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How Do The Oil Prices Affect The Macroeconomic Fundamentals, Monetary Policy and Stock Market? : The Case of The MENA Countries

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Abstract: *The main objective of this study is to investigate the impact of oil prices on macroeconomic fundamentals, monetary policy and stock market for eight* oil-exporting and non-oil exports *countries in the Middle East and North African region, namely Algeria, Egypt, Iran, Kuwait, Morocco, Saudi* Arabia, *Tunisia and Turkey. Using quarterly data for the period 1994Q4-2015Q2, with a Panel-ARDL, we may conclude that there are short run dynamic cross-section relationships between first, oil prices and macroeconomic variables such as growth rate and consumer price index, second, oil prices and money market rate and third, market capitalization and oil prices.*

In the long run, dependent variables such as consumer price index and market stock exhibit a cointegration relationship with oil prices. However, no cointegration relationships can be established among oil price variations, monetary policy and growth rate. In this context, we apply a multivariate VAR model to examine responses of all variables to oil price shocks. We find a relatively 100% elastic response of economic growth in oil-exporting *country except for Kuwait and conversely, oil-importing economics, it appears reasonably stable close to zero of GDP response to oil prices.*

Similarly, same results can be captured of market response estimated an each oil-importing countries and oil-exporting countries to oil price, which is considered a negatively sign during the first period in these countries causes by financial crisis contagion.

The next macroeconomic variable, CPI seems positive response to oil .In addition, oil prices appear to have a negligible response on money market rates in the Middle East and North Africa except for turkey and Egypt

Keywords: *Economic growth,* O*il shocks, Monetary policy,, PANEL-ARDL, Stock market*

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I. Introduction

The oil price is the most attractive index in the financial market. As the world economy is highly vulnerable to oil price fluctuations, since 2002, the price of a barrel of oil has increased fourfold, moving from $26 in 2002 to $107 in 2012. The prices dropped from about $90 in June 2014 to less than $50 a barrel in august 2015. It is now below 46 dollar. In this context, the market worries about crude oil future, especially is worries resurfaced many new signs as China's economy slowdown, increase offer, minted quotas by The Organization of the Petroleum Exporting Countries

In contrast, oil prices appear to have a positive impact on the economies of oil-countries and negative effect on oil-importing economies. So that when the US dollar raised, the current account balance, government revenue and GDP increase in first group. Conversely, when the oil price increased, the cost of production leads directly CPI to push up and indirectly money market rates are rising as well as current account imbalance. This situation, in turn is lagging oil-importing economy's growth. Moreover, financial markets have declined while the oil prices are lowered in oil-exporting and continued to increase in non-oil exports countries.

In our analysis, we shall investigate the impact of oil prices on macroeconomic fundamentals, monetary policy and stock market for eight Middle East and North African countries.

The rest of the paper is organized as follows. In section 2 we present a literature review on the effect. Section 3 presents the model and the methodology, followed by the results and discussion in Section 4, and finally, section 5 presents the main conclusion.

II. Literature review

The price of oil plays a strategic role in the global economy. Many studies have highlighted its different impacts on macroeconomic variables such as GDP growth, unemployment rates, inflation, the stock market, etc.

(See: Rasche and Tatom (1977), Darby (1982), Hamilton (1983, 1996, 2003), Lee et al. (1995), Rotemberg and Woodford (1996), Eltony and Al-Awadi (2001), Brown and Yücel (2002, 2010), Blanchard and Gali (2007), Bjørland (2008), Wang, Wu, and Yang (2013), Basher, Haug, and Sadorsky (2012), Benhabib et al (2014, 2015)).

Pradhan et al (2015) pointed out in their study a robust long-run economic relationship economic growth, oil prices, depth in the stock market, and three other key macroeconomic indicators: real effective exchange rate, inflation rate, and real rate of interest using a panel vector autoregressive model for the G-20 countries over the period 1961– 2012.

