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Profit Persistence in Energy Industry: A Comparison between Listed and Unlisted Companies

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ABSTRACT

In this paper, we examine the profit persistency for energy industry around the world during the sample period between 2010 and 2016. We distinguish our dataset into two groups: The listed and unlisted companies to see whether these groups show a different pattern. Profit is measured using four different proxies; namely, return on asset, return on equity, return on capital employed and profit margin. The results of this study indicates that profits do not persist. Where it means that competition in the energy industry is high. In addition, the competition is found to be higher in listed companies compare to unlisted companies.

Keywords: Profit Persistence, Listed and Unlisted Companies, Energy Industry
JEL Classifications: G30, L10, C22

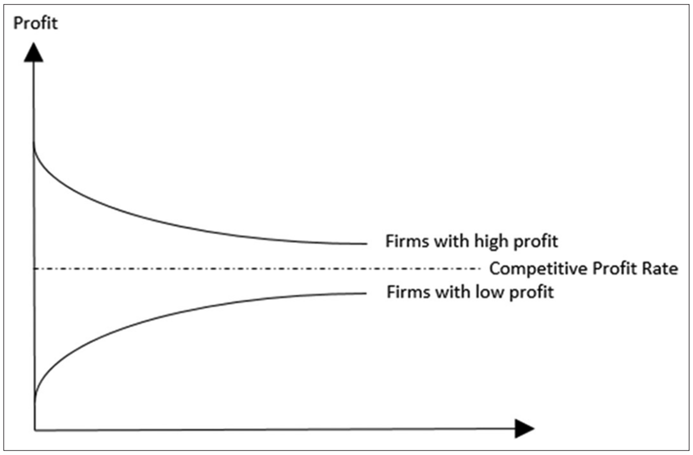
1. INTRODUCTION

The theoretical debate on the relationship between competition and firm-level profitability reveals the theory of the competitive market hypothesis. While the empirical results lead to an uncontradictory conclusion which can be simply defined as "Competition equalize the high and low profits." In other words, the abnormal profit should disappear immediately in a competitive market. This is called "profit persistency." According to Mueller (1986), all companies in the long-run, regardless of the industry they actively operate in, should remain in equilibrium with no excess profits or losses. Besides, the pioneer studies of Adam Smith, David Ricardo, John S. Mill, Joseph Schumpeter establishes the equal tending profit rates across industries in long-run. The unrevealed assumptions of this theory can be defined as competition. Competition leads to higher efficiency and productivity and hence contributes significantly to the rate of growth of the economy. Furthermore, competition forces the low-profit companies to increase the profit to sector norms and decreases to high-profit companies' profits by market signals. The market signals refer to the process of theoretically abnormally high rates of return companies with the threat of entry of the new companies that are making abnormally low profits should restructure or exit. In other words, if a firm has excess profits then competitors enter the market offering similar products at lower costs until the profitability of the market equals the competitive rate. Therefore, the effect of competition on the long-run should force profits to converge. The visual inspection of convergence of the profits can be seen in Figure 1.

Even though theoretical and empirical papers have examined the profit persistency, there are still very limited theories highlighting the deviations from the expected competition and profit relationship. The level of competition in the industry, entry and exit barriers to market, ownership structure of the companies, the strength of anti-trust policies, country-specific regulatory systems, privatization and deregulation, insufficient time of competition, structural breaks in the economy can be counted as major ones.

Profit persistency is examined a lot in finance and economics literature after its importance uncovered by Mueller (1977). The present study aims to reveal the persistence of profit on energy industry companies with a contribution to current literature by investigating such relationship by listed and unlisted companies around the world during the period between 2010 and 2016. In recent years a great number of research papers have emerged looking into the relationship with several methodologies. We

Figure 1: Competition and profits



employ several panel unit-root tests as a methodology to identify the profit persistency and long-run competition in the energy industry. The results of the paper show that the coefficients of the unlisted companies are lower than listed companies, the competition is very high and profit is stationary for all energy companies.

