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# THE IMPACT OF SANCTIONS ON OIL, GAS AND PETROLEUM COMPANIES' CAPITAL STRUCTURE - A COMPARISON TO CEMENT INDUSTRY AND FORECASTING THE FUTURE TREND

# O IMPACTO DAS SANÇÕES NA ESTRUTURA DE CAPITAL DAS EMPRESAS DE PETRÓLEO, GÁS E PETRÓLEO - UMA COMPARAÇÃO COM A INDÚSTRIA DE CIMENTO E PREVISÃO DA TENDÊNCIA FUTURA

# EL IMPACTO DE LAS SANCIONES EN LA ESTRUCTURA DE CAPITAL DE LAS EMPRESAS DE PETRÓLEO, GAS Y PETRÓLEO - UNA COMPARACIÓN CON LA INDUSTRIA DEL CEMENTO Y PREDICCIÓN DE LA TENDENCIA FUTURA

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## ABSTRACT

**Objective:** The main purpose of this paper is to determine whether imposing oil sanctions have a significant impact on oil, gas and petroleum companies' capital structure or not. The most innovative aspect of our study is to evaluate the influence of sanctions on a firm-specific variable rather than macroeconomic level.

**Method**: To address this problem, we investigate oil companies listed in Tehran Stock Exchange from 2006 to 2018. Furthermore, a comparison between oil industry and cement industry and a prediction of oil companies' capital structure trend is conducted.

**Results:** The results indicate that 2012 oil sanctions against Iran affect the oil companies' capital structure and the future trend reveals that the share of equity in capital structure will increase. Moreover, we inspect no significant relationship between oil sanctions and cement companies' capital structure.


**Keywords:** Capital Structure, Sanction, Oil companies.


## RESUMO

**Objetivo**: o objetivo principal deste artigo é determinar se a imposição de sanções sobre o petróleo tem um impacto significativo na estrutura de capital das empresas de petróleo, gás e petróleo ou não. O aspecto mais inovador de nosso estudo é avaliar a influência das sanções em uma variável específica da empresa, e não no nível macroeconômico.

**Método**: Para resolver este problema, investigamos as empresas de petróleo listadas na Bolsa de Valores de Teerã de 2006 a 2018. Além disso, uma comparação entre a indústria de petróleo e a indústria de cimento e uma previsão da tendência da estrutura de capital das empresas de petróleo é conduzida.

**Resultados**: Os resultados indicam que as sanções do petróleo de 2012 contra o Irã afetam a estrutura de capital das empresas petrolíferas e a tendência futura revela que a participação do patrimônio líquido na estrutura de capital aumentará. Além disso, não inspecionamos nenhuma relação significativa entre as sanções do petróleo e a estrutura de capital das empresas de cimento.


**Palavras-chave**: Estrutura de Capital, Sanções, Petroleiras.


## RESUMEN

**Objetivo**: El propósito principal de este documento es determinar si la imposición de sanciones petroleras tiene un impacto significativo en la estructura de capital de las empresas de petróleo, gas y petróleo. El aspecto más innovador de nuestro estudio es evaluar la influencia de las sanciones en una variable específica de la empresa más que en el nivel macroeconómico.

**Método**: Para abordar este problema, investigamos las compañías petroleras que cotizan en la Bolsa de Valores de Teherán de 2006 a 2018. Además, se realiza una comparación entre la industria petrolera y la industria cementera y se realiza una predicción de la tendencia de la estructura de capital de las compañías petroleras.

**Resultados**: Los resultados indican que las sanciones petroleras de 2012 contra Irán afectan la estructura de capital de las compañías petroleras y la tendencia futura revela que la participación del capital en la estructura de capital aumentará. Además, no inspeccionamos una relación significativa entre las sanciones petroleras y la estructura de capital de las empresas cementeras.

**Palabras clave**: Estructura de capital, Sanción, Empresas petroleras.

## 1 INTRODUCTION

Imposing sanctions on a country and its economic influences is among the most debatable issues in under sanction countries. There is a broad literature about the impacts of sanctions on macroeconomic variables but little is known about how they can affect firm-specific level. On the other hand, macroeconomics and microeconomics are intertwined and their reciprocal relationship is inevitable. Therefore, in this research, we intend to fill in this gap.

