Management Strategy for Business Sustainability Under Macro Effects In An Econometric Model – Case of PKN Orlens in Oil and Gas Industry in Poland

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Abstract: The Poland economy has gained lots of achievements esp. in gas and oil industry during the 2014-2019 period and affected by Covid 19 and US-China trade war. Orlens group is a big gas and oil group operating in Central Europe countries such as Germany, Poland, Czech and Lithuania. This paper measures the revenue and EBITDA of a big gas and oil company, PKN Orlens in Poland, under impacts of macro indicators. As we experienced role of business management and sustainable development in gas and oil industry has been increasing with new perspectives in management, corporate governance models.In order to recommend for sustainable business development, this research paper aims to figure out how much effects in revenue from macro indicators of one of big listed Poland firms, PKN Orlens during the period 2014-2019 with semiannual data. Our findings show that revenue are affected much more by exchange rate and lending rate. It implies bank system policies and macro policies.

JEL classification numbers: M21, M1, G12, G30

Keywords: sustainable business development, business management, revenue, gas and oil industry, Poland, policy

INTRODUCTION

Nowadays, under 4.0 industry PKN Orlens will pay more attention to fluctuatins in macro variables and risk management, esp. New perspectives in governance , management and risk models. This is the 1st reason we conduct this research paper.

Second, macro policy makers will need to look at risk management in gas and oil industry and impacts of macro factors on revenue in order to adjust macro policies. What we need to adjust in CPI, exchange rate, lending rate and other policies? This is the 2nd reason for us to conduct this study.

Orlens group . Central European fuel leader, has operated in Europe countries such as Germany, Lithuania, Czech and Poland since 2004 and it has 2679 service stations in economy sectors.

Hence, This study will calculate and figure out not only inflation but other macro factors, both internal and external, such as GDP growth, CPI, lending rate, SP500, trade balance and exchange rate, etc. affecting both revenue during the time 2014-2019.

PREVIOUS STUDIES

Research Issues

Issue 1: What are impacts of internal indicators such as inflation, GDP growth, lending rate,…on revenue of PKN Orlens?

Issue 2: Evaluating impacts of external indicators such as CPI US, exchange rate and S&P500 on PKN revenue?

There are hypotheses need to be test:

Hypothesis 1: the revenue (PKN) will increase if inflation decrease and it will decrease if GDP growth decreases..

Hypothesis 2: If exchange rate decreases (PLN appreciation), revenue will decrease.

Hypothesis 3: With the above reasons in Covid 19 and US-China commerce war and low inflation, the revenue (PKN) will be highly affected by US macro conditions and SP500.

Literature review: Jahangir and Dural (2011) presented that with OLS, export andoil price can be forcaseted with GDP.Then, Ekmecioglu (2012) mentioned that crisi in oil price (crude) affected much on macro conditions. And Ciftci (2014) mentioned that no evidence showing stock return affected by interest rate. Then, Yoshino et al (2015) stated that in China, CPI affected by oil price at a milder level compared to other developed nations.

Beside, Ratti et al (2016) pointed that interest rate (tighten) linked with oil price positively

Anand et al (2018) said companies kepp much cash during oil price crisis and budget deficit. Then, Mukhtarov et al (2019) specified oil price and exchange rate has negative correlation in Azerbaijan case.

Last but not least, Onakoya (2020) showed between oil segment and unemployment and GDP there is positive correlation.

We see research gap: while other previous studies relate oil price to macro conditions, our study mainly concern macro indicators affecting revenue of PKN Orlens. There is no researches so far done on this topic in a specific and big listed gas and oil firm in Poland.

The below table will summarize previous studies relating to company under macro impacts topic:

Methodology

In our study, data from the stock exchange during the period 2014-2019 and financial statements of PKN Orlens to estimate macro effects on revenue.

This paper uses qualitative method with analytical combined with quantitative data analysis. Financial data from listed firm (PKN Orlens).