Katircioglu et al (2015) used panel cointegration for testing the relationship between oil price movements and macroeconomic aggregates, such as gross domestic product (GDP), consumer prices (CPI), and unemployment, for twenty-six OECD countries between 1980 and 2011. They results confirmed that there is a long-term relationship between oil prices and those macroeconomic aggregates

George Filis (2010) examined the relationship among consumer price index, industrial production, and stock market and oil prices in Greece during the period from 1996 M1 to 2008 M6. He found a positive effect of oil prices and the stock market on the Greek CPI, in the long run while oil prices exercise significant negative influence to the stock market and response negatively to CPI.

Korhonen et al. (2007) estimated the real exchange rate in OPEC countries from 1975 to 2005 and three oil-producing Commonwealth Independent States (CIS) from1993 to 2005 using panel co-integration methods. Their results show that real oil price has a direct effect on the equilibrium exchange rate in oil-producing countries. Nikbakht (2009) studied the long run relationship between real oil prices and real exchange rates from 2000 to 2007 by using monthly panel of seven OPEC countries (Algeria, Indonesia, Iran, Kuwait, Nigeria, Saudi Arabia, and Venezuela). His results show that there is a long-run and positive linkage between real oil prices and real exchange rates in OPEC countries.

In Morocco, Lahrech et al (2014**)** examined the association between oil price shocks and the MASI index (Moroccan All Shares Index). A based a Dynamic Conditional Correlation Multivariate GARCH, they concluded the existence of significant correlation between oil, MASI index and the Moroccan economic sectors.

Necibi (2013) analyzed the impact of oil prices in Tunisia economic activity. His established relationship between oil price variation and macroeconomics variables, when oil price rose, the production cost was pushed up, meaning consumer price index pushed up and output pushed down using quarterly and monthly data from the period going from 2000 to 2011.

In similarly study and over the turkey data between January 1988 and March 2011, Çatık and Önder (2013) detected the nonlinear relationship between oil prices and macroeconomic activity based on a multivariate two-regime threshold VAR (TVAR) model.

Akoum et al (2012) finds the evidence oil and stock returns co-move over the long term for the six Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) utilising a wavelet analysis.

Farzanegan and Markwardt (2009) investigated the effects of oil price shocks on the Iranian economy by applying a VAR approach. They observed a strong positive relationship between positive oil price changes and industrial output growth. On the contrary, the impact of oil prices has negligible effect on real government expenditures and appreciate real effective exchange rate.

Eltony (2001**)** used VAR (p) for quarterly data were for the period 1984 Q1 – 1998 Q4 and found causality between major macroeconomic variables in Kuwait (oil prices and oil revenues, and government development and current expenditure).

III. The Econometric Approach

Data source

The sample comprises 83 quarterly observations for the period 1994Q4 – 2015Q2.The sources of our variables are collected from different issues of International financial Statistics and world development indicators**.**

Definition of the model

The ARDL model is used to analyze cointegration series for short and long-run dynamics, even when the time-series are stationary I(0) or integrated of order I(1). The variables ma include a mixture of stationary and non-stationary time-series for ARDL Bounds testing approach proposed by Pesaran (1997), Pesaran, Smith and Shin (2001) and Pesaran et al. (2001). In addition, the bounds testing procedure (Pesaran et al., 2001) proposed in this study are robust for small sample (Abd Pattichis, 1999; Mah, 2000; and Tang and Nair, 2002, Halim et al 2008, Si Mohammed et benhabaib (2015)). In this context, we use panel ARDL cointegration tests for cross-section data from eight oil-exporting and non-oil exports countries in the Middle East and North African region, namely Algeria, Egypt, Iran, Kuwait, Morocco, Saudi Arabia, Tunisia and Turkey.

Our variables are oil prices and macroeconomic variables such as growth rate and consumer price index change, money market rate as monetary policy repentant and market capitalization.

IV. Results and discussions

Stationary test results

Before presenting the results from the empirical panel ARDL, we will apply the stationary test of the time series data. We have chosen the cross-sectionally augmented panel unit root test of Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using ADF.