Logically, the sanctioning country or organization seeks the main industry of sanctioned economy and hits the core. After the victory of Islamic revolution in Iran, many sanctions have been imposed by disparate countries and organizations. Iran's economy is majorly based on oil and petroleum; hence prohibiting Iran to sell oil and its derivation will possibly have malicious effects and can even paralyze the whole economy. First of all, we aim to discuss briefly about the history of oil sanctions against Iran.

The first oil sanction against Iran went back to 1950 that was ordained by the Great Britain as an answer to nationalization of oil industry. In 1995, the US government took an action by which it banned American oil companies to invest on oil and gas projects in Iran and it broke up the commercial relationship with Iran, unilaterally. In 2012, a number of countries led by the US put on a new oil sanction against Iran in order to prevent or restrict Iran nuclear program. The sanctioning countries aim to deprive Iran from oil revenue and to oblige Iran to cooperate with international community in order to disambiguating about its probable military nuclear program. This sanction was followed by instruments like

sanctioning purchase or purchasers, oil tankers insurance and banks and its goal was to dissuade purchasers from buying Iran oil and persuade them to buy from other suppliers. Consequently, in March 2012, Iran oil exports decreased to below two million barrels a day and almost a quarter of Iran oil platforms became inactive.

The aforementioned 2012 oil sanction is considered in the present study as the historical origin for sanction. The reactions of oil, gas and petroleum companies to this action convinced us to conduct this research. A significant sign of these reactions is corporate financing decisions. As we mentioned above, almost all previous studies investigate the relationship between sanctions and macroeconomic indices. Our aim is to find out this connection in microeconomic level. Corporate capital structure is managers' instrument by which they can signal so many important things. As a result, our intention is to know whether imposing oil sanctions influences oil, gas and petroleum corporates' capital structure or not.

To obtain this goal, we analyze the financial statements of oil, gas and petroleum companies listed in Tehran Stock Exchange from 2006 to 2018. We choose this time period to achieve a sufficient time period and neutralize time effect. Furthermore,we exclude companies with incomplete data in the study period. Our research method is OLS with random effects and we also conduct a forecast based on our estimated regression. We consider the 2012 oil sanction as a dummy variable and some other control variables based on previous studies.

In the following section, we discuss the theoretical background and literature review about sanctions and its impacts on economies, capital structure, theories and the factors influence it and some previous researches about oil, gas and petroleum companies. In the research data and methodology section, we provide our study data, econometric method and our model in detail. In the results section, the estimation results of econometric equations can be seen and eventually in the conclusion and discussion section, we argue about the results of our study, develop the conclusions and propose our findings.

## 2 THEORETICAL BACKGROUND AND LITERATURE REVIEW

Capital structure means the combination of debt and equity for financing firm's operation and growth. The theories that are highly accepted about capital structure are Trade-

off theory, Pecking-order Theory, Signaling theory and Market timing theory. In the following, we explain each of these theories.

The trade-off theory commenced from studies of Modigliani and Miller (1958) and Modigliani and Miller (1963). This theory expresses that capital structure reflects balance between debt tax benefits and bankruptcy costs. In fact, the main idea in this theory is that firms should determine debt and equity in capital structure via trade-off between benefits and costs. The hypothesis of trade-off theory is that if a firm finances all its activities by means of debt, it would be very beneficial for it; but bankruptcy risk of using debt doesn't permit firms to do so. Firms following this theory have a capital structure target and move slowly toward this (Myers, 1984). Myers and Majluf (1984) are pioneers of Pecking-order theory. The key element in this theory is information asymmetry inside and outside of firms (Baker and Martin, 2011). According to Pecking-order theory firm's internal sources of financing are preferable in comparison to external sources and if a firm is obliged to harness external sources of financing, it prefers debt. As a result, the priority of financing sources is earnings, debt and equity, respectively. Myers and Majluf (1984) explained that managers who aim to maximize their firm's value, forbear from external financing via equity; considering their more information against shareholders and external investors. In Pecking-order model in order to avoid adverse selection problems and losing value, firms with high quality tend to finance their activities by means of internal sources. They don't intend to perform their high quality by changing capital structure. The Signaling theory demonstrates models in which capital structure acts as private signals (Ross, 1977). According to this theory, if high quality firms' managers with valuable investment projects or low bankruptcy risk issue debt for financing, market will discover it, reacts positively to debt issuance and this prompts to increase their share's price; Whereas, the market reaction to equity issuance will be negative. Making decision about equity issuance depends on market circumstances. This idea with the studies of Baker and Wurgler (2002) create Market timing theory. This theory emphasizes that adverse selection is different in different times. It means that in inconvenient economic condition, firms don't issue equity; in normal economic condition they start it and in economic boom, there is an acme for equity issuance. Empirical results of Bayless and Chaplinsky (1996) and Baker and Wurgler (2002) represented that there is a positive relationship between equity issuance and business cycle. However, it is necessary to consider

