The Factors Affect Company Performance in Renewable Energy Industry

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Abstract

Concerns about global warming and climate change are generating interest in renewable energy measures with the purpose to minimize environmental impact. Promoting renewable energy production becomes indispensable since its represent a tiny fraction of energy consumed. The purpose of this study is to identify the performance determinants are divided in country-specific advantages and firm-specific advantages. Companies were selected from Bloomberg and filtered due to its information availability from COMPUSTAT to construct a Panel Data structure.

The results proved that both country level (shares of renewable and energy consumption) and firm level (market capitalization, employee growth rate and capital intensity) determinants were significant in the renewable energy industry. Through the analysis, it's possible to realize that return on assets it's a performance measure with long term results, but unlike it, gross profit margin is variable that demonstrate short term results. We conclude that renewable energy industry has a great potential due to its results performed.

Keywords: renewable energy industry; company performance; country-specific advantage; firm-specific advantage

1. Introduction

Aslani and Mohaghar (2013) identified a significant growth in energy demand and consumption due to economic and social development. Based on (Australian Government (Australian Renewable Energy Agency)) , renewable energy (RE) can be acquired from natural resources that can be refilled, in other words, it's essentially inexhaustible. It can be generated from natural resources such as bio-energy, geothermal energy, hydropower, ocean energy, solar energy and wind energy. Nowadays, the development of renewable energy resources has become the theme of much discourse which encompasses about energy security, climate change, and depletion of fossil fuel resources increases. Indeed, energy policy is receiving increased international attention not only from a range of researchers, but also policy makers, consumers, and so on.

The purpose of this study is to explore an application of renewable energy. Available researches into this

phenomenon are limited with respect to how firm-specific advantages (FSA) can determine the performance of renewable energy companies. However, it's also critical to understand that government plays an important role in the economic structure. The development of power, transportation, and other utilities has been implemented by the government in some economies. Moreover, the government has offered financial incentives and subsidies. Therefore, this study is undertaken in order to understand how the country-specific advantage (CSA) and firm-specific advantage (FSA) influence the corporate performance of renewable energy.

2. Literature Review

The studies performed on the relationship between performance and several variables that will be presented first at country-specific advantage and firm-specific advantage. At best, studies were linked as much as possible on their commonalities, and not as much in a chronological order.

2.1 Country-specific advantage (CSA) and Firm-specific advantage (FSA)

The main goal of business strategy is to create and sustain competitive advantage in form of lower costs or differentiated products (Porter, 1998). It's an advantage that an enterprise has over their rivals with the purpose to create value for enterprise itself and especially its shareholders. Managers have a goal to create and interact strategic possibilities for the purpose to build advantages upon competitors.

In order to deepen our understanding of competitive advantage, I will separate and analyze in two different advantages which are: Firm-specific advantage and Country-specific advantage. Rugman and Collinson (2012) defined firm-specific advantage (FSA) as an enterprise that manifest its abundant resources such as higher productivity of tangible and intangible assets to build specifics strengths and benefits. Also, Rugman and Collinson (2012) defined country-specific advantage (CSA) or location-specific advantages as a country that manifest its attractiveness of different locations such as policies, labor force, competitive environment, and so on to build specifics strengths and benefits.

According to Vera and Langlois (2007), countries promote policies to control and avoid further results for the global warming induced by the increasing greenhouse gas emissions. Many studies have similar opinions about the role of government in promote investments such as Klaassen et al. (2005) and Owen (2006), they cited the influence of policy interventions to reduce costs of new technologies with the objective to expand market shares since these innovations are often more expensive than existing ones. Endrikat, Guenther, and Hoppe (2014) referred to the potential impact of country-level factors such as different regulatory systems (price supports, tax credits and mandates) or different cultural values. A proper regulatory support is needed to make renewable energy sufficient, feasible and reliable to achieve the sustainability targets in a country (Vera & Langlois, 2007). According to Johnstone et al. (2008), there are six distinct policy types which are R&D, investment incentives, tax incentives, tariff incentives, voluntary programs, obligations and tradable certificates.

