Oil price and stock market returns uncertainties and private investment in Saudi Arabia

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Article Info	Abstract:
	The private sector plays a crucial role in the economy. This paper constructs an empirical model for the sector in Saudi Arabia. It incorporates oil price uncertainty as well as stock market returns volatility to predict the sector. It estimates the GARCH (generalized autoregressive conditional heteroskedasticity) and ARDL (autoregressive distributed lag) models. **Findings/Originality:** Our estimations show significant evidence of a long-run relationship between private investment, oil price, and the stock market. We also find that the stock market index has a significant positive effect on private investment in the short run. The effects are strong in the case of unexpected news from the oil sector. Oil price uncertainty can be considered as a channel of transmission of negative shocks on the private sector. For these reasons, when Saudi Arabia has launched its 2030 vision, it announced that one of its goals is to become a non-oil dependent country.

Introduction

The private sector plays a crucial role in supporting economic growth and reducing poverty in the world. It is considered the engine of growth and the creator of economic diversification as it creates jobs, increases government revenue, and improves productivity. The private sector generates more than 80% of employment and government revenues in developing countries. For these reasons, governments support the private sector to achieve high and sustainable economic growth. In Saudi Arabia, the development of the private sector is highly dependent on government spending.

High oil revenues released by the country have negatively influenced the private sector and contributed to the non-development of economic sectors. The private sector's contribution to GDP is considered the lowest in the region. Oil prices fluctuate a lot. Saudi Arabia launched a strategy program to transform itself into a well-diversified economy country in April 2016. The Saudi vision 2030 is built on three main pillars: a vibrant society, a thriving economy, and an ambitious nation. The private sector must be developed to reach these goals. Authorities should encourage and support investments in the country, and the Ministry of Commerce and Investment is reviewing all initiatives and proposals to improve the private sector. Oil revenues represent the primary currency resource for the country. Still, due to the large drops of oil prices from one period to another, diversification in the economy can be the solution to overcome these drops in prices. Uncertainty in oil prices harms government plans and future strategies. For example, the drastic reduction in oil prices in June 2014 led to an increase in inflation and unemployment. Investment

is considered as an essential factor contributing to economic diversification, which leads to economic growth. The authorities count heavily on the private sector's driving role to achieve the 2030 vision goals and reduce the almost dependence on the oil sector.

Economists insisted on the benefits of macroeconomic stability. They focused on the effect of oil price instability on several macroeconomic activities such as industrial production, inflation, exchange rate, interest rate, unemployment, and monetary policy. One of the main sectors influenced by the uncertainty of oil price is the private sector. Since the 1970s, many works have studied the relationship between investment and uncertainty. For the theoretical literature, studies proved that uncertainty affects investment, but the results are ambiguous. Many studies distinguished that an increase in uncertainty contributes to reducing investment (Dixit & Pindyck, 1994). Others have a different point of view, where they considered that increased uncertainty leads to an increase in investment because of the increasing property of the marginal capital product function. Carruth, Dickerson, and Henley (2000) found a negative relationship between uncertainty and aggregate investment.

Several methods have been employed to model the effects of uncertainty on several economic activities, and different approaches have been proposed to measure uncertainty. Most of these studies considered the time series conditional heteroscedastic methods in measuring macroeconomic variables as proxies for uncertainty (see Huizinga, 1993 and Price, 1995). According to these studies, uncertainty can be estimated from different macroeconomic variables such as prices, wages, etc. In this paper, we calculate uncertainty for oil price and stock market return variables. Two measures are exposed in this paper. The first one is based on a GARCH model to extract stock return volatility. The second one is a measure to construct a proxy for oil price uncertainty (Rafiq, Salim, & Bloch, 2009). These uncertainty measures are used to assess both variables' impact on the private sector in Saudi Arabia. Our objective is to test whether stock price returns and oil price uncertainties affect the level of private investment in Saudi Arabia. According to the previous empirical studies devoted to the impact of economic uncertainty on private investment, we expect that oil price and stock market returns uncertainties significantly affect private investment in Saudi Arabia. We hope that the empirical findings can explain the nature of the connection between the uncertainties of oil price and stock market return and that of private investment.

To our knowledge, few studies are examining the link between uncertainty and investment in Gulf countries. This kind of research enables us to assess the importance of these factors on the country's future developments and the strategic perspectives that must authorities take to develop the private sector and diminish its dependency on the crude oil sector. This quarterly paper considers data related to the period 1998:1 – 2018:4 for the oil price, stock market, and two times series for the private sector. By employing GARCH and ARDL models, we conclude that oil price uncertainty negatively influences the Saudi private sector. The stock market index leads to a significant positive impact. Our estimations show substantial evidence of a long-run relationship between private investment, oil price uncertainty, and the stock market. Results also show that both oil prices and stock market uncertainty have a significant impact on private investment in the short run. These linkages are particularly strong in unexpected news for the oil sector, where oil price uncertainty is considered a channel of transmission of adverse shocks to the private sector in the long-run.

Since the 1970s, many works have studied the relationship between investment and uncertainty. According to these studies, we can employ many proxies for uncertainty. Results found are ambiguous due to the choice of the source of uncertainty. According to the standard neoclassical investment model, we highlighted a positive relationship from which a firm decides to invest when the expected net present value is positive. In this logic, Hartman (1972) considered a neoclassical model to examine the relationship between capital productivity and uncertainty. He

concluded that the uncertainty factor has a non-negative effect on investment. Roberts and Weitzman (1981) declared that when a firm has the option to abandon an investment, we can conclude that an increase in uncertainty leads to a rise in the investment. On the other side and parting from the option theory of investment, a firm can abandon investment when it is irreversible. It decides to invest when the expected net present value is greater than the option value of waiting. Therefore, we can document a negative relationship between uncertainty and investment according to the investment option theory.