There are several contributions of this paper. First profit persistency in energy industry studies is very limited. The reason we focus on energy sector is that it is one of the fastest growing industries around the world. The second contribution is that we analyze the listed and unlisted companies separately to see whether there is any difference between listed and unlisted companies. With this respect the paper is organized as follows: Section II summarizes the prior related literature. Section III describes the data. Section IV reports the empirical results. The last section concludes the paper.

2. LITERATURE REVIEW

According to the efficient market hypothesis, there should be no excess profit in an efficient market, if there is any, it should converge the norm quickly. In other words, the abnormal profit should disappear immediately in an efficient market. This is called "profit persistency". Profit persistency is examined a lot in finance and economics literature after its importance uncovered by Mueller (1977).

One of the first empirical paper is written by Mueller (1986) who investigate the profit persistency using the U.S. companies. He studies manufacturing companies and finds that the persistence coefficient is 0.493. After his analysis, Kessides (1990) investigates the profit persistency using the manufacturing companies in the US and finds that the persistence coefficient is very close to Mueller (1986) paper 0.430. The difference between these two papers is that Kessides (1990) uses updated sample periods. Gschwandtner (2012) analyses the US companies by dividing his sample into three sub-sample (1950–1966; 1967–1983; 1984–1999). By doing so, she includes the companies if they exit and enter again. Therefore, she has more observation in her study. Her findings show that there is not much change in the US companies in terms of profit persistence. The profit persistency coefficient for her sample periods is 0.42, 0.36 and 0.45, respectively.

Profit persistency not only examined in the US but also analysed in Europe and emerging markets. Cubbin and Geroski (1990) use the United Kingdom companies to see whether persistence of profit exists or not. Their sample period covers 1948–1977 and they found that the profit persistency coefficient is 0.48 for the UK companies. Another study which examines the German companies is written by Schwalbach and Mahmood (1990). They also use very old sample period, 1961–1982. The result of their paper is same as the UK paper, 0.48. Jenny and Weber (1990) investigate the profit persistency for France companies and show that the coefficient of profit persistence is 0.37. The common theme of these papers is to analyse companies in one of the European Union companies and the coefficient of profit persistence for each country are very close to each other. This is not surprising since these countries are the most industrialized countries in the European Union and their financial system are very mature.

Another strand of the profit persistency studies can be categorized as cross-country studies. Goddard et al. (2011) study 65 developed and developing countries from 1997 to 2007 and show that the average of profit persistence is 0.42. Earlier Goddard et al. paper (2004) which uses banking sector in the biggest five countries in Europe show that profit persistency can be seen only in the short-run and profit persistence depends on the types of the banks. Moreover, Geroski and Jacquemin (1988) use 134 large European companies to determine the profit persistency in the large companies. They include companies from UK, France and Germany and show that profit persistency is around 0.41. Glen et al. (2001) also examine multi-countries profit persistency but they use seven developing countries separately. They find that the lowest profit persistency coefficient is 0.13 for Brazil and the highest profit persistency coefficient 0.42 for Zimbabwe. In our paper, we also investigate the multi-countries but we did not limit our countries to any region or union. So, we have 46 different countries in our listed companies' sample and 38 different countries in our unlisted companies' sample around the world.

The energy industry has become the centre of the finance and economics literature in the recent years. Despite the fact that energy companies have been investigated from several aspects, the lack of profit persistence analysis leads us to investigate this phenomenon in the energy sector. There is numerous analysis regarding profit persistency for different sectors around the world, there is still a gap in the literature to analyse the profit persistency for energy companies. One of the limited paper regarding energy sector is Gozbasi and Aslan (2015). The study examined the profit persistency using the Turkish energy companies. They find that degree of persistence is high in the energy companies in Turkey. We extend this finding including all the listed and unlisted energy companies around the world. As far as our knowledge this is the first paper which studies the profit persistency for the energy sector globally. Due to its high requirement of capital and difficulty of entry to the market, the profit persistency might be different from other sectors. Thus, it is very important to show the profit persistency in energy companies.