Analysis of the effects of 6 macro variables on revenue of listed gas and oil company, PKN Orlens. Monthly data collected from 2014-2019 for PKN stock price and other macro data from reliable sources such as Statistics Office and ceicdata.com (date access 3/1/2020). EBITDA and revenue is a function with 6 macro variables (x1: GDP growth rate (g), x2: CPI Poland (i), x3: Loan interest rate (r), x4: Exchange rate (ex_rate), x5: S&P 500, x6: CPI US. We use OLS regression.

Total 6 macro variables are described with sources in the below table:

Table 1: Variables description

Variable name	Sign	Data source	Reference source
Dependent variable			
Revenue	Rev	Financial statements	PKN Orleans website
Independent variables			
GDP growth	g	Bureau statistics	**Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter)** "Impacts of Internal and External Macro Factors on Firm Stock Price in An Econometric Model – A Case In Viet Nam Real Estate Industry"
CPI Poland	VNindex	HOSE and HNX	**Dinh Tran Ngoc Huy** "Econometric model for ACB bank stock price 2008-2011, Sai Gon university journal, No.22, 2015"
CPI US	Rf	Ministry of Finance (MOF)	**Dinh Tran Ngoc Huy** "Econometric model for ACB bank stock price 2008-2011"
Lending rate	r	Commercial bank	**Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter)** "Impacts of Internal and External Macro…"
Exchange rate	Ex_rate	Commercial bank	**Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter)** "Impacts of Internal and External Macro .."
S&P500	SP500	NYSE	**Dinh Tran Ngoc Huy** "Econometric model for ACB bank stock price 2008-2011, Sai Gon university journal, No.22, 2015"

In the below table, we see statistics for 6 variables. We find our standard deviation of EBITDA, revenue and SP500 with highest values, while std. deviation of exchange rate and lending rate as lowest values.

	REVENUE	SP500	CPI	CPI_US	EX_RATE	G	R_POLAND	EBITDA
Mean	94.62222	23.87883	0.456667	1.697778	3.757778	4.188889	3.577778	7.833333
Median	95.30000	24.23410	-0.030000	1.740000	3.720000	3.840000	3.650000	9.600000
Maximum	110.0000	27.52060	1.980000	2.960000	4.250000	5.360000	4.200000	11.00000
Minimum	79.50000	20.43940	-0.930000	0.730000	3.480000	3.060000	3.200000	-2.700000
Std. Dev.	11.98121	2.927143	1.298432	0.693069	0.252872	0.959941	0.302191	4.334743
Skewness	0.096306	-0.003670	0.144327	0.157563	0.789606	0.053968	0.711307	-1.770455
Kurtosis	1.617620	1.381307	1.184832	2.585439	2.572081	1.344664	3.080978	5.008566
Jarque-Bera	0.730528	0.982583	1.266809	0.101687	1.003884	1.031920	0.761395	6.214646
Probability	0.694013	0.611836	0.530782	0.950428	0.605354	0.596927	0.683384	0.044721
Sum	851.6000	214.9095	4.110000	15.28000	33.82000	37.70000	32.20000	70.50000
Sum Sq. Dev.	1148.396	68.54535	13.48740	3.842756	0.511556	7.371889	0.730556	150.3200

Fig.1: Descriptive statistics for 6 macro variables

MAIN RESULTS

Overall Analysis: First we look at the below figure, we find out correlation matrix of internal variables. We see that Increase in industrial manufacturing index will cause Beta CAPM increases while decrease in CPI will make it decreases.

Correlation Matrix							
	REVENUE	SP500	CPI	CPI_US	EX_RATE	G	R_POLAND
REVENUE	1.000000	0.365211	0.654141	0.233062	-0.432571	0.713033	0.721025
SP500	0.365211	1.000000	0.882570	-0.255275	0.001449	0.740606	0.121830
CPI	0.654141	0.882570	1.000000	-0.101215	-0.340300	0.869940	0.459489
CPI_US	0.233062	-0.255275	-0.101215	1.000000	-0.644439	0.239811	0.030173
EX_RATE	-0.432571	0.001449	-0.340300	-0.644439	1.000000	-0.337561	-0.572435
G	0.713033	0.740606	0.869940	0.239811	-0.337561	1.000000	0.257156
R_POLAND	0.721025	0.121830	0.459489	0.030173	-0.572435	0.257156	1.000000

Fig.2: Correlation matrix of revenue and 6 variables

Empirical Research Findings and Discussion

In the below section, data used are from 2014-2019 with monthly data for stock price of PKN Orlens. Different scenarios are created by comparing scenarios: revenue under macro internal factors impacts and macro external variables effects.