that despite studies that confirm significant relationship between high market-to-book value with low debt issuance like Frank and Goyal (2004), high expected inflation would cause debt issuance to be cheap and increase the share of debt in capital structure (Oztekin, 2015). In addition, in the existence of inflation, it is possible to under value the share because of investors' inflation illusion and this leads to enhance financing via debt (Ritter and Welch, 2002).

Regarding factors influence capital structure, there are many studies each of which introduce some effectual factors. For instance, Parsons and Titmam (2008) demonstrated tangibility of assets, non-debt tax shield, growth, monopoly, industry classification, size, fluctuations and profitability as factors affecting leverage. De Jong et al. (2007) investigated firm-specific and macroeconomic factors affecting leverage ratio in 42 countries (some developed countries and some developing countries). The results showed that capital structure of different countries is dissimilar and macroeconomic factors have both direct and indirect effect on leverage. Nevertheless, they introduced tangibility of assets, business risk, firm size, tax, growth, profitability and liquidity as firm-specific variables and countries' financial regulation, shareholder and creditors' legal regulation, being bank-based or market-based of financial system, development level of debt and equity market, investment formation and GDP growth as macroeconomic variables of capital structure. Frank and Goyal (2009) conducted an analogous research on the US pubic stock firms from 1950 to 2003 that the results evinced industry debt median, market-to-book value of assets, tangibility of assets, earnings, logarithm of assets and expected inflation to have relationship with capital structure. It was also performed that firms with dividend strategy have a lower inclination to finance via borrowing. Baker and Martin (2011) explained tangibility of assets, firm size, growth opportunities, profitability, cash volatility, industry classification, tax considerations, debt rank of firm and debt market, equity market and macroeconomic conditions as determinants of capital structure. In this trend, Oztekin (2015) studied capital structure in 37 countries and declared firm size, tangibility of assets, industry leverage ratio mean, profitability and inflation the most important and significant factors influence capital structure.

In the realm of previous researches on capital structure of oil, gas and petroleum companies, Emeh and Okoli (2015) studied capital structure of oil and gas companies listed in Nigeria Stock Exchange from 1990 to 2012. The results indicated significant effect of

profitability, tangibility of assets, tax shield, size, growth opportunities and earning volatility on capital structure. Shambor (2017) in an endeavor to find the determinants of capital structure in oil and gas companies, analyzed data of 346 companies included in OILGSWD from 2000 to 2015. It was evinced that tangibility of assets, profitability, size, liquidity and tax shield have a significant relationship with leverage; while there was no relationship between leverage and growth.

On the other hand, there is a wide range of researches developed the literature of the impact of sanctions on macroeconomic variables. For instance, Farzanegan and Hayo (2018) used 2001-2013 Iranian-province-level data to affirm that international 2012 sanctions had a significantly stronger negative impact on shadow economy than they had on the official GDP growth rate,.Barkhordari and Jalili (2018) found that the US sanctions in 2012 had a significant impact on increasing exchange rate of Iran. Ghorbani Dastgerdi et al. (2018) investigated the nexus between economic sanctions and inflation in Iran and the results indicated that economic sanctions increase the expected inflation and prompt to a higher inflation. Nademi et al. (2018) evinced that Iran sanctions have some direct and indirect impacts on economy. The macroeconomic variables directly increased by the sanctions are exchange rate, the gap between official and market exchange rate and exchange rate fluctuations. On the other hand, unemployment rate and inflation rate are indirectly raised by increasing the gap between official and market exchange rate as a result of imposing sanctions. In an attempt to study stock market volatility under sanctions, Goudarzi (2014) showed that Iranian stock market has not been influenced by the sanctions. Furthermore,the results of Ankudinov et al. (2017) indicated that for almost all sector indices of Russian market return, there was a statistically significant relationship between them and the imposed sanctions but it did not lead to a structural break. Garshasbi and Yousefi (2016) evaluated the effects of Iran sanctions on macroeconomic variables via indexing sanctions and found the direct impacts only on economic growth rate.