To outperform and overcome competitors, Strandskov (2010) mentioned that enterprises must possess exclusive resources and capabilities in form of assets and skills which have been developed for a period of time. A lot of capabilities to generate strategic opportunities for the company would be mentioned as

examples of prosperous negotiations or relationships with stakeholders. Renewable research and development expenditures is a significant factor to induce companies' innovation and is related to profit through the opportunities (Johnstone et al., 2008). According to Vera and Langlois (2007), the process to implement renewable energy procedures vary from company to company and a successful accomplishment depends on firms' priorities, the existing expertise of energy data, capable human and financial resources for decision making and so on. However a particular FSA may be highlighted for its importance and significance in creating and be deployed into dynamic capabilities, which is entrepreneurship (Marinova, Child, & Marinov, 2011). In Rugman and Collinson (2012) FSA/CSA matrix, firms might experience situations through its strategies and the intensity they are exposed to external factor or developed capabilities. In his study he mentioned that companies in quadrant 3 are considered as international business, which is very similar than renewable energy organizations, where both FSA and CSA are extremely essential factors to achieve its goals and gain competitive advantage over competitors. Also, Rugman and Collinson (2012) highlighted that firms applies cost leadership and differentiation strategies and might face challenges in reconciling both advantages. The FSAs of the companies are enhanced and facilitated through CSAs.

2.2 Porter's Diamond Framework

Over the years, achieve high level of performance has become the main target for most of nations in their struggle. But what are the intrinsic causes that makes a nation and industries more competitive than its competitors on a global scale? For Wee, Yang, Chou, and Padilan (2012), Porter's diamond of national advantage tries to clarify and analyze the superioty of nations and industries due to determined factors, where it explains the reason why a nation succeeds in specifics industries but not in others.

According to Porter (1990), there are 4 major determinants such as factor conditions, demand conditions, related and supporting industries, structure and rivalry that allows an organization to gain and sustain potentially competitive advantages. Also, he included the roles played by 2 different factors like "chance" and "government" which have significant influence on these 4 major determinants. Porter's diamond of national advantage represents a dynamic system in which all factors interact with each other, becoming very complicated to replicate the same frame of the industry in different countries (Porter, 1990).

2.3 Corporate Performance

For a long time, companies analyzed and measured its performance based on income statements. However, this method (considered by many) are no longer suitable for organization practices due to increasingly globalized and highly competitive economy like responsiveness, customization, flexibility, and so on (Chow & Stede, 2006). Nowadays, organizations seek different methods with the purpose to widen their scope, improving strategy implementation and obtaining success since the global economy has radically changed. In addition to, Chow and Stede (2006) emphasized even financial measures are measured more accurately, it's considered to be most sensitive to uncontrollable multiple factors. Also for Halkos and Tzeremes (2012), the use of financial measures in a company provides an analytical perspective for industry evaluation in order to conduct and support its operations. Another benefit

provided by this tool is the possibility to forecast future performance, recognizing characteristics and determinants of good or bad performing which may imply in success or bankruptcy prediction (Delen, Kuzey, & Uyar, 2013).

Several researches used different financial ratios, different samples, different situations and different analysis tools to evaluate the performance of renewable energy companies. For example, Patari, Arminen, Tuppura, and Jantunen (2014) analyzed 210 firms from global energy industry and through his findings, he observed a positive impact between corporate financial performance and sustainable development. In Ekatah, Samy, Bampton, and Halabi (2011) research, it was used case-study approach of a multinational energy company to examine the link between factors and financial performance (profitability). Researches also used financial performance to appraise relation between factors in emerging markets, such as China. Base on Zhang, Li, Zhou, and Zhou (2013) study, it was employed data from renewable energy firms in China to estimate the influence of government subsidies on renewable energy manufacturing firms financial performance.

As mentioned before, financial ratios can be used for several intentions, since it's possible not only estimate the current situation but also can be used to predict future situations and based on the outcomes, making decisions to achieve companies' goals. Locatelli and Mancini (2010) and Weaver (2012) applied financial performance such as profitability analyzing renewable energy firms with the purpose to measure and plan investments in long-term scenarios (construction of power plants), and company decision-making to obtain first mover advantage (development of a project), respectively.