We model our data analysis as in the below figure:

	Revenue	**Other statistic measures**	**Gap**
Internal variables	**Scenario**	**Scenario ..**	**Analysis**
External variables			

Fig.3: Analyzing revenue under impacts from macro factors in scenarios

Using OLS regression from Eviews, we find out: CPI and exchange rate have positive correlation with revenue of PKN Orlens while SP500 has negative correlation with revenue.

Dependent Variable: REVENUE
Method: Least Squares
Date: 01/03/21   Time: 14:31
Sample: 1 9
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SP500	-2.065058	5.499997	-0.375465	0.7434
CPI	5.659439	28.97401	0.195328	0.8632
CPI_US	7.706416	19.38556	0.397534	0.7294
EX_RATE	30.54983	51.64372	0.591550	0.6141
G	5.929580	20.90360	0.283663	0.8033
R_POLAND	29.10727	18.13754	1.604808	0.2497
C	-115.5120	132.4342	-0.872222	0.4751

R-squared	0.910018	Mean dependent var	94.62222
Adjusted R-squared	0.640071	S.D. dependent var	11.98121
S.E. of regression	7.188016	Akaike info criterion	6.834186
Sum squared resid	103.3351	Schwarz criterion	6.987582
Log likelihood	-23.75383	F-statistic	3.371104
Durbin-Watson stat	1.734945	Prob(F-statistic)	0.246385

Fig.4: External and Internal impacts on Revenue of PKN Orlens

DISCUSSION FOR FURTHER RESEARCHES

We can continue to analyze other factors behind the risk scene (oil price, public debt, etc.) in order to recommend suitable policies and plans to control profit and revenue better.

In order to enhance risk management culture at PKN Orlens, a big listed gas and oil company in Poland, in the context of trade ward and Covid 19 effects, we have to consider some following action plans:

- It is necessary to enhance the role of risk supervision and control according to the risk management process as follows:

Step 1: Establish and analyze risk contexts (internal and external environment of the enterprise)

Step 2: Identify and classify risks

Step 3: Risk measurement and analysis

Step 4: Risk assessment (level of risk)

Step 5: Handling risks (through specific policies and plans)

Throughout the 5-step process of risk management in commercial banks and businesses is risk monitoring activities, performing communication and advisory functions for risk management activities.

In addition, it is necessary to build a culture of risk and a culture of risk management in enterprises and regulatory agencies

In addition, it is necessary to focus on risk prevention through 3 objects: people, processes (policies), and technology.

CONCLUSION AND POLICY SUGGESTION

As shown from the above regression model and equation, Government and Ministry of Finance need to increase GDP growth for increasing revenue of the firm.

This research paper provides evidence that revenue are affected much more by exchange rate and lending rate. It means that the role of bank system in trying to reduce these rates properly. When PLN/USD rate reduces or PLN appreciation, it leads to decrease in revenue.

Policy implications: Our model also shows that other macro factors such as CPI and exchange rate just have positive impact on EBITDA while SP500 has negative correlation with EBITDA. And exchange rate and lending rate have much more effects on revenue of PKN Orlens.

Management implications:

Specifically, for PKN Orlens management:

- Building a model to analyze the impact of macro variables on profit and revenue as described above.
- In order to enhance revenue stream for the firm, management needs to predict an increase from CPI Poland, CPI US, Poland GDP growth rate, exchange rate and lending rate, as well as a reduction in SP500 index.

Limitation of the research: Finally, this study opens some new directions for further researches in management control policies in gas and oil system as well as in the whole economy. We also can add other factors such as public debt into our model for expanding research. Even we can expand our research model for other industries as well as in other emerging markets and all over the world.

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