PERFORMANCE OF PRIVATE ELECTRICITY AND NATURAL GAS DISTRIBUTION FIRMS DURING ENERGY REFORM, FINANCIAL CRISES AND EU ACCESSION[*]

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Abstract

This paper uses accounting measures, namely; Return on Assets and Operating Return on Assets to examine the performance of private electricity and natural gas distribution firms in Turkey through 1990-2005. In this period Turkish energy sector went through three major restructurings, each of which occurred just about a major step was taken between Turkey and European Union and during various financial crises. The period also reflects any changes in the industry due to each restructuring. System-GMM methodology is employed to analyze firm level data. The findings show that the measures are negatively associated with firm size but positively related to sales growth. Moreover the debt ratio positively affects the measures during the economic expansion periods. The measures display irrelevancy to GDP and a declining pattern in time. More importantly, the level of Operating Return on Assets is always below that of Return on Assets, suggesting that the firms are earning profit elsewhere than their own distribution activities.

Keywords: Firm performance, energy sector, financial crises

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Özet

Enerji Reformu, Finansal Krizler ve AB'ye Katılım Sürecinde Özel Elektrik ve Doğal Gaz Dağıtım Firmalarının Performansı

Bu çalışma varlıkların getirisi ve varlıkların faaliyet getirisi gibi muhasebe ölçütlerini kullanmak suretiyle 1990-2005 yılları arasında Türkiye'de faaliyet gösteren özel elektrik ve doğal gaz dağıtım firmalarının performansını araştırmaktadır. Bu süreç içerisinde Türkiye'deki enerji sektörü, farklı finansal krizler ve Türkiye ile Avrupa Birliği arasında atılan önemli adımların eşiğinde, üç büyük yeniden yapılandırma yaşanmıştır. Firma düzeyindeki verinin analizi için system-GMM metodolojisi kullanılmıştır. Sonuçlar göstermektedir ki söz konusu ölçütler firma büyüklüğü ile negatif, satışlardaki büyüme ile pozitif yönde ilişkilidir. Borçlanma oranı sadece ekonomik genişleme dönemlerinde söz konusu ölçütleri olumlu yönde etkilemektedir. Ölçütler GSYH'ya duyarsız ve zaman içerisinde düşme eğilimi göstermekte olup firmaların karlarını kendi dağıtım faaliyetlerinin dışındaki alanlarda elde ettiklerini onaylar şekilde firmaların varlıklarının faaliyet getirisi varlıkların getirisi düzeyinin hep altında yer almaktadır

Anahtar Sözcükler: Firma performansı, enerji sektörü, finansal krizler.

INTRODUCTION

The main purpose of this study is to examine the accounting performance of firms operating in energy sector in an emerging market, Turkey. Therefore, we study a period between 1990 and 2005 which not only overlap with reform sequences, but also own distinguished macroeconomic and institutional peculiarities. The restructurings in the energy sector occurred just around the time when a major step between Turkey and the European Union (EU) is taken towards the Turkey's full membership. The Customs Union Agreement between Turkey and EU came into force towards the end of 1995, Turkey's candidacy was announced at the Helsinki Submit of the European Council in December 1999, and the accession talks between Turkey and EU have commenced in October 2005. Turkish energy reform has commenced in 1984, and given a priority to the distribution side and our sample contains only the firms which are registered for electricity and natural gas distribution.

Our objective is twofold. Firstly, we examine if a difference exists between the periods in terms of the accounting performance measures of the firms; which are, Return on Assets (ROA) and Operating Return on Assets (OPROA). Our second purpose is to find out how the accounting measures of performance are influenced by firm specific factors, which are debt-to-equity-ratio, size, sales growth and international sales. To sum up, our analysis is

expected to shed light for energy sector firms in Turkey on how different the time periods, characterized in the increase and decrease in GDP, influence the profitability and how the accounting performances are affected by firm specific characteristics within the representative periods

This study contributes from various aspects to the limited existing body of literature regarding the emerging markets particularly by concentrating on energy sector firms. Firstly, our study is not limited with the energy sector firms that are publicly traded on the Istanbul Stock Exchange (ISE). Our data is obtained from the larger sector database of the Central Bank of Turkey, which are collected from firms on voluntary basis. Given that the number of energy sector firms listed on the ISE only amounts to the 10 per cent of our sample, our work provides a more thorough representation of the energy sector firms in Turkey.