As we mentioned before there are so few studies about the nexus of sanctions and firm-specific level variables. In this milieu, Kordlouie et al. (2018) aimed to investigate the impact of sanctions on cost of capital for Tehran Stock Exchange companies. They concluded that 2010 sanctions did not have a significant effect on firms' cost of capital. Additionally, Vladislav et al. (2020) analyzed the factors affecting the profitability of Russian enterprises

active in manufacturing industry from 2012 to 2016 in the time of sanction and crisis and introduced some different influencing factors for different subcategories.

## 3 RESEARCH DATA AND METHODOLOGY

### Regression Phase

In the present study, we consider leverage ratioas dependent variable, dummy variable of sanction as independent variable and some control variables according to previous researches. Our control variables are ROA, tangibility of assets (firm-specific factors), capital market return, economic growth rate and inflation rate (macroeconomic factors). Moreover, many financial variables are influenced by themselves with a lag. To consider the role of time and to avoid the possible endogeneity, we include leverage ratio with one lag of time to our independent variable. Our statistical society is oil, gas and petroleum companies listed in Tehran Stock Exchange that their financial data is flawless during the study period (2006-2018). The research method harnessed in our work is regression analysis via Ordinary Least Square. Data gathering conducted by observing financial statements of mentioned companies and macroeconomic data of Iran. Defining variables can be seen in table 1.

**Table 1**
Defining variables

| variable | measurement criterion | label |
|---|---|---|
| Leverage | total debt/total assets | Lev |
| Sanction dummy variable | 0 for 2006-2011 and 1 for 2012-2018 | Dummy |
| ROA | gross profit/total assets | ROA |
| Tangibility of assets | fixed assets/total assets | Tan |
| Capital market return | (market return in current year-market return in previous year)/market return in previous year | Cap_Market_Return |
| Economic growth | yearly economic growth | Eco_Growth |
| Inflation rate | yearly inflation rate | Inf_Rate |

Moreover, a data summary of the variables is provided in table 2.

**Table 2**
Data summary of variables (oil, gas and petroleum companies)

| variable | number of observations | mean | standard deviation | maximum | minimum |
|---|---|---|---|---|---|
| Leverage | 143 | 0.553835 | 0.194974 | 0.969692 | 0.108760 |
| Sanction dummy variable | 13 | - | - | - | - |
| ROA | 143 | 0.272558 | 0.167318 | 0.642599 | -0.2266 |
| Tangibility of assets | 143 | 0.382975 | 0.205363 | 0.938626 | 0.035056 |
| Capital market return | 13 | 0.314124 | 0.40703 | 1.077122 | -0.20982 |
| Economic growth | 13 | 1.976923 | 5.051756 | 12.5 | -7.7 |
| Inflation rate | 13 | 18.5426 | 8.800902 | 34.7 | 8.736908 |

Our main question is whether 2012 oil sanctions against Iran have significant impact on oil industry capital structure decisions or not. To address this question, we define the econometric equation as follows:

$$Lev_{it} = \alpha_i + \beta X_{it} + u_{it};\ i=1,\ldots,11,\ t=1,\ldots,13 \qquad (1)$$

Where $Lev_{it}$is dependent variable of company i in year t, $\alpha_i$ is intercept, $\beta$ is independent variables coefficient vector, $X_{it}$ independent variable vector of company i in year t and $u_{it}$ is error term.

First of all for regression analysis of panel data, we conduct unit root test in order to check data stationary in firm-specific level. For this aim, we use Levin, Lin & Chu method. The null hypothesis is lacking data stationary. The results are demonstrated in table 3.