Table 1 The result of Unit Root Test at Level or I (0) (Null: Unit Root Test): With Intercept and Trend

Variable	Levin, Lin & Chu t*	Probability	Im, Pesaran and Shin W-stat	Probability	ADF - Fisher Chi-square	Probability	
GDP	-1.77853	0.0377	-2.78145	0.0027	37.7037	0.0017	I(0)
Oil	-0.68411	0.2470	0.53659	0.7042	7.95123	0.9503	I(1)
I	-3.32729	0.0004	-1.84120	0.0328	23.5717	0.0404	I(0)
Mrk	-1.47662	0.0699	-0.61151	0.2704	19.3304	0.2519	I(1)
CPI	-3.46934	0.0003	-3.34414	0.0004	43.5671	0.0002	I(0)

Table 01 presents the result of unit root test at level. We reject the null hypothesis and accepts the alternative hypothesis for two variables (oil, Market capitalization) when the p-value is more than 0.05 (5%) and even 0.1 (10). P-value of oil variable are respectively 0.247, 0.7 and 0.95 respectively for three tests of Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003) and Fisher-type tests using ADF. Therefore, the p-value of market capitalization is more than the 5% critical value (0.06, 0.27 and 0.25).

CPI change, GDP and interest rate variables, though they are stationary at levels (I (0)). The test statistic is less than the 5% critical value that we cannot be rejected the null hypothesis. Indeed, we observed p-value of GDP is 3%, 0.2% and 0.1%, where the critical value of interest rate is less than 0.04%, 3% and 4%. Finally, p-value of CPI is significant at 5% then they three probability are 0.03%, 0.04% and 0.02%.

Table 2 The result of Unit Root Test at 1st different or I (1) (Null: Unit Root Test): with Intercept and Trend

Variable	Levin, Lin & Chu t*	Probability	Im, Pesaran and Shin W-stat	Probability	ADF - Fisher Chi-square	Probability	
GDP	-2.61131	0.0045	-5.47554	0.0000			I(0)
Oil	-22.7033	0.0000	-20.1954	0.0000	268.732	0.0000	I(1)
I	-20.1422	0.0000	-19.1702	0.0000	231.507	0.0000	I(0)
Mrk	-10.0700	0.0000	-11.4630	0.0000	154.633	0.0000	I(1)
CPI	-7.54668	0.0000	-17.6019	0.0000	207.286	0.0000	I(0)

Table 2 shows the result of unit root test at 1st different. All results confirm integrated oil and markets variables of order one (I (1))on the contrary, the series of CPI, interest rate and GDP are no unit roots, then we conclude these variables are stationary at levels (I (0).

Cointegration tests

In order to explain the relationship between oil prices and the MENA economies **(Table03)**, the Panel-ARDL model is used to analyze cointegration series for short and long-run dynamics

In the long run, dependent variables such as consumer price index and market stock exhibit a cointegration relationship with oil prices. However, no cointegration relationships can be established among oil price variations, monetary policy and growth rate.

Table 03 pooled cointegration test

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
A) Long Run Equation				
OILP	-0.000462	0.000819	-0.563168	0.0035
MRK	0.014846	0.002788	5.325305	0.0000
I	0.010527	0.007621	1.381287	0.1677
CPI	-0.020791	0.005160	-4.029242	0.0001
B) Short Run Equation				
COINTEQ01	-0.121092	0.063348	-1.911519	0.0464

D(GDP(-1))	1.753913	0.494250	3.548633	0.0004
D(GDP(-2))	-1.578388	0.514201	-3.069597	0.0022
D(GDP(-3))	0.530667	0.162131	3.273082	0.0011
D(OILP)	-0.000965	0.000930	-1.038513	0.2995
D(MRK)	0.002216	0.008338	0.265824	0.7905
D(I)	-0.017112	0.015435	-1.108638	0.2681
D(CPI)	-0.008527	0.004616	-1.847420	0.0652
C	0.116539	0.063998	1.820974	0.0691
Mean dependent var	0.003375	S.D. dependent var		0.459245
S.E. of regression	0.417403	Akaike info criterion		-7.225068
Sum squared resid	99.48249	Schwarz criterion		-6.699723
Log likelihood	2413.309	Hannan-Quinn criter.		-7.021257

*Note: p-values and any subsequent tests do not account for model selection.