Furthermore, the importance of the energy sector stems from its prominent role as a main contributor to the production of goods and services[1], and Turkey is not an exception in this (Balat, 2008, Jobert and Karanfil, 2007). Besides, the last 20 years of the Turkish economy is characterized by frequent macro-economic fluctuations and institutional changes (Cizre and Yeldan, 2005). Consequently, it is preeminent to provide evidence on the performance of Turkish energy sector by observing the impact of outside and inside shocks on the performance of the representative firms. To the best of our knowledge no previous study other than ours addresses not only the performance of private energy sector firms in Turkey, but also the discrepancies between the impacts of highly volatile periods on their performances.

We employ accounting measures of performance for studying the energy firms. However, the fact that we are not able to use any stock market measures of performance, do not create any disadvantages for our work. Because, as outlined by Gunduz and Tatoglu (2003), the measures of stock market performance (i.e. Tobin's Q and price-earnings ratio) are not reliable for analyzing Turkish firms due to the market inefficiency of ISE given its small and thin characteristics[2].

Our findings signify that both ROA and OPROA display a decreasing pattern in time. Moreover, contrary to our expectations, the level of OPROA is found to be below that of ROA for all periods, indicating the possibility that firms derive their profit from other activities than distribution of electricity or natural gas. Our results provide strong evidence that the firm size is negatively associated with accounting performance measures. Additionally the debt-to-equity- ratio is found to be boosting the measures of accounting performance during the expansion periods thanks to relatively favorable cost of external

financing. Furthermore, our study lends considerable support to the prediction that the sales growth is positively related with accounting performance measures for almost every period. Finally, our analyses do not yield any significant evidence on the impact of international sales and GDP on the accounting performance measures.

The remainder of the paper proceeds as follows. Section two of the paper briefs on Turkish energy reform, while the third section presents the previous studies. Section four describes the data and the methodology and the results are explained in the fifth section. Finally, the last section concludes the paper.

1. TURKISH ENERGY SECTOR REFORM

Turkey is destined to become an energy market, hub, and transit country between energy starving Europe and energy abound states of Central Asia and Middle East. Turkish energy sector is growing fast attaining an impressive almost 8% annual demand growth since 1980, and expected to grow at the same pace until 2020 (Lazard). Many domestic and foreign firms are willing to participate within the expansion process of this sector provided that a secure investment and operational environment is created. Turkey has introduced various measures to achieve this with limited success so far (Erdogdu, 2006, Yılmaz and Uslu, 2007). For the sake of our analyses, in this section we focus only on developments in the electricity and natural gas divisions of Turkish energy sector, and thus strictly tell the stories of responsible dominant public utilities, namely Turkish Electricity Authority (TEK), and Petroleum Pipeline Corporation (BOTAS)[3].

Both electricity and natural gas sectors are still dominated by publicly owned utilities. TEK and BOTAS were established in 1970 and 1974, respectively. The former was responsible only from generation and transmission until 1982, when its operations expanded to include distribution, as well. The latter was established mainly to transport crude oil by pipelines, but later in 1987 it was also assigned with transport of natural gas. Presently, BOTAS has a monopoly in import, transport and distribution of natural gas.