3. DATA AND METHODOLOGY

Our data comprises all the energy companies (listed and unlisted) around the world during the period between 2010 and 2016. We use Orbis (Bureau van Dijk) to download the financial statements of each company in our sample. We download two separate data, listed companies and unlisted companies. In each file, several restrictions are used to eliminate potential problems such as missing observations. First of all, our data set include only active companies. Secondly, we use NACE code to identify only energy companies. NACE code of electricity, gas, steam and air conditioning supply is 35 but we do not use all the energy-related companies. We go further and choose only 3511 production of electricity. We also delete the companies if they do not have a valid observation for the entire sample period. The last restriction we impose is that our profit proxies should be a positive number. In other words, if a company has a negative value of any of the profit proxies we delete that particular company.

To investigate the persistence of profit in energy companies around the world, we use four different proxies to capture the profit. Our first proxy is a return on asset (ROA) which is calculated as net income to a total asset of each company. The second proxy is a return on equity (ROE) which is defined as net income to shareholders' equity. The third proxy is a return on capital employed (ROCE) which is defined as net income to capital employed and the last variable is profit margin which is computed as net income to net sales.

The profit proxies are winsorized at the 5% and 95% levels each year to eliminate the effect of outliers in our sample. As a final sample, we have 180 companies from 46 different countries around the world in our listed companies' dataset and 1.348 companies from 34 different countries around the world in our unlisted companies' dataset.

As a first analysis, we demonstrate how our profit proxies change over time. Table 1 reports the descriptive statistics for the whole period from 2010 to 2016 including listed and unlisted companies. The average ROA in our sample is 5.459 which is the lowest average value among our profit proxies, and the highest value is 23.958 (profit margin).

To illustrate whether there is the difference between listed and unlisted companies, we divided our sample into two parts. The first part only consists listed companies and the second part includes unlisted companies. Table 2 reports the descriptive statistics for listed and unlisted companies separately in Panel A and B, respectively. As we could see in Table 2 there is slight difference in our profit proxies between listed and unlisted companies, especially in ROA and ROCE. However, ROE and profit margin are quite different between listed and unlisted companies.

As an empirical specification, we adopt several panel unit root tests, namely Harris and Tzavalis (HT) (1999), Levin, Lin and Chu (LLC) (2002) and Im, Pesaran and Shin (IPS) (2003). The advantage of panel unit root is that it allows us to examine mean-reversion in a panel data. The reason that we employ three different panel unit root tests is to show that our result does not depend on our choice of tests. It is robust with several different approaches.

3.1. LLC (2002)

LLC (2002) suggests that individual time series unit-root tests are required a large amount of time to analyse. They propose an alternative approach to capture the mean-reversion when we have panel data. Their hypothesis can be stated as follow:

$H_0: \rho_i = 0$

$H_0: \rho_i < 0$

LLC test can be summarized in four steps. First of all, we adopt augmented ADF for each cross-section.

$$\Delta y_{it} = \rho_i y_{i,t-1} + \sum_{j=1}^{\rho_i} \theta_j \Delta y_{i,t-j} + \alpha_{mi} d_{mt} + \varepsilon_{it} \quad (1)$$

From the ADF regression, we calculate the error variance. In the second step, we run two auxiliary regressions to get orthogonalized residuals.

1. Δy_{it} on $\Delta y_{i,t-j}$ and d_{mt} to get the residuals and $\hat{e}_{it}$
2. $y_{i,t-1}$ on $\Delta y_{i,t-j}$ and d_{mt} to obtain residuals $\hat{\vartheta}_{i,t-1}$

We then standardized the residuals using standard errors from ADF regressions.

$$\tilde{e}_{it} = \hat{e}_{it} / \hat{\sigma}_{\varepsilon l} \quad (2)$$

$$\tilde{\vartheta}_{l,t-1} = \hat{\vartheta}_{it} / \hat{\sigma}_{\varepsilon l} \quad (3)$$

As a final step, we adopt pooled OLS regression to test our null hypothesis.

$$\tilde{e}_{it} = \rho \tilde{\vartheta}_{l,t-1} + \tilde{\varepsilon}_{it} \quad (4)$$

3.2. HT (1999)

This method is designed to detect unit root in panel data when you have relatively short time span. The hypothesis is same as the other panel unit-root tests: The null is that there is a unit-root and the alternative hypothesis is that each time series is stationary.