3. Methodology

3.1 Research Hypothesis

Several research papers have proposed there are several dimensions of performance measurement and some of scholars have tried to detect the efficiency of the implement by means of adopting others and broad extensions dimensions in their studies. These different points of views affect the relationship between dependent and independent variables, therefore the development of hypothesis. As mentioned before, there are two determinants of firm performance which are firm level determinant and country level determinant referred by Hansen & Wenerfelt (1989). Based on prior knowledge and observation, it's useful to develop some predictions regarding the potential outcomes that are supported from previous studies. Then, after the obtained results based on expectations, it will be possible to review if the outcomes are aligned or not with previous studies findings. The hypotheses of this study are as follows:

1) Country-specific advantages

Therefore, multiple perspectives expect that the country level is an important element of the structure impacting firm performance. Stated formally:

Hypothesis 1: CSA factors impacts corporate performance.

a) Tax incentives

Tax incentives became an important factor in developing and transition countries and its effects have encouraged further researches. From 1999 to 2007, Wu, We, Zhou, and Wu (2011) researched 245 firms

in a highly interventionist government environment and found that connected organizations with government is an efficient way to surpass market disadvantages and acquire some benefits from it, since tax incentives from governments has several benefits to firms with the purpose to obtain bank loans, obtain resources and so on.

However, in Teraoui, Kaddour, Chichti, and Rejeb (2011) research demonstrated that even tax incentives are considered a source of motivation for development but in the long term. In short term, it affects negatively the performance due to the intensity of international competition faced by local firms. They noticed that government involvement is needed for companies' survival to improve competitiveness and stimulate investment, given the importance that tax incentive encourages investors and it allows improvement of economic and financial performance. The research that used a sample of 60 firms taking into account the period from 2001 to 2003 considered the current system of tax incentives as inefficient from several weakness, but with great potential in long term since it is a crucial factor to increase profitability and expand markets.

Based on previous findings and theory about tax incentives, we expect that tax incentives are an important element of the structure impacting firm performance. Formally, we predict that:

   Hypothesis 1a: Tax incentives impacts positively corporate performance.

b) Shares of renewable

According to Benli (2013), there are countries with potential and abundant renewable sources that can be developed to decrease the dependence on fossil fuels, whether imported or not. The transition to implement shares of renewable is required not only to reduce gas emissions and to avoid high cost of imported energy resources, but also promote the development of the shared of renewable influencing positively organization's performance (Boon & Dieperink, 2014). A stable policy framework would minimize doubts and allow investments of renewable energy technology for investors that are investing in long term projects.

Also, it's essential to influence perception and support by revealing the potential in deploying the renewable energy in companies' procedures. This leads us to expect that the shares of renewable are an important element of the structure impacting firm performance. Stated as a formal hypothesis:

   Hypothesis 1b: Shares of renewable impacts positively corporate performance.

c) Energy consumption

Ye, Liu, and Kong (2013) observed that organizations' effort to reduce energy consumption has a great influence on firms' market value and investors' behaviors. Also, according to Ahmed, Montagno, and Naffziger (2003), management worried about environment performance will focus their efforts to achieve positive impact. In other words, reducing energy consumption will impact positively on firm's performance. Based on extant theory and evidence, as well as our expectation that the energy consumption may have a stronger role with firm performance, we predict that:

   Hypothesis 1c: Energy consumption impacts positively corporate performance.

d) Infrastructure (Roadways)

Based on Chandra and Thompson (2000) research using historical data from 1969 to 1993 as evidence, they found that investing in highway construction can reduce transportation costs and it has positive influence on firm's performance. With a different point of view, Moreno, Lopez-Bazo, and Artis (2002) used data of 12 companies from 1980 to 1991 and assumed that infrastructure doesn't have significant influence on performance in the long-run, contrary to what happens with the employment, which has a positive effect.

Based on previous findings and theory about infrastructure, we expect that infrastructure is an important element of the structure impacting firm performance. Formally, we predict that:

Hypothesis 1d: Infrastructure impacts positively corporate performance.

2) Firm-specific advantages

Therefore, multiple perspectives expect that the firm level is an important element of the structure impacting firm performance. Stated formally:

Hypothesis 2: FSA factors impacts corporate performance.

a) Market capitalization

According to Endrikat et al. (2014), investing in renewable energy industry requires more resources and larger firms tend to have more resources. Economies of scale, controls over stakeholders are some of the many reasons that market capitalization is positively associated with performance.

This leads us to expect that the market capitalization is an important element of the structure impacting market capitalization. Stated as a formal hypothesis:

Hypothesis 2a: Market capitalization impacts positively corporate performance.

b) Research & Development

Performance of a company is also likely to be determined by a firm's research and development activities, providing innovative approach especially in the renewable energy industry. According to Endrikat et al. (2014), research and development efforts are needed to implement renewable energy policies and develop sustainable technologies. The study which analyzed 149 studies concluded that research and development it's a long-term form of investment that improve knowledge and process innovation affecting companies' performance.