Turkish energy reform initiated in 1984 by attempting to break the monopoly of these public utilities, and this came immediately after Turkey's switch to an export oriented industrialization strategy from an inward looking one in 1980. Turkish energy reform has received remarkable technical and financial supports particularly from the World Bank (World Bank, 2005), which commenced with five successive Structural Adjustment Loans given between 1980 and 1984, all conditioned on reforms in major sectors, including energy

(Öniş and Kirkpatrick, 1991). One of the main motives behind this energy reform was to attract private firms to undertake necessary investment for new energy facilities as well as for renewal and maintenance of old facilities. During the pre-1980 era the resources were channeled to meet growing energy demand, and thus the investment needs of distribution, and to a lesser degree transmission, networks were comparatively neglected.

To fulfill this conditionality, Turkey started the reform from electricity sector by announcing the 1984 Electricity Act, which abolished the monopoly of integrated public utility TEK, and opened the way for private participation within the Turkish energy sector. Nevertheless, the transfer of ownership of public facilities was, and to some extent still is, a very sensitive issue in Turkey (Bagdadioglu, 2005), thus numerous innovative schemes, for instance, the Build-Operate-Transfer (BOT) to start with, and later the Build-Own-Operate (BOO), auto-producer, and the Transfer-of-Operating-Rights (TOOR), were initiated to attract domestic and foreign private investors into the sector. The first three schemes were used as instruments for creation of new generation capacity, and the last for distribution network. Take-or-pay clauses, Treasury guarantees, long-term purchase agreements, and allowance of recovering returns during the early years of investment attracted considerable number of private firms into the sector, and created significant generation capacity during the 1990s, while distribution investments relatively lagged behind.

To encourage private investors into the distribution part, Turkey had to show its devotion to the reform. For this, then came in 1993 the first major restructuring of the sector, where TEK was divided into two public utilities, one responsible from generation and transmission, TEAS, and another from distribution, TEDAS. The financial crisis of 1994 hindered the reform process, while the Customs Union commenced between Turkey and EU in 1995 slightly improved the Turkish reform prospect. However, private investors remained cautious until international arbitration was allowed in 1999, and further institutional and legal changes introduced in 2001.

The second major restructuring occurred with the announcement of Electricity Market Law in February 2001, while the Turkish economy was hit by the subsequent and stronger wave of financial crisis originated in November 2000[4]. The EML of 2001 was a breakthrough in the sense that it was in line with related EU regulations, addressed all aspects of electricity activities, and at last established much needed sector regulator, Electricity Market Regulatory Authority (EPDK). Meanwhile, EML separated TEAS further into three public companies, namely Electricity Generation Corporation (EUAS), Turkish Electricity Transmission Corporation (TEIAS), and Turkish Electricity Trading and Contracting Corporation (TETAS). Later, similar but less dramatic

developments accomplished in the natural gas sector, where Natural Gas Market Law was announced in May 2001, and required vertical disintegration of BOTAS after 2009. NGML also changed the regulator's name to Energy Market Regulatory Authority, and expanded its jurisdiction to include regulation of petroleum and liquefied petroleum gas market.

Finally, in March 2004 Turkey announced the Electricity Sector Reform and Privatization Strategy Paper, defining the plan and timetable for privatization in electricity sector (ESRPSP, 2004). This came before the accession talks between Turkey and EU went ahead in October 2005, ensuring EU about the Turkish commitment to the energy reform. The plan envisaged starting with privatization of electricity distribution in 2006, to follow up with transfer of generation facilities to private firms. Then, after a transitory period of five years a fully liberalized electricity market is expected to emerge by the end of 2011. Before privatization, TEDAS was divided into 20 distribution corporations by merging its 81 provincial distribution organizations[5], while six generation corporations were planned to be created out of EUAS. Yet, this plan has not worked as expected due to lack of coordination between related several public institutions involved in privatization process, and political reasons. The energy sector is a very lucrative one, and many domestic and foreign firms are expected to participate in the bidding process, which currently raises conflicting public opinions and stimulates heated political debates. The present Government was unwilling to take any political risks by engaging in such intense debates just before the election of head of state and the general election in 2007. Therefore the Government dropped the privatization issue from its agenda until the end of 2007. However, to the date there has been no progress in energy sector privatization in Turkey.