Relationships between oil prices and MENA economics variables

Appendix 1 reports the relationships between oil prices and MENA economics variables in short run by country.

The deviation from long-run equilibrium is corrected very slow adjustment speed about 12% every quarterly. The speed of adjustment is higher in the MENA oil-importing countries oil when the term spread are 30% for turkey and Egypt, 58 and 41% for morocco and Tunisia. On the contrary for oil-exporting countries, the speed of adjustment during same period estimated move to a targeted about 25% and less than first group speed adjustment. This result refers the small time elapsed by oil-exporting countries to correct their macroeconomics variables deviation from long-run equilibrium using the oil revenue.

In addition, we note the speed of adjustment required lower rate in Saudi Arabia and Kuwait compare the Algeria to move from the short-run to the long-run equilibrium relationship among Variables study. This result clarifies the comparative advantage of oil dependent between these countries and distinguishes between oil-rich countries and relatively non-oil-rich countries. furthermore, this relationship emphasizes how policymaker chooses their sector oil strategy to serve ever expanding public spending to stimulate growth economic, sterilization practice and intervention in the financial market, while Saudi Arabia and Kuwait produced 11 bbl/ day and 3 bbl/ day respectively compare 1.7 barrels of crude per day in Algeria.

Also, Oil price trend have associated a statistically significant as positive effect on Algeria, Iran, Kuwait and Saudi Arabic. However, Tunisia GDP is one regressor has not detected short run relationship with oil price which implies may be that change in oil price effects the real GDP of Tunisia negatively. Turkey Financial Market capitalization is related positively, but it's not statically significant for the period 1994Q4-2015Q2. Third, oil prices appear having a statistically association relationship with the CPI of oil-importing countries and oil-exporting countries in the MENA region, when oil price increases inflation also increase.

The impact of oil Prices by individual country's economics

In this section, we analysis the impact of oil prices on macroeconomic fundamentals, monetary policy and stock market for eight Middle East and North Africa by individual country's economics. We use SVAR model developed by many empirical who investigated the effect of oil shocks on differ variables: see Blanchard et Quah (1989), Cushman et Zha (1997), Zha (1999), Maćkowiak (2007), Sato et alii (2009), Kilian (2009).

Figure 1 checks the impulse responses. The impulse responses present the dynamic responses of the exogenous variables in relation to the time of variation of the endogenous variable (See Doan (1992), Sims and Zha (1999)). It shows the responses of GDP in oil-exporting countries are a positive sign during all period, and conversely, oil-importing economics, it appears reasonably stable close to zero of GDP response to oil prices.

Similarly, same results can be captured of market response estimated an each oil-importing countries and oil-exporting countries to oil price, which is considered a negatively sign during the first period in these countries causes by financial crisis contagion.

The next macroeconomic variable, CPI seems positive response to oil change and provide the theoretical framework while oil increase lead inflation to rise except Arabic Saudi case. This puzzling result of Arabic Saudi can be explained by beg exchange rate regime adopted.

Indeed, Oil price have a mixed effect response on monetary policy. It is observed that shows a negative sign in long run for Iran, Algeria, morocco, Tunisia and turkey, so that moving in the same positively direction in Kuwait, Arabic Saudi, Egypt.

In fact, the rising oil prices lead to increase inflation and automatically monetary policy response by raising interest rate that can be explained the positively response. On other hand, the negative sign affect by decrease interest rate in the world of both developed countries and less developed especially during financial

crisis (transfer of monetary policy) except in the Algeria case while the impact of oil price has a negligible effect on money market rate. As such, oil revenue is sterilized by the central bank has week sign on interbank market, crowding monetary policy to including economy growth in their objectives and divergence between real economy and monetary policy.