Using a survey on the investment under uncertainty, Dixit and Pindyck (1994) concluded an adverse effect of real investment options. Lee and Shin (2000) declared that the factor labor share of a firm's costs plays an essential role in uncertainty's positive or negative effect. Also, many methods for measuring uncertainty of macroeconomic variables are proposed in the empirical literature. One of the most applied in studies is the ARCH methodology. For example, Huizinga (1993) used GARCH models for measuring the uncertainty of macroeconomic variables. He considered macroeconomic variables when modeling investment, U.S. inflation, real wages, and real profits. He concluded the negative effect of uncertainty on investment.

Similarly, many studies have highlighted the negative impact of uncertainty on investment. Aizenman and Marion (1993, 1995) showed that macroeconomic volatility variables (volatility of monetary, fiscal, and external variables) have a negative impact on private investment. Bénassy-Quéré, Fontagné, & LahrÈche-Révil (2001) highlighted the impact of exchange rate regimes on foreign direct investment for the southern and eastern Mediterranean countries. Their results confirm previous empirical analyzes and show a negative influence of exchange rate volatility on FDI. Similarly, the studies conducted by Guerin and Lahreche-Revil (2001) describe the relationship between exchange rate volatility and investment using a theoretical model where the uncertainty of the exchange rate generates uncertainty on-demand, and firms invest in serving foreign markets. Their results showed that the market structure plays an important role, and it is decisive for understanding the impact of exchange rate volatility on investment. Öge Güney (2019) studied the impact of macroeconomic uncertainty on Polish private investment. They highlighted that real exchange rate uncertainties, inflation, and GDP growth have a significant negative effect on private investment.

Several studies insisted on the importance of oil price on investment. They highlighted that oil price uncertainty was considered one of the most critical factors impacting several economic activities, such as the private sector. The oil price uncertainty, which results from oil price volatility, leads to adjustments in economic activity. Massive changes in the oil price affect economic activity. Guo and Kliesen (2005) studied oil price shocks' impact on U.S macro-economic activity over 1984–2004. They found that daily oil price uncertainty has a negative and significant effect on crucial U.S. macro-economic variables. Elder and Serletis (2010) employed a multivariate GARCH-in-mean VAR model to investigate the relationship between oil price uncertainty and investment; they found a negative and statistically significant oil price uncertainty impact on investment, durables consumption, and output. In addition, Bredin, Elder, and Fountas (2011) examined the impact of oil price uncertainty on industrial production for the G-7 countries. They concluded that oil price uncertainty negatively affects four G7 countries (Canada, France, the U.K., and the USA) on industrial production. In addition,

In the same way, besides changes in oil prices, stock market returns fluctuations play an important role in affecting several economic activities. Stock markets are characterized by instability, which leads to the non-efficiency and causes uncertainty. When stock market returns volatility is high, firms operating in the private sector become more careful and affect investment decisions. Investors prefer to wait for more information in the market to make the best decisions. Therefore, uncertainty in stock markets generates a slowdown in real activity, and then investment will be affected. Investment is the most volatile component of aggregate demand as it depends on

the opinions about future decisions. Investors react in these markets due to the conditions, which surround the market. In case of uncertain and unstable conditions, many investors panic and decide to liquidate their stock holdings. When they buy and sell stocks in financial markets, investors tend to invest in stocks having low risk and high expected returns. When stock markets know a decline, stock prices know large fluctuations and therefore know increased volatility. The higher variability of prices leads to uncertainty in the stock market as investors think to move their investments in the slow down market to more safe investments. Investors' actions depend on the market's situation and behaviors, while uncertainty plays an essential role in making decisions.

Due to petroleum discovery, Saudi Arabia transformed from a Saharan developing country to a developed rich country, influence, and sovereignty. According to these oil reserves, Saudi Arabia was very dependent on the oil sector and became the first petrodollars country. For the last fourth or fifth decades, the oil sector accounted more than 40% of real GDP and more than 80% of total exports.

Although the oil sector is necessary and essential for the Gulf region, other sectors must be added to diversify the economy and maintain sustainability. In fact, because of problems related to oil price and its fragility to world economic situations, where oil revenues known a massive drop for exporting countries due to the recent collapse of oil prices, Saudi Arabia has known a decline in investments and an economic growth slowdown especially in the year 2014. Another problem surrounding the production of petroleum is the development of renewable resources such as solar energy, which will reduce oil consumption in the next decades.

For these reasons and to overcome these difficulties, policymakers in the country were thinking of diversifying its economy and encouraging private investments. For example, Saudi authorities announced that they aim to attract private sector investments worth $577 billion over the next decade. Therefore, the authorities launched the National Industrial Development and Logistics Program to reach this goal.

Over the last decades, the high oil price volatility and the high dependency on the oil sector make policymakers in Saudi Arabia doubtful and sometimes complicate situations to release their strategies and development plans. For that reason, Saudi launched its 2030 vision in April 2016 with a development program aiming at transforming Saudi Arabia into a country not very dependent on the oil sector. The vision 2030 is based on a diversification program of Saudi Arabia that supports and encourages the private sector. Authorities declared a privatization program to transform some government services to private entities by using high technologies and digital services to be more efficient. With the implementation of significant market reforms in the 2030 vision, authorities review all initiatives to develop and support the Saudi stock exchange market (TADAWUL). Authorities look that