2. PREVIOUS STUDIES

The studies by Gursoy and Aydogan (1999), Gunduz and Tatoglu (2003), Aksu and Kosedag (2006) and Gonenc et al., (2007) are the leading ones which investigate the performance of Turkish firms through accounting performance of measures. However, our study is the first to address two of the short comings of these previous works. Firstly, the indicated studies only analyze the firms that are publicly traded on ISE. Secondly, as indicated by Haynes et al., (2002) and Claasens (2004), macroeconomic fluctuations have a significantly adverse effect on accounting performance of firms. Despite utilizing value based measures instead of accounting measures, Hawawini et al., (2002) concur that institutional and macroeconomic effects have to be considered as well as firm specific factors for investigating performance of firms. On the contrary, previous studies analyzing the performance of firms, do not take into account

the role of the volatile character of the macro-economic structure and the ever-changing institutional factors in Turkey on the performance of the firms. Last but not least, despite its strategic importance in the Turkish economy, none of the indicated studies concentrates on the performance of energy sector alone.

Following the studies by Ozkan (2005) and Somçağ (2006), the last 15 years of the Turkish economy can be investigated in 5 diverse time periods. First of all the years 1990, 1991, 1992, and 1993 are characterized by major changes in economic policies such as significant deregulation in product and capital markets leading to increased domestic and international competition (Gunduz and Tatoglu, 2003). However the first financial crisis of 1990's hit Turkey right after the Tequila crisis of Mexico in 1994. Immediately after this year Turkey has suffered outside shocks such as chronic inflation, adjustment of export markets due to newly settled customs union with the European Union within the years 1995 and 1998 (Somçağ, 2006). Moreover, the Turkish economy also suffered the Asian Crisis in 1997 and Russian debt default in 1998 through the "contagion effect" (Eitman et al., 2006). On the one hand, after launching an anti-inflationary program as a result of an agreement with IMF, Turkish companies have taken advantage of decreasing costs of external finance thanks to diminishing rates of inflation and in turn lower real interest rates within the years 1999 and 2000 (Central Bank of Turkey, 2004). On the other hand, the beneficial stage of the macroeconomic environment in Turkey has come to an end with the severe financial crises that hit Turkey twice; first in November 2000 and then in February 2001[6]. The years 2001 and 2002 are characterized as crisis period in the *2004 Balance of Payments Report* of the Central Bank of Turkey. Because during these years, number of firms entering into bankruptcy codes has reached to its peak and investment ratios of firms have declined dramatically due to costly external finance emanating from the lack of liquidity in financial markets. Turkish economy has started to attract foreign portfolio investments and display high GDP growth rates through the years 2003, 2004 and 2005. Unlike the previous period, this period is characterized by relatively lower and stable inflation level and interest rates (Somçağ, 2006).

In this study we also investigate the relationship between firm specific factors and accounting performance measures of energy firms, along with how this relationship differs within the different periods. Firstly, firm size is included to account for potential economies of scale and scope accruing to large firms. However, Fiegenbaum and Karnani (1991) has indicated that output viability is a more obvious source of competitive advantage in volatile and capital intensive industries, such as energy sector. They conclude that small firms are found to be more profitable thanks to their flexibility to adjust their outputs along with the macroeconomic volatility. Secondly, we analyze the firm growth, measured as year one year sales growth and predict that the sales growth boosts accounting

performance of firms. However we also bear in mind the claim by Allison et al., (2006) that firms may sacrifice profitability for encouraging the sales growth such as reducing sales prices. Furthermore, we also check for the debt-to-equity-ratio of firms. It is indicated in Arslan et al., (2006) that during the economic recessions, in other words in crisis periods, external finance becomes more costly. Thus, debt ratio in the crisis periods has a larger impact on total costs of firms which in turn diminishes profits. On the contrary, we expect debt ratio to be positively associated with profitability during the economic expansion periods. Lastly, we consider international sales as another firm specific factor that may have an impact on the accounting performance of firms. Rugman (1979) and Caves (1982) indicate that since markets are not fully integrated, involvement in more than one national market serves to balance out regional macroeconomic trends that are less than perfectly correlated. Consequently, the involvement in international sales is expected to improve accounting performance measures

