth. The UAE construction industry, records a positive output over the forecast period resulting from industrial construction and increased government expenditure on the development of infrastructure and attributed to investments in transport infrastructure, communications, public sector, commercial, and industrial construction, considered to be the key drivers of industry growth. Tender prices in UAE construction industry are expected to continue to rise as funding becomes readily available and confidence return to the global economy. Labor rates movement shows steady growth at an average of 5.7% over the last ten years and experiences a steady rate of labor attributed to growth in industries. There is significant influence of the variables of industry output, construction tender prices, and labor rates movement on the UAE economic growth. There is significant difference in the contributions of the variables to the economic growth at .05 significance level (2-tailed). Profitability variations variables and economic growth are not independent of each other. Changes in the rates of such variables cause a change in the level of UAE economic growth. They are predictors of economic growth at 5% level of significance. Beta coefficients of profitability variables of the economic growth model shows that 74% of industry output, 23% of tender price, and 3.1% of labor rates movement will result in achieving targeted economic growth of UAE, sufficient to support economic sustainability over the long-run and maintain competitiveness in the global economic environment. Profitability variables and economic growth have decreasing

and increasing trend in the time series model, statistically distinguished from random behavior.

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