HT test uses y_{it} instead of the difference y_{it} as a dependent variable. So the null hypothesis is that

$H_0: \rho_i = 1$

$H_0: \rho_i \neq 1$

Limiting normal distribution of HT test is given as:

$$\sqrt{N}(\rho - 1 - B_2) \rightarrow N(0, C_2) \text{ where } B_2 = -3/(T+1) \text{ and}$$
$$C_2 = 3(17T^2 - 20T + 17)/[5(T-1)(T+1)^3] \quad (5)$$

3.3. IPS Test (2003)

The only difference between IPS and LLC is that IPS allows for heterogeneous coefficients, so it has fewer restrictions than LLC method. The null hypothesis can be stated as follows:

$H_0:\gamma_i=1$

$H_1: \gamma_i<1$

The test statistics can be calculated in two different ways. The first method is to calculate average t-statistics for each individual unit root test.

$$\bar{t} = \frac{1}{N}\sum_{t=1}^{N} t_i \tag{6}$$

The second method is to calculate the Z statistics using the average t-statistics. Z statistics is the standardized version of t-statistics.

4. EMPIRICAL RESULTS

Table 3 reports the result of panel unit-root tests for listed and unlisted energy companies around the world. Panel A of Table 3 shows the listed energy companies and Panel B of Table 3 show the unlisted energy companies. As we earlier explained, we have used three different panel unit-root test to verify the stationary of our proxies of profit. In each panel unit-root test, we adopt two different analysis. Since we have a panel data it would be very difficult to detect whether our data has a trend or not. Therefore, we analyze our data in both ways, without trend and with the trend.

The results of panel unit-root tests show that we reject the null hypothesis for all of our proxies of profit regardless of the tests. In other words, we conclude that all of our proxies are stationary so they do not have random walk they have mean-reverting process. This result also implies that profits are not persistent.

After we determine that our proxies of profit are stationary, we would like to test the persistence of profits or speed of adjustment. We follow the prior literature and use first-order auto-regressive estimation as follow:

$$\rho_{i,t}=\alpha_i+\lambda_i\rho_{i,t-1}+\varepsilon_{i,t} \tag{7}$$

Where, $\rho_{i,t}$ is the profitability proxies of company *i* at time *t*. Coefficient of interest is λ_i which shows the speed of adjustment coefficients of excess profits. $\varepsilon_{i,t}$ represents the error term.

$\rho_{i,t}$ is calculated as the cross-sectional average profit rate of energy companies in year *t* subtract from the profit rate of each company at time *t*.

$$\rho_{i,t} = \vartheta_{i,t} - \overline{\vartheta_t} \tag{8}$$

Where $\overline{\vartheta_t} = \sum_{i=1}^{n} \frac{\vartheta_t}{n}$

The coefficient of interest λ_i indicates the speed of adjustment or the competition in the industry. If the value of λ_i is close to zero we can interpret as the low degree of persistence. In other words, the small number indicates high competition (Bektas, 2007).

Another point is to look at $\hat{\rho}_{i,t} = \frac{\hat{\alpha}}{1-\hat{\lambda}}$ which represents the long-run profit rate or equilibrium of profit rate of companies.