3. DATA AND METHODOLOGY

Our sample is formed by 54 firms and the period of our study begins in the year 1990 and ends at 2005. The number of firms in the sample belonging to the electricity distribution sector is 34 while that number falls to 20 for the firms belonging to the gas distribution sector. Our unbalanced data is collected from the sector database of the Central Bank of Turkey. This database is made up by the voluntary acknowledgement of individual firms. Therefore, we had the opportunity to work on larger number of sample firms since the average number of firms listed on the ISE during the sample period is five; namely, three firms belonging to the electricity and two firms to the gas industries, respectively.

Table 1 exhibits the descriptive statistics of the accounting performance measures and the control variables of the energy firms. The results show that both the mean and median values of ROA (measured as net profits scaled by total assets) and OPROA (measured as the sum of operating profits scaled by total assets) and the value of OPROA is always lower than that of ROA. Firm size is defined as the inflation adjusted natural logarithm of total assets. The debt ratio is measured as the ratio of debt to equity. *INT/SA* represents the ratio of international sales to total sales. On average 12 percent of the sample firms have international sales in our sample firms. *Growth* represents the sales growth and it is measured as percentage increase in sales from year t to year t+1 after adjusted for inflation. Last but not least, GDP is the annual real GDP growth rate in Turkey between 1990 and 2005.

Table 1. Decriptive Statistics

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	Mean	Median	St.Dev	25th percentile	75th percentile
ROA	0.090	0.240	0.256	0.001	0.213
OPROA	0.067	0.052	0.214	-0.011	0.175
SIZE	12.582	12.630	2.735	11.194	14.672
DEBT	0.532	0.517	0.284	0.329	0.774
GDP	3.678	6.500	5.460	1.450	7.600
INT/SA	0.014	0.000	0.070	0.000	0.010
GROWTH	1.230	0.935	3.540	0.420	1.460
Notes: Number of firms = 30, average number of electricity firms = 18, average number of gas firms =12, number of observations = 120, number of firms with international sales = 3					

Notes: Table 1 provides descriptive statistics for the main variables used in our analysis from the years beginning at 1990 and ending at 2005. *ROA* is estimated as net profits scaled by total assets and *OPROA* is measured as the sum of operating profits scaled by total assets. *SIZE* is defined as the inflation adjusted natural logarithm of total assets. *DEBT* is the debt-to-equity ratio. *INT/SA* represents the ratio of international sales to total sales. GDP is the annual real gross domestic product growth rate. Finally, *GROWTH* represents the sales growth and it is represented by percentage increase in sales from year t to year t+1 after adjusted for inflation.

Figure 1 displays the level of ROA and OPROA of the energy firms in Turkey throughout the sample period. As seen from the figure, both ROA and OPROA display a declining pattern through the years 1990 to 2005. The striking result from Figure 1 is not only that the accounting performance of the energy firms fall dramatically throughout the sample period, but also the value of OPROA is always below that of ROA. The latter result is not in accord with our expectations since the OPROA of Turkish firms belonging to various sectors and listed on ISE is found to be always above ROA (Gonenc et al., 2007). This consistent outcome reveals that the profits generated by the energy firms in Turkey are not necessarily from their main operations but from the other activities out of their business description.