Based on extant theory and evidence, as well as our expectation that the research and development may have a stronger role with firm performance, we predict that:

Hypothesis 2b: Research and development impacts positively corporate performance.

c) Capital intensity

Companies with high capital intensity are usually reluctant to change its business model. And based on Endrikat et al. (2014) analyzed 149 cases, capital intensity is associated with firm's cost structure and its impact negatively companies performance, because high capital intensity companies are less flexible in its process, having problems to suit in different environment and are unwilling to change its strategies.

Based on previous findings and theory about capital intensity, we expect that capital intensity is an important element of the structure impacting firm performance. Formally, we predict that:

Hypothesis 2c: Capital intensity impacts negatively corporate performance

d) Employee growth rate

Based on Dogl and Holtbrugge (2010) research, renewable energy industry it is considered a high technology industry and having competent employees is very important. The more competent employees available for local or foreign firms, more benefits companies will receive from employees' skills and qualifications. Also, through practices and policies, firms control employees' growth rate with the purpose to reduce costs and increase their commitment (Arthur, 1994).

This leads us to expect that the employee growth rate is an important element of the structure impacting firm performance. Stated as a formal hypothesis:

Hypothesis 2d: Employee growth rate impacts positively corporate performance

3.2 Definition of the Variables

Based on hypothesis establishment, we explained by supporting ideas from previous researches about the relationship between dependent variables represented by return on assets, gross profit margin and interest coverage; and independent variables represented by tax incentives, infrastructure, shares of renewable, research and development, market capitalization, energy consumption, employee growth rate and capital intensity.

The summary of the definition of the variables, and how its each variable is represented were described in the Table 1 as following:

3.3 Source of Data and Sample Size

To acquire a sufficiently large sample for statistical testing objective, we collected data from all countries to ensure that firms in the sample would have sufficient scale to use formal performance measurement systems. The companies in the study, chosen from Bloomberg (major global provider of financial data, real time and historic price data, and so on), were selected according to scope of study, sectors related to renewable energy sources and obtained a total sample of 845 firms.

Our sample was drawn from the COMPUSTAT, a database of financial, statistical and market information on global companies from Standard & Poor's. In constructing the sample, first it was included in the scope of research the located firms on COMPUSTAT by their "name" or "ticker" and exclude the ones it couldn't be located. Due to the exclusion of not located firms, the initial sample was reduced to 430 firms from 34 different countries. Then, in compliance with country specific advantage and firm specific advantage variables, the sample was restricted with at most 5 firms per country to provide the statistical power needed to detect the factors that affect corporate performance. The selection was based on its firm size and since it has homogeneous and heterogeneous samples, it was possible to select firms from each country and cover at least 70% or more of the total sample.

Table1. Definition of the variables

	Variable	Definition
Dependent Variable	ROA	$\text{Return on assets} = \dfrac{\text{Net income}}{\text{Total assets}}$
	GPM	Gross Profit Margin (%) $= \dfrac{\text{Revenues} - \text{Cost of Goods Sold}}{\text{Revenues}} \text{ x } 100$
	INTCOV	Interest Coverage $= \dfrac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest expense}}$
Independent Variable	TAX	Countries with tax incentives = 1, countries without tax incentives = 0
	RENEWABLE	Shares of renewable energy in primary energy consumption in percentage (%).
	ENERGYMTOE	Total energy consumption in million tonnes of oil equivalent (MTOE).
	INFRASTRUCTURE	Total length of the road network in kilometers (km) per country
	MKTCAPIT	Market capitalization = Common shares outstanding (in millions) x Price-close monthly (in dollars)
	RD	All costs incurred in millions (M) related to the development of new products or services
	CAPITAL INTENS	$\text{Capital Intensity} = \dfrac{\text{Total Assets}}{\text{Sales}}$
	EMPLOYEES	$\text{Employee growth rate} = \dfrac{\text{Empl}_t - \text{Empl}_{t-1}}{\text{Empl}_{t-1}}$

Source: This study

3.4 Econometric Procedures

This study employed the panel data methodology due to its several benefits mentioned by Baltagi (2008)

such as controlling for individual heterogeneity, more informative, less collinearity between variables, increasing the degrees of freedom, and exploration of the dynamics of adjustment. And compared to normal time series methodologies, panel data methodology produces more efficient and more reliable parameters estimates.