Table 4 reports the result of the speed of adjustment analysis. Panel A of Table 4 shows the results of listed companies and Panel B of Table 4 shows the results of unlisted companies. As we can see that the coefficient of 1-λ_i which indicates the panel value

Table 1: Summary statistics

Summary statistics	n	Mean±SD	Min	Max
ROA	10696	5.459±4.957	0.266	20.087
ROE	10696	19.293±18.532	0.962	96.703
ROCE	10696	10.829±9.311	1.634	50.214
Profit margin	10696	23.958±16.761	1.874	62.76

Table 2: Summary statistics

Listed companies	n	Mean±SD	Min	Max
ROA	1260	4.524±2.963	0.458	12.320
ROE	1260	10.881±6.531	1.633	31.806
ROCE	1260	9.578±5.558	2.47	26.572
Profit margin	1260	17.022±12.983	1.323	51.634
Unlisted companies				
ROA	9436	5.610±5.238	0.246	21.134
ROE	9436	20.524±19.652	0.892	98.293
ROCE	9436	11.045±9.933	1.598	54.31
Profit margin	9436	24.870±16.972	1.996	63.033

Table 3: Unit root test

Listed companies	ROA		ROE		ROCE		Profit margin	
	No-trend	Trend	No-trend	Trend	No-trend	Trend	No-trend	Trend
LLC	−66.861 (0.000)	−80.673 (0.000)	−36.625 (0.000)	−10.100 (0.000)	−32.706 (0.000)	−12.100 (0.000)	−51.378 (0.000)	−52.400 (0.000)
HT	0.256 (0.000)	−0.015 (0.000)	0.224 (0.000)	0.0062 (0.000)	0.252 (0.000)	−0.025 (0.000)	0.323 (0.000)	−0.028 (0.000)
IPS	−11.152 (0.000)	−74.944 (0.000)	−8.922 (0.000)	−34.472 (0.000)	−6.197 (0.000)	−63.624 (0.000)	−12.038 (0.000)	−27.583 (0.000)
Unlisted companies								
LLC	−15.250 (0.000)	−46.300 (0.000)	−0.469 (0.000)	−16.200 (0.000)	−30.000 (0.000)	−51.492 (0.000)	−86.220 (0.000)	−24.200 (0.000)
HT	0.145 (0.000)	−0.193 (0.000)	0.236 (0.000)	−0.135 (0.000)	0.2580 (0.000)	−0.118 (0.000)	0.132 (0.000)	−0.191 (0.000)
IPS	−21.891 (0.000)	−28.150 (0.000)	−31.282 (0.000)	−16.260 (0.000)	−26.003 (0.000)	−26.100 (0.000)	−19.034 (0.000)	−17.020 (0.000)

Table 4: The speed of adjustment

Variable	$\hat{\alpha}$	$t(\hat{\alpha})$	$\hat{\lambda}$	$1-\hat{\lambda}$	$\hat{\rho}_{i,t} = \frac{\alpha}{1-\hat{\lambda}}$	R^2
Listed companies						
ROA	−3.300	−33.11	0.724	0.276	−11.956	0.56
ROE	−7.388	−26.92	0.669	0.331	−22.320	0.50
ROCE	−7.774	−41.39	0.806	0.194	−40.072	0.68
Profit margin	−14.631	−51.20	0.858	0.142	−103.035	0.75
Unlisted companies						
ROA	−4.234	−87.21	0.752	0.248	−17.072	0.58
ROE	−12.661	−64.15	0.589	0.411	−30.805	0.49
ROCE	−7.715	−72.08	0.679	0.321	−24.037	0.58
Profit Margin	−18.386	−90.76	0.737	0.263	−69.909	0.56

of the speed of adjustment is between 0.142 and 0.331 for listed companies and between 0.248 and 0.411 for unlisted companies. The results of the speed of adjustment of adjustment suggest that the competition in energy companies is higher for listed companies than unlisted companies. When we look at closer to the result of persistency we can see that profit margin and ROA have the lower value which suggest that the competition affects assets and sales more than equity.

Not only we examine the speed of adjustment on energy companies but also, we would like to investigate whether there is any difference between listed and unlisted companies. As Table 4 reports there is a slight difference between listed and unlisted companies in terms of the speed of adjustment especially when we use ROCE, ROE and Profit Margin. On the other hand, the speed of adjustment using ROA gives us a very close value between listed and unlisted companies. This result suggests that the competition is higher for listed companies compare to unlisted companies which are expected since the listed companies operate publicly.