Figure 1. The Pattern of Roa and Oproa Within The Years
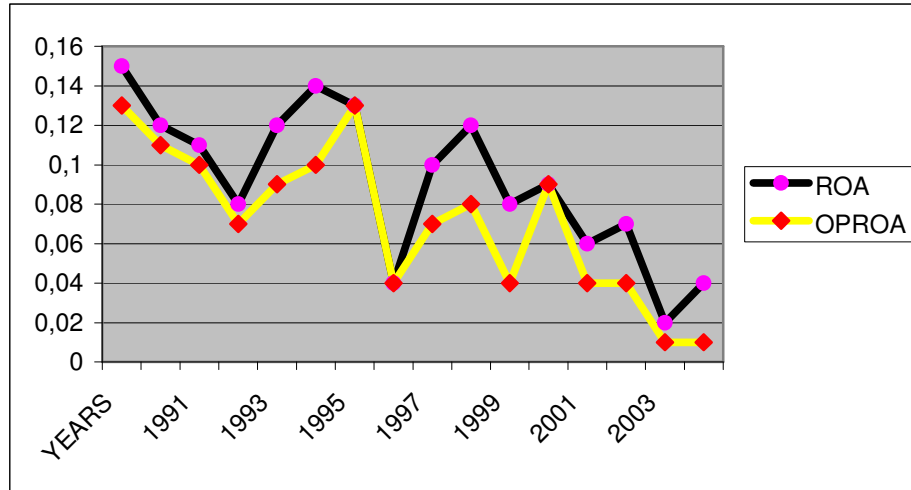
Notes: This figure demonstrates the value patterns of *ROA* and *OPROA* between the years 1990 and 2005. The x-axis stands for the years and the y-axis for the values of the *ROA* and the *OPROA*. *ROA* is estimated as net profits scaled by total assets, and *OPROA* is measured as the sum of operating profits scaled by total assets.

Table 2 shows the two tailed Pearson correlation matrix for our variables. The results for the variables in the table assure that there is no potential of multicollinearity between the variables, except for ROA and OPROA, for which the correlation coefficient is 0.701.

Table 2. Pearson Correlation Matrix

	ROA	OPROA	SIZE	LEV	GDP	INT/TA
OPROA	0.701*					
SIZE	-0.22*	-0.15*				
DEBT	-0.35	-0.13	0.07			
GDP	0.01	0.02	0.08	0.42*		
INT/SA	0.03	0.07	-0.01	0.01	0.04	
GROWTH	0.29*	0.31*	-0.13*	-0.14*	0.09	-0.02

*Notes***:** This table presents the Pearson's Correlation matrix for the variables used in our analysis for the number of 774 firms. *ROA* is estimated as net profits scaled by total assets and *OPROA* is measured as the sum of operating profits scaled by total assets. *SIZE* is defined as the inflation adjusted natural logarithm of total assets. *DEBT* is the debt-to-equity ratio. *INT/SA* represents the ratio of international sales to total sales. GDP is the annual real gross domestic product growth rate. Finally, *GROWTH* represents the sales growth and it is represented by percentage increase in sales from year t to year t+1 after adjusted for inflation. * indicates that correlation is significant at the 5% level (two tailed).

The methodological approach for our estimations is the generalized method of moment (GMM) estimation method. Anderson and Hsiao, (1982) and Arellano and Bond (1991) emphasize that GMM has superiority over other methods at tackling estimation issues, such as nonnormality, heteroscedasticity, and measurement errors. Because of these methodological advantages, this study applies a system-GMM approach to the unbalanced panel data of energy firms. Hansen's [1982] J-tests are used in order to test whether valid instrumental variables are used and the model specifications are appropriate. The model we use for our estimations is;

$$Performance_{it} = \alpha_o + \alpha_1 Performance_{it-1} + \sum_{j=1}^{k} \beta_j x_{ij} + v_i + v_t + \varepsilon_{it}$$

where *Performanceit (Performanceit-1)* measures interchangeably the firm *i*'s ROA and OPROA in period t (t-1). Moreover, *vi* represents time -invariant unobservable firm-specific effects and *vt* represents systematic but time-specific effects, and finally, *xij* s are regressors.