Finally, the market worries about crude oil future, especially s worries resurfaced many new signs as China's economy slowdown, increase offer, minted quotas by The Organization of the Petroleum Exporting Countries. The persistence of lower oil price (The prices dropped from about $100 in September 2014 to less than $50 a barrel in august 2015,) has been associated with an negative responses. Moreover, a one-standard deviation of oil price causes all explanatory variables to decrease about 0.02 to 2 a standard deviation over last period as interval of week or negative except GDP and CPI in non-oil countries (see Appendix 2)

Responses correlation

Table 05 presents response correlation between oil prices and macroeconomic fundamentals, for eight Middle East and North African countries. The correlation coefficient between oil and GDP appear positive and present more ha 45 % for Algeria, Iran, Kuwait and Saudi Arabic. On the other hand, Morocco and Tunisia presents negative correlation with oil, but less than turkey. GDP and oil correlation in Egypt explain more than 0.5. Furthermore, CPI and oil variables suggest positive correlation in all countries except Morocco and Tunisia. Thirst variable (interest rate) is well correlated with the oil prices in both importing and exporting oil countries except Turkey, while was not well correlated and reflect the independence of monetary policy with oil prices. Finally, market capitalization was not well correlated with oil sector in Kuwait when which should be well correlated in the rest countries given differ sign between them.

Table 05: Response correlation among MENA variables.

	GDP_IRN	CPI_IRN	I_IRN	MRK_IRN	OILP
OILP	0,47	0,28	-0,52	0,63	1
	GDP_KWT	CPI_KWT	I_KWT	MRK_KWT	OILP
OILP	0,51	0,08	-0,27	-0,03	1
	GDP_SA	CPI_SA	I_SA	MRK_SA	OILP
OILP	0,20	0,05	0,40	0,46	1
	GDP_TUN	CPI_TUN	I_TUN	MRK_TUN	OILP
OILP	-0,15	-0,08	-0,40	-0,11	1
	GDP_EGP	CPI_EGP	I_EGP	MRK_EGP	OILP
OILP	-0,56	0,47	0,42	0,40	1
	GDP_ALG	CPI_ALG	I_ALG	MRK_ALG	OILP
OILP	0,70	0,20	-0,15	0,32	1
	GDP_MAR	CPI_MAR	I_MAR	MRK_MAR	OILP
OILP	-0,09	-0,15	0,06	-0,39	1
	GDP_TUR	CPI_TUR	I_TUR	MRK_TUR	OILP
OILP	-0,17	0,31	-0,20	0,15	1

V. Conclusion

In the case of MENA region, the main conclusion is that their economies risk can be explained by fundamentals complemented with the oil price decline during the last year. Our results show that there are long-run relationships between oil and consumer price index and market stock. However, our estimation of a Panel-ARDL model indicates that necessary prerequisites to detersive their economies, especially in oil exporters. Foreign exchange reserves of oil exporting countries have not enough to be facing an oil price shock in the long run.

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Appendix 1*:* Cross section short run coeffecients -ALG

_EGP

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.308161	0.011231	-27.43759	0.0001
D(Y(-1))	-0.176413	0.014102	-12.50988	0.0011
D(OILP)	-0.005163	1.75E-05	-295.7704	0.0000
D(MRK)	0.015117	0.000148	101.9408	0.0000
D(CPI)	-0.134245	0.009872	-13.59912	0.0009
C	0.348764	0.022542	15.47149	0.0006

_IRN

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.229867	0.005430	-42.33060	0.0000
D(Y(-1))	0.038339	0.011764	3.259078	0.0472
D(OILP)	0.005969	2.74E-05	218.2222	0.0000
D(MRK)	0.077726	0.001958	39.70287	0.0000
D(CPI)	-0.016309	0.000203	-80.30038	0.0000
C	0.254878	0.012826	19.87215	0.0003