**Table 3**

The results of unit root test via Levin, Lin & Chu method (oil, gas and petroleum companies)

| statistical criterion / variable | t statistic | probability | test result |
|---|---|---|---|
| Leverage | -2.30983 | 0.0104 | stationary proof |
| Sanction dummy variable | - | - | - |
| ROA | -2.22593 | 0.0130 | stationary proof |
| Tangibility of assets | -5.40966 | 0.0000 | stationary proof |
| Capital market return | -7.98884 | 0.0000 | stationary proof |
| Economic growth | -7.23907 | 0.0000 | stationary proof |
| Inflation rate | -1.52019 | 0.0642 | at first difference |

Next, we use cointegration test to know whether there is a long term relationship between dependent and independent variables or not. For this purpose, we use Kao cointegration test. The null hypothesis in this test is the absence of cointegration. The results are shown in table 4.

**Table 4**

The result of Kao test (oil, gas and petroleum companies)

| statistical criterion / test | t statistic | probability | test result |
|---|---|---|---|
| Kao | -2.479826 | 0.0066 | cointegration proof |

Now, to estimate regression model, it is necessary to conduct F Limer (Chow) test to determine whether we utilize pooled data or panel data analysis. The null hypothesis is using pooled data analysis. The results are presented in the table 5.

**Table 5**

The result of F Limer test (oil, gas and petroleum companies)

| statistical criterion / test | F statistic | probability | test result |
|---|---|---|---|
| F Limer | 3.055564 | 0.0018 | panel data analysis proof |

After indication of utilizing panel data analysis, we implement Hausman test to specify estimation with random effects model or fixed effects model. The null hypothesis is using random effects model. The results are shown in table 6.

**Table 6**
The result of Hausman test (oil, gas and petroleum companies)

| **statistical criterion / test** | **chi-square statistic** | **probability** | **test result** |
|---|---|---|---|
| Hausman | 0.000000 | 1.0000 | random effects model |

The results of estimating equation are shown in the table 7.

**Table 7**
The results of estimating equation 1 (oil, gas and petroleum companies**)**

| | coefficient | t-statistic | prob. | result (95%) |
|---|---|---|---|---|
| Leverage(-1) | 0.742973 | 17.37444 | 0.0000 | accepted |
| Sanction dummy variable | -0.080603 | -4.794647 | 0.0000 | accepted |
| ROA | -0.441355 | -7.315229 | 0.0000 | accepted |
| Tangibility of assets | -0.244776 | -4.629279 | 0.0000 | accepted |
| Capital market return | -0.066160 | -3.569539 | 0.0005 | accepted |
| Economic growth | -0.001524 | -0.984854 | 0.3266 | rejected |
| Inflation rate | 0.001431 | 1.631533 | 0.1053 | rejected |
| R-squared=0.815346 | | | | |

As indicated in table 7, sanction has a negative and significant effect on oil, gas and petroleum companies' leverage ratio.

Previous studies evinced that the determinants of capital structure in different industries, are different. Harris and Raviv (1991) mentioned that leverage ratio for companies active in a similar industry is alike and for companies active in dissimilar industries is different. This fact stimulates us to find out if oil sanction has impact on corporate capital structure of other industries. As a sample, we make an attempt to answer the same question of our study for cement industry. Cement industry is a principal industry because it is a major raw material for construction which is a high value determinant of Iran economy. So, we want to know whether oil sanction also influences capital structure of corporates active in cement industry as a mother industry or not.

To address the above question, we conduct the same implementation for cement industry. Therefore, the OLS equation is as equation 1.

Defining variables is the same as those in table 1. Data summary of variables is indicated in table 8.

**Table 8**
Data summary of variables (cement companies)

| variable | number of observations | mean | standard deviation | maximum | minimum |
|---|---|---|---|---|---|
| Leverage | 169 | 0.562010 | 0.167009 | 0.999067 | 0.166645 |
| Sanction dummy variable | 13 | - | - | - | - |
| ROA | 169 | 0.244530 | 0.138099 | 0.727888 | 0.014896 |
| Tangibility of assets | 169 | 0.455854 | 0.209337 | 0.892203 | 0.088455 |
| Capital market return | 13 | 0.314124 | 0.40703 | 1.077122 | -0.20982 |
| Economic growth | 13 | 1.976923 | 5.051756 | 12.5 | -7.7 |
| Inflation rate | 13 | 18.5426 | 8.800902 | 34.7 | 8.736908 |

The results of unit root, cointegration, F Limer (Chow) and Hausman tests are reported in the tables 9, 10, 11 and 12, respectively.