ASSESSMENT OF RESULTS

Table 3 represents the regression results from the GMM models. Panel A of the table exhibits the results of the model in which the dependent variable is ROA, and Panel B shows those of the model that has OPROA as dependent variable. Moreover, J-statitics reported at the bottom of the table for the both panels are all statistically insignificant suggesting that the instrumental variables used in the GMM estimations are valid (Hansen, 1982). The results obtained in both panels are identical therefore can be explained together.

Firstly, the first coefficients in the table are the lagged variables of the dependant variables and indicate the speed of adjustment to the target levels and both those of ROA and OPROA are very close in the models. When calculated as the 1 minus the estimated coefficient o the lagged variables, we find that the average speed of adjustment to the target levels to the accounting performance measures is 0.097, which is slightly slow.

Firm size is found to be significantly and negatively associated with both ROA and OPROA in every model of the table. Despite having similar statistical significances, negative influence of size has a higher economic significance on OPROA than ROA. All together, this result does not support the prediction that energy firms take the advantage of economies of scale owing to becoming larger. Therefore we obtain evidence that smaller firms operating in the energy

sector display a better accounting performance owing to their greater flexibility to better adjust ever changing economic and financial conditions in Turkey. Downsizing is a particularly beneficial policy for firms during economic contraction periods.

Debt-to-equity ratio is not found to be significantly influencing the accounting performance measures in general. In order to see the impact of debt usage in the economic expansion periods we interact the debt-to-equity ratio with the annual real growth in GDP. Interestingly, through the coefficients of the interaction variable in both of the models, we find strong evidence that the debt ratio is positively related with both of the accounting measures when baked up by the economic growth. This result shows that, due to the abrupt and dramatic decline in the interest rates during the economic growth periods the external financing becomes cheaper, and therefore positively influences the accounting performance of the energy firms. It should be noted that since external financing becomes costly during crises or economic constriction periods (see; Arslan et al., 2006 for the details), firms opt out external finance. More specifically, the positive influence of debt ratio is more emphasized on ROA than OPROA during the economic expansion periods suggesting that the contribution of debt financing was less diverted to operating activities in the economic growth periods.

Despite its combined positive effect on the accounting measures with the debt-to-equity-ratios, real annual GDP growth is not found to have any significant impact on neither ROA nor OPROA. This result is in accord with the display in Figure 1. Therefore our estimation justifies the demonstration in the figure that economic expansions and accounting performance measures do not go hand in hand for the energy firms in Turkey.

In accord with our expectations, the firm growth is statistically significantly related with both ROA and OPROA. Undoubtedly, the growth on sales flourishes the accounting performance of firms. Specifically, judging into the coefficients of the variable, which are lower for ROA, it is seen that the positive influence of the sales growth is more influential for OPROA. When the growth variable is interacted with the annual real GDP growth, neither the economic nor statistical significances of the coefficients display a substantial difference from the previous findings. We conclude that the impact of growth on the accounting performance of firms does not necessarily improve during the economic expansion periods.

Finally, international sales variable is not found to have any impact on the accounting performance measures. Contrary to our expectations its interaction with the annual real GDP growth variable does not yield any significant result for any of the accounting measures either.

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Table 3. Regression Results For The Accounting Performances