_KWT

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.192203	0.004364	-44.04171	0.0000
D(Y(-1))	0.097726	0.011659	8.382048	0.0036
D(OILP)	-0.006557	7.30E-05	-89.81905	0.0000
D(MRK)	-0.020169	0.001001	-20.15669	0.0003
D(CPI)	-0.017377	0.005992	-2.899974	0.0625
C	0.201818	0.012647	15.95737	0.0005

_MAR

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.580376	0.008832	-65.71439	0.0000
D(Y(-1))	0.337381	0.010594	31.84675	0.0001
D(OILP)	-0.008138	9.84E-05	-82.72028	0.0000
D(MRK)	-0.028025	0.000793	-35.32036	0.0000
D(CPI)	0.084737	0.008216	10.31334	0.0019
C	0.588979	0.032172	18.30743	0.0004

_SA

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.198285	0.004826	-41.08816	0.0000
D(Y(-1))	0.007680	0.012132	0.633056	0.5717
D(OILP)	-0.012459	3.31E-05	-375.8754	0.0000
D(MRK)	0.009244	0.001153	8.018226	0.0040
D(CPI)	-0.022157	0.004273	-5.184943	0.0139
C	0.229185	0.008623	26.57735	0.0001

_TUN

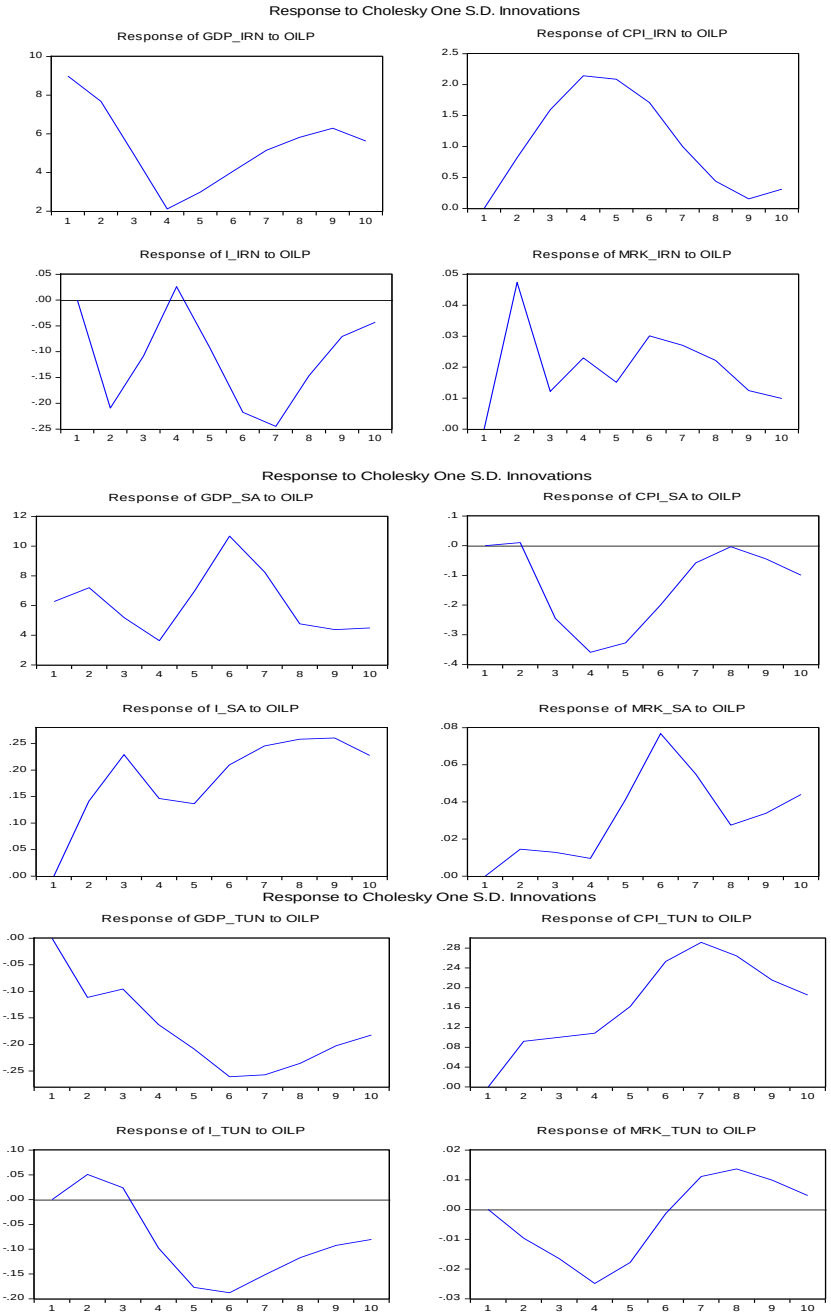
Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.414709	0.010504	-39.48222	0.0000
D(Y(-1))	0.028268	0.012511	2.259492	0.1090
D(OILP)	7.86E-05	1.82E-05	4.305612	0.0231
D(MRK)	-0.024002	0.000664	-36.13390	0.0000