The regression model is specified as follows:

$$ROA = a1 + \alpha1TAX + \alpha2INFRASTRUCTURE + \alpha3RENEWABLE + \alpha4RD + \alpha5MKTCAPIT + \alpha6ENERGYMTOE + \alpha7EMPLOYEES + \alpha8CAPITALNTENS$$

$$GPM = a1 + \alpha1TAX + \alpha2INFRASTRUCTURE + \alpha3RENEWABLE + \alpha4RD + \alpha5MKTCAPIT + \alpha6ENERGYMTOE + \alpha7EMPLOYEES + \alpha8CAPITALNTENS$$

$$INTCOV = a1 + \alpha1TAX + \alpha2INFRASTRUCTURE + \alpha3RENEWABLE + \alpha4RD + \alpha5MKTCAPIT + \alpha6ENERGYMTOE + \alpha7EMPLOYEES + \alpha8CAPITALNTENS$$

4. Research Findings

4.1 Descriptive Statistics Analysis

In this study, we selected a total of 93 renewable energy companies from 34 countries, which approximately 52% of the companies were considered small, and the remaining companies accounted for about 48% of the companies (large).

According to the Table 2, it shows the values of the minimum, maximum, mean and standard deviation of the used data in this study. Gross profit margin has a high mean value (40.10) than other two dependent variables. It has a maximum value of 104.53 and a standard deviation of 29.38. At same time, return on assets has a low mean value (-0.45), and a maximum and standard deviation are 147.82 and 24.28, respectively, compared to other dependent variables. The maximum and minimum values for each performance measures indicate that the performance varies substantially among renewable energy companies that are listed in the Bloomberg. Also, some independent variables such as infrastructure, energy consumption and research and development have a higher mean value, 1775237, 405.82, and 46.23, respectively with compared to the mean value of financial performance.

Table 2. Descriptive analysis

	Mean	Median	Maximum	Minimum	Std. Dev.
Return on assets	-0.45	1.61	147.82	-375.93	24.28
Gross profit margin	40.10	36.94	104.53	-166.43	29.38
Interest coverage	31.25	1.77	4978.72	-895.14	380.43
Renewable	12.15	8.24	56.77	0.00	11.62
Captial Intensity	9.08	3.22	227.57	0.39	24.03
Infrastructure	1775237	823217	6586610	2090	2028042
Energy Consumption	405.82	165.82	2712.77	16.52	672.59
Employee growth rate	17.84	5.94	360.87	-99.43	53.64
Research and development	46.23	5.45	709.00	0.00	103.30

Source: This study

4.2 Correlation analysis

Continuing with the analysis of our data, Table 3 reports correlations between variables. Correlation analysis is used to explore the possible interactions between two or variables more than two. Some results showed some high correlations but in an acceptable level of correlation and is not expected to influence the results of the regression analysis.

Table 3. Correlations between variables

	Return on assets	Gross profit margin	Interest coverage	Tax	Renew.	RD	Mktcap	Infras.	Energy	Employee	Capint.
Return on assets	1										
Gross profit margin	0.26	1									
Interest coverage	0.35	0.07	1								
Tax	0.05	0.14	-0.06	1							
Renew.	0.01	-0.11	-0.01	0.06	1						
RD	0.05	-0.13	0.08	-0.13	0.09	1					
Mktcap	0.35	-0.09	0.16	-0.10	0.49	0.42	1				
Infras.	0.09	0.02	-0.11	0.30	0.24	-0.18	0.22	1			
Energy	-0.01	-0.05	-0.14	0.09	0.07	-0.11	0.30	0.63	1		
Employee	0.22	-0.03	0.02	-0.04	-0.18	-0.18	-0.09	0.21	0.13	1	
Capint.	0.08	0.39	0.03	0.11	-0.24	-0.11	-0.20	0.10	-0.10	0.17	1

Source: This study

According to Greene (2000), further investigation is needed for VIFs higher than 4, and VIFs exceeding 10 are signs of serious multi-collinearity requiring adjustment. As shown in Table 4, Table 5 and Table 6, the multi-collinearity test demonstrates that no significant collinearity exists in our 3 regression models.