**Table 9**
The results of unit root test via Levin, Lin & Chu method (cement companies)

| statistical criterion / variable | t statistic | probability | test result |
|---|---|---|---|
| Leverage | -5.41366 | 0.0000 | stationary proof |
| Sanction dummy variable | - | - | - |
| ROA | -11.7834 | 0.0000 | stationary proof |
| Tangibility of assets | 1.02703 | 0.8478 | at first difference |
| Capital market return | -7.98884 | 0.0000 | stationary proof |
| Economic growth | -7.23907 | 0.0000 | stationary proof |
| Inflation rate | -1.52019 | 0.0642 | at first difference |

**Table 10**
The result of Kao test (cement companies)

| statistical criterion / test | t statistic | probability | test result |
|---|---|---|---|
| Kao | -1.637910 | 0.0500 | cointegration proof |

**Table 11**
The result of F Limer test (cement companies)

| statistical criterion / test | F statistic | probability | test result |
|---|---|---|---|
| F Limer | 6.481157 | 0.0000 | panel data analysis proof |

**Table 12**
The result of Hausman test (cement companies)

| statistical criterion / test | chi-square statistic | probability | test result |
|---|---|---|---|
| Hausman | 0.000000 | 1.0000 | random effects model |

The results of estimating equation are shown in the table 13.

**Table 13**
The results of estimating equation 1 (cement companies)

| | coefficient | t-statistic | prob. | result (95%) |
|---|---|---|---|---|
| Leverage(-1) | 0.750742 | 18.70465 | 0.0000 | accepted |
| Sanction dummy variable | 0.009814 | 0.778631 | 0.4374 | rejected |
| ROA | -0.292427 | -5.240632 | 0.0000 | accepted |
| Tangibility of assets | -0.031385 | -1.044858 | 0.2978 | rejected |
| Capital market return | -0.018488 | -1.335203 | 0.1839 | rejected |
| Economic growth | 0.000684 | 0.964263 | 0.3365 | rejected |
| Inflation rate | 0.003182 | 2.723994 | 0.0072 | accepted |
| R-squared= 0.786781 | | | | |

As indicated in table 13, sanction has not a significant effect on cement companies' leverage ratio.

**Forecasting Phase**

In this part of the study, our purpose is to predict capital structure trend in oil, gas and petroleum for the next period according to our regression model. In order to achieve this objective, we want to examine whether our model is reliable for forecasting or not. In other words, our intention is to test our predictability the obtained model. Thus, we re-estimate the equation 1 in the period of 2006 to 2017 and forecast leverage ratio for 2018 and calculate

RMSE for determining the prediction error. The results of re-estimation are provided in table 14.

**Table 14**

The results of re-estimating equation 1 for oil, gas and petroleum companies from 2006-2017

| | coefficient | t-statistic | prob. | result (95%) |
|---|---|---|---|---|
| Leverage(-1) | 0.714585 | 15.23632 | 0.0000 | accepted |
| Sanction dummy variable | -0.074967 | -4.342203 | 0.0000 | accepted |
| ROA | -0.499476 | -7.601588 | 0.0000 | accepted |
| Tangibility of assets | -0.258642 | -4.443987 | 0.0000 | accepted |
| Capital market return | -0.062096 | -3.265136 | 0.0014 | accepted |
| Economic growth | -0.001436 | -0.800475 | 0.4251 | rejected |
| Inflation rate | 0.001579 | 1.470178 | 0.1443 | rejected |
| R-squared=0.798697 | | | | |

Now in table 15 the forecasted and the real amounts of corporates leverage ratio are brought together and RMSE is calculated.

**Table 15**

Comparing forecasted and real values of leverage ratio for oil, gas and petroleum companies from 2006-2017 and calculated RMSE

| forecasted leverage ratio | real leverage ratio |
|---|---|
| 0.379208 | 0.377594 |
| 0.305825 | 0.274656 |
| 0.448577 | 0.332688 |
| 0.711007 | 0.718613 |
| 0.502482 | 0.510103 |
| 0.420022 | 0.636117 |
| 0.557451 | 0.664377 |
| 0.427612 | 0.401783 |
| 0.368014 | 0.305837 |
| 0.603346 | 0.603725 |
| 0.258474 | 0.208362 |
| RMSE=0.085118 | |

The calculated RMSE, considering our data range, is acceptable and our forecast is admissible. Consequently, we can predict capital structure trend for 2019 and 2020 with the results shown in table 7.