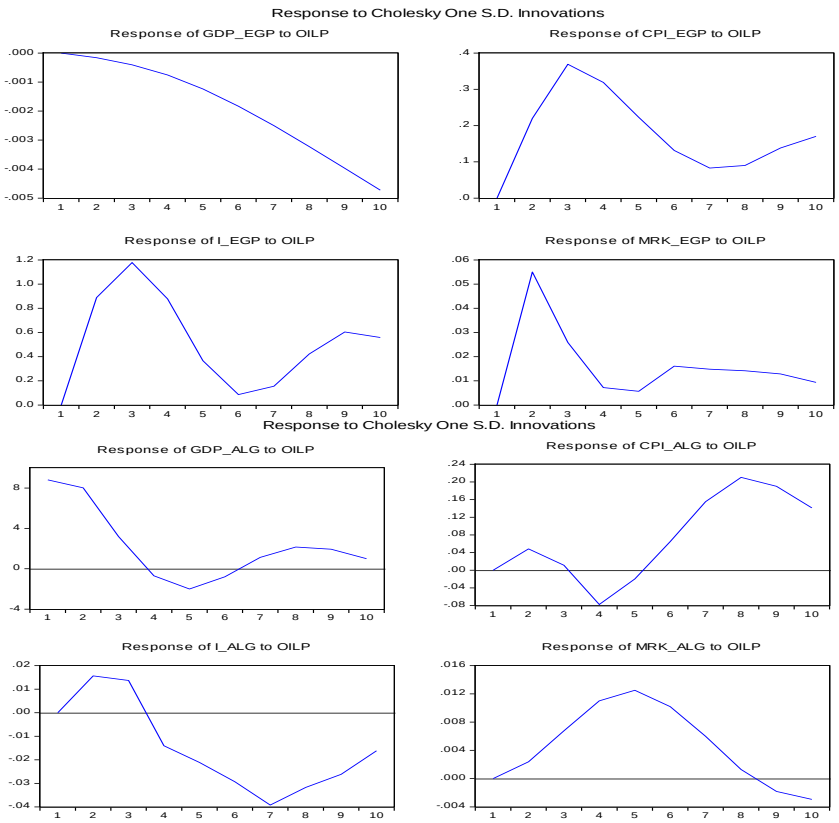
D(CPI)	-0.028152	0.003657	-7.698253	0.0046
C	0.461418	0.016306	28.29816	0.0001

_TUR

Variable	Coefficient	Std. Error	t-Statistic	Prob. *
COINTEQ01	-0.340369	0.007370	-46.18589	0.0000
D(Y(-1))	0.192448	0.011739	16.39354	0.0005
D(OILP)	0.001443	8.72E-05	16.54319	0.0005
D(MRK)	0.064265	0.296330	0.216869	0.8422
D(CPI)	-0.000722	0.000215	-3.360302	0.0437
C	0.507719	0.030644	16.56811	0.0005

Appendix 2: The impulse response





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