Table 4. Multi-collinearity test (Return on Asset-ROA)

Variable	VIF
Tax incentives	1.176
Shares of renewable	1.569
Energy consumption	2.056
Infrastructure	2.235
Market capitalization	1.919
Research and development	1.405
Capital intensity	1.211
Employee growth rate	1.137

Table 5. Multi-collinearity test (Gross profit margin - GPM)

Variable	VIF
Tax incentives	1.176
Shares of renewable	1.569
Energy consumption	2.056
Infrastructure	2.235
Market capitalization	1.919
Research and development	1.405
Capital intensity	1.211
Employee growth rate	1.137

Table 6. Multi-collinearity test (Interest coverage - INTCOV)

Variable	VIF
Tax incentives	1.172
Shares of renewable	1.593
Energy consumption	2.011
Infrastructure	2.245
Market capitalization	1.954
Research and development	1.399
Capital intensity	1.18
Employee growth rate	1.155

4.3 Results analysis

The regression results for the dependent variables return on assets, gross profit margin and interest coverage by panel estimation procedure are shown in Table 7, Table8 and Table9, and the explanatory variables used to estimate the influence in the performance of RE firms through independent variables. A total of 93 companies were considered in a time period of 6 years going from 2008 to 2013. The sample demonstrates significant outcomes for measuring companies' performance, and the power of the model (R-Square) varies between 10.08% and 31.66%.

Table 7. Estimation of the panel data model (Dependent variable: Return on assets)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	3.35428	3.28653	1.02061	0.3103	
Shares of renewable	-0.31478	0.13472	-2.33662	0.0218	**
Energy consumption	-0.00550	0.00241	-2.27908	0.0251	**
Infrastructure	0.00000	0.00000	0.52225	0.6028	
Market capitalization	16.0012	2.93792	5.44643	0.0000	***
Research & development	-0.01329	0.00955	-1.39072	0.1679	
Capital intensity	0.04461	0.08795	0.50720	0.6133	
Employee growth rate	0.05319	0.02160	2.46238	0.0158	**
C	-5.41965	3.32412	-1.63040	0.1066	

R-squared	0.31387	Mean dependent	-0.6591
Adjusted R-squared	0.25078	S.D. dependent var	11.7398
S.E. of regression	10.1617	Akaike info	7.56419
Sum squared resid	8983.61	Schwarz criterion	7.80459
Log likelihood	-354.081	Hannan-Quinn	7.66136
F-statistic	4.97483	Durbin-Watson stat	0.47593
Prob(F-statistic)	0.00004		

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 7, the coefficient of shares of renewable and energy consumption are negative and significant for return on assets, respectively, -0.31478 under a 95% confidence level and -0.00550 also under a 95% confidence level. On the contrary, the coefficient of market capitalization and employee growth rate is positive and significant for return on assets, respectively, 16.0012 under a 99% confidence level and 0.05319 under a 95% confidence level. The explanatory power observed in return on assets of this regression was reported with 0.31387 R-square level.

Empirical outcomes provide different results for hypothesis 1b that propose a positive relationship to the performance. The empirical results support hypothesis 1c that lower energy consumption in a country, the more they grow in terms of performance as mentioned in Ye et al. (2013) research, on the contrary in Nasreen and Anwar (2014) study, that cited the positive influence of energy in companies 'process.

The results suggest that market capitalization are more likely to influence return on assets which provide support for our hypothesis 2a, and the results hold for Endrikat et al. (2014). In accordance with Miller and Noulas (1996) findings, empirical results support hypothesis 2d that high employees growth rate will perform better in terms of performance.

Also contrary to the empirical evidence in the literature, our empirical outcomes provide no support for the relationship between shares of renewable, which according to previous researches, would lead to a better performance indicator for the enterprises. Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1d, hypothesis 2b and hypothesis 2c.

Table 8. Estimation of the panel data model (Dependent variable: Gross profit margin)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	6.07569	6.49916	0.93484	0.3525	
Shares of renewable	-0.16670	0.26640	-0.62574	0.5331	
Energy consumption	-0.00129	0.00477	-0.27124	0.7869	
Infrastructure	0.00000	0.00000	-0.27745	0.7821	
Market capitalization	5.06863	5.80978	0.87243	0.3854	
Research & development	-0.02370	0.01889	-1.25425	0.2131	
Capital intensity	0.64726	0.17392	3.72170	0.0004	***
Employee growth rate	-0.03972	0.04271	-0.92991	0.3550	
C	29.8592	6.57349	4.54236	0.0000	
R-squared	0.19461	Mean dependent		35.3901	
Adjusted R-squared	0.12055	S.D. dependent var		21.4280	
S.E. of regression	20.0949	Akaike info		8.92787	
Sum squared resid	35131.0	Schwarz criterion		9.16828	
Log likelihood	-419.538	Hannan-Quinn		9.02505	
F-statistic	2.62779	Durbin-Watson stat		0.43339	
Prob(F-statistic)	0.01258				