We harness the estimated equation for oil, gas and petroleum companies from 2006 to 2018. Initially, we forecast the significant independent variables indicated in table 7 according to their 2006 to 2018 trends. Then, we predict our dependent variable by placing our forecasted values in the regression we had achieved. Table 16 shows the results of prediction.

**Table 16**
Forecasting leverage ratio in 2019 and 2020

| forecasted ROA | forecasted tangibility of assets | forecasted capital market return | forecasted leverage ratio |
|---|---|---|---|
| 0.380387<br>0.411802 | 0.414155<br>0.387199 | 0.493112<br>0.518681 | 0.299328<br>0.231175 |
| 0.494158<br>0.530263 | -0.036760<br>-0.083140 | 0.493112<br>0.518681 | 0.259065<br>0.264106 |
| 0.311540<br>0.319318 | 0.196971<br>0.177214 | 0.493112<br>0.518681 | 0.384803<br>0.386898 |
| 0.246120<br>0.239714 | 0.184724<br>0.163009 | 0.493112<br>0.518681 | 0.447796<br>0.472311 |
| 0.292803<br>0.307938 | 0.219007<br>0.191023 | 0.493112<br>0.518681 | 0.422957<br>0.416888 |
| 0.305192<br>0.295798 | 0.098444<br>0.086209 | 0.493112<br>0.518681 | 0.555649<br>0.546488 |
| -0.062590<br>-0.085480 | 0.694462<br>0.719754 | 0.493112<br>0.518681 | 0.494873<br>0.514537 |
| 0.404493<br>0.393827 | 0.184092<br>0.174097 | 0.493112<br>0.518681 | 0.268664<br>0.268488 |
| 0.568698<br>0.591238 | -0.077300<br>-0.133890 | 0.493112<br>0.518681 | 0.274970<br>0.261431 |
| 0.426631<br>0.443121 | 0.038047<br>-0.005020 | 0.493112<br>0.518681 | 0.437641<br>0.416121 |
| 0.445198<br>0.481449 | 0.229647<br>0.173718 | 0.493112<br>0.518681 | 0.199212<br>0.178308 |

The upper and lower numbers in each cell indicate forecasted values for 2019 and 2020, respectively.

## 4. CONCLUSION AND DISCUSSION

The results of our study reveal that Iran 2012 oil sanctions affect oil companies' leverage ratio negatively and does not have a significant impact on cement companies leverage' ratio. Conclusively, we hit two birds with one stone. We disclose that not only oil sanctions have a direct relationship with oil companies' capital structure and has nothing to do with cement industry financing policies, but also the capital structure of companies with different industries have different determinants. This conclusion supports Harris and Raviv (1991).

To explain how oil sanctions affect oil companies' leverage ratio, we can flashback to previous researches. Iran's economy is majorly based on oil, gas and their derivations and in the time of sanction exposure, the intention of government to produce and sell oil will be at the highest level. Therefore, oil companies will need to be financed. On the other hand, we have mentioned that imposing sanctions increase the exchange rate and it has happened in Iran as well. This phenomenon is beneficial for export companies that their revenue is in

currencies more powerful than Rial andit enhances their profitability and investors will be attracted to them. Moreover, Iran capital market index showed a significant escalation and many people were convinced to participate in Tehran Stock Exchange. As a result, these investors were encouraged to purchase oil companies' shares. So, because of cooperating these factors, the share of equity in financing decisions has increased and oil sanctions have had a direct negative and significant impact on oil companies'capital structure.

Furthermore, our forecasting results indicate that leverage ratio will be decreased in 2019 and 2020. The mean of studied oil companies' leverage ratio in 2018 is 0.452911. Nevertheless, we predict that it will be dropped to 0.367723 and 0.359705 in 2019 and 2020, respectively. Therefore, it can be observed that the share of equity in oil companies' capital structure will be continually increasing.

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