5. CONCLUSION

The competitive environment hypothesis can be defined as the results of competition on low and high profits. The hypothesis states that profits of the low-profit companies should increase to sector norms and high-profit companies' profits decrease to competitive profit rate. Therefore, profits do not persist under competition.

In this paper, profit persistence of the listed and unlisted energy companies is examined by several panel unit root tests. Besides, the speed of adjustment is also analyzed. Data of the empirical investigation is a ROAs, ROE, ROCE and profit margin of 180 listed companies from 46 different countries and 1.348 unlisted companies from 34 different countries separately.

The results of the study reveal that both listed and unlisted energy companies' profits are mean reverting. The mean reverting process implies that profits are not persistent. As a result of high competition on energy industry non persistent profits validates competitive environment hypothesis. Moreover, competition among listed companies is found to be higher than unlisted companies. The feature of the listed companies makes them more competitive compare to the unlisted firms. The last point is that the pressure of competition appears to force energy companies' high and low profits to competitive profit rate and this may be of interest to investors and policy-makers.

REFERENCES

Bektas, E. (2007), The persistence of profits in the Turkish banking system. Applied Economics Letters, 14(3), 187-190.

Cubbin, J., Geroski, P.A. (1990), The persistence of profits in the United Kingdom. In: Mueller, D.C., editor. The Dynamics of Company Profits: An International Comparison. Cambridge: Cambridge University Press. p147-168.

Geroski, P.A., Jacquemin, A. (1988), The persistence of profits: A European comparison. The Economic Journal, 98(391), 375-389.

Glen, J., Lee, K., Singh, A. (2001), Persistence of profitability and competition in emerging markets. Economics Letters, 72, 247-253.

Goddard, J., Liu, H., Molyneux, P., Wilson, J.O.S. (2011), The persistence of bank profit. Journal of Banking and Finance, 35(11), 2881-2890.

Goddard, J., Molyneux, P., Wilson, J.O.S. (2004), The profitability of European banks: A cross-sectional and dynamic panel analysis. The Manchester School, 72(3), 363-381.

Gozbasi, O., Aslan, A. (2015), Persistence of profit in energy industry: Dynamic evidence from Turkish companies. International Journal of Economics and Financial Issues, 5(2), 624-628.

Gschwandtner, A. (2012), Evolution of profit persistence in the USA: Evidence from three periods. The Manchester School, 80, 172-209.

Harris, R., Tzavalis, E. (1999), Inference for unit roots in dynamic panels where the time dimension is fixed. Journal of Econometrics, 91(2), 201-226.

Im, K., Pesaran, M., Shin, Y. (2003), Testing for unit roots in heterogeneous panels. Journal of Econometrics, 115(1), 53-74.

Jenny, F.Y., Weber, A.P. (1990), The persistence of profits in France. In: Mueller, D.C., editor. The Dynamics of Company Profits: An International Comparison. Cambridge: Cambridge University Press. p123-128.

Kessides, I. (1990), The persistence of profits in the U.S. manufacturing industries. In: Mueller, D.C., editor. The Dynamics of Company Profits: An International Comparison. Cambridge: Cambridge University Press. p59-76.

Levin, A., Lin, C., Chu, C. (2002), Unit root tests in panel data: Asymptotic and finite-sample properties. Journal of Econometrics, 108(1), 1-24.

Mueller, D.C. (1977), The persistence of profits above the norm. Economica, 44(176), 369-380.

Mueller, D.C. (1986), Profits in the Long Run. Cambridge: Cambridge University Press.

Schwalbach, J., Mahmood, T. (1990), The persistence of corporate profits in the federal republic of Germany. In: Mueller, D.C., editor. The Dynamics of Company Profits: An International Comparison. Cambridge: Cambridge University Press. p105-122.