Panel A Dependent Variable: ROA			Panel B Dependent Variable: OPROA		
Variables	Model (1)	Model (2)	Variables	Model (1)	Model (2)
ROA_{t-1}	0.902**	0.935***	$OPROA_{t-1}$	0.864***	0.891***
	(28.813)	(29.998)		(39.437)	(42.825)
SIZE	-0.156***	-0.254***	SIZE	-1.314***	-1.004***
	(-5.088)	(-4.187)		(-6.261)	(-5.843)
GDP	0.022	0.035	GDP	0.115	0.184
	(1.072)	(1.154)		(1.358)	(1.201)
DEBT	0.057	0.068	DEBT	0.027	0.040
	(0.403)	(0.535)		(0.841)	(0.969)
DEBT*GDP		0.192***	DEBT*GDP		0.061***
		(2.905)			(3.176)
GROWTH	0.114***	0.193***	GROWTH	0.881***	0.693***
	(3.613)	(3.721)		(5.021)	(4.592)
GROWTH*GDP		0.128***	GROWTH*GDP		0.548***
		(2.981)			(3.914)
INT/SA	0.005	0.009	INT/SA	0.077	0.041
	(0.152)	(0.215)		(0.614)	(0.714)
INT/SA*GDP		0.083	INT/SA*GDP		0.101
		(0.615)			(1.115)
Number of Observations	774	774	*Number of Observations*	774	774
J-Statistic	0.282	0.485	J-Statistic	(1.211)	(1.446)

Notes: This table presents GMM estimations predicting ROA in Panel A and OPROA in Panel B over the period 1990-2005. *ROA* is estimated as net profits scaled by total assets and *OPROA* is measured as the sum of operating profits scaled by total assets. *SIZE* is defined as the inflation adjusted natural logarithm of total assets. *DEBT* is the debt-to-equity-ratio. *INT/SA* represents the ratio of international sales to total sales. GDP is the annual real gross domestic product growth rate. Finally, *GROWTH* represents the sales growth and it is represented by percentage increase in sales from year t to year t+1 after adjusted for inflation. t-statistic values are reported in parentheses. We use consistent to heteroscedasticity standard errors. ***, ** and * indicate coefficient is significant at the 1%, 5% and 10% level respectively.

CONCLUSION

In this paper we examine the accounting performance of firms operating in energy sector in Turkey by comparing the performance of the representative firms within a period characterized by either predominantly economic contraction times or economic expansion times. Since we are not limited by the firms publicly traded on the ISE, our study provides a more representative investigation of energy sector firms in Turkey.

In general both the level of ROA and OPROA, which are the accounting performance measures of our study, is observed to decline in time beginning at 1990 and ending at 2005. Moreover the result, which demonstrates that level of ROA is always above that of OPROA thus contradicts to findings for the other ISE listed firms belonging to various sectors. This finding suggests that the main profitability source of energy sector firms in every period is not only their operations but also other activities out of their industry description.

Our findings also provide insights into our understanding of the relationship between firm specific characteristics and accounting performance measures within the different periods. Firstly, size is found to be always negatively associated with both of the accounting performing measures. This result lends a considerable support to the prediction that small firms are more profitable thanks to their flexibility to fluctuate their outputs along with the macroeconomic volatility. Secondly, the sales growth is found to be positively associated with both of the accounting performance measures. Aligning with our expectations, the debt ratio is found to be only significantly and positively related with both of the accounting performance measures during the economic expansion times. In other words, debt-to-equity ratio is not found to be irrelevant for the accounting measures in general. Last but not least, no significant evidence is obtained for generalization concerning the relationship between the accounting performance measures and international sales and annual real GDP growth.

NOTES

[1] For more information on the strategic importance of energy sector, see, Rebeitz (2006).
[2] For further and detailed information on general advantages of accounting based measures over stock market based ones; see, Prowse (1992).
[3] For a detailed account of developments particularly in electricity and natural gas sectors, see Ozkivrak (2005), and Çetin and Oguz (2007), respectively.
[4] For a provocative evaluation of February 2001 crisis from a political economy perspective, see Öniş (2006).

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[5] Bagdadioglu et al., (2007) argue that this merger policy was efficiency enhancing. Evidently, the first three candidates of distribution privatization received a record number of applications (Lazard).

[6] We have not considered the year 2000 as the crisis period since the financial constraints for firms are found to commence and take place during the years 2001 and 2002, as indicated in the study by Arslan, Florackis and Ozkan (2006).

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