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 8, the coefficient of capital intensity are positive and the only coefficient significant for gross profit margin, respectively, 0.64726 under a 99% confidence level. The explanatory power observed in gross profit margin of this regression was reported with 0.19461 R-square level. Empirical outcomes provide different results for hypothesis 2c that propose a negative relationship to the performance. Our findings are incompatible with those of recent empirical studies by Endrikat et al. (2014) that highlighted that high capital intensity companies are less flexible in its process, having problems to suit in different situations and are unwilling to change its strategies.

Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1b, hypothesis 1c, hypothesis 1d, hypothesis 2a, hypothesis 2b and hypothesis 2d.

Table 9. Estimation of the panel data model (Dependent variable: Interest coverage)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Tax incentives	0.96979	35.2358	0.02752	0.9781	
Shares of renewable	-1.45720	1.48112	-0.98385	0.3281	
Energy consumption	-0.04054	0.02694	-1.50517	0.1362	
Infrastructure	0.00000	0.00001	-0.24698	0.8055	
Market capitalization	75.9848	32.3803	2.34663	0.0214	**
Research & development	-0.06296	0.10253	-0.61407	0.5409	
Capital intensity	0.22567	0.96097	0.23483	0.8149	
Employee growth rate	0.09385	0.23529	0.39889	0.6910	
C	-8.41424	35.7158	-0.23559	0.8143	

R-squared	0.09003	Mean dependent	-13.709	
Adjusted R-squared	0.00016	S.D. dependent var	108.560	
S.E. of regression	108.551	Akaike info	12.3070	
Sum squared resid	954446.3	Schwarz criterion	12.5569	
Log likelihood	-544.813	Hannan-Quinn	12.4078	
F-statistic	1.00176	Durbin-Watson stat	0.39019	
Prob(F-statistic)	0.44132			

Significance level: *** <0.01, ** <0.05 and * <0.1

Source: This study

Based on the findings in Table 9, the coefficient of market capitalization are positive and the only coefficient significant for interest coverage, respectively, 75.9848 under a 95% confidence level. The explanatory power observed in interest coverage of this regression was reported with 0.09003 R-square level. The results suggest that market capitalization are more likely to influence return on assets which provide support for our hypothesis 2a, and the results hold for (Endrikat et al. (2014)).

Based on our findings demonstrated in the estimation of panel data model, we provide no support for hypothesis 1a, hypothesis 1b, hypothesis 1c, hypothesis 1d, hypothesis 2b, hypothesis 2c and hypothesis 2d.

5. Conclusion

Through our result findings, we found the relationship between dependent and independent variables, if exists or not, and we can conclude the following observations:

1) Shares of renewable have negative impact on return on assets, it means that lower the share of renewable energy higher the opportunities to expand its business and develop or invest in renewable technologies. Consequently, it will bring more revenues impacting in its net income;

2) Market capitalization is positive effect to the return on assets and interest coverage; it means that larger firms have more exposure and more resources to make investments. It implies that a company might have the capability to honor its debt easily and also generate revenue using its assets such as its renewable

energy technologies. The results will impact positively in its performance;

3) Energy consumption it's a variable that impact negatively on return on assets. Return on assets is a performance measurement that is very sensitive variable to the costs implied for the energy consumption. It's a short term alternative to reduce costs and especially the damage to environment, increasing net income and stakeholders reliance on companies procedures;

4) Employee growth rate it's a variable that impact directly on return on assets. The reason why this variable has this effect can be explained due to its impact for business long term objectives. Definitely, employees are considered companies' greatest asset that provide competitive advantage. In the long term, employees will bring favorable results to the shareholders since it's an investment and it will provide excellent outcomes that match firm's mission. ;

5)Capital intensity has positive impact on gross profit margin, it means that the money invested by shareholders are producing revenue and firms with high capital intensity won't have volatility in income statements affecting in its net income since it's not usual to change its strategies such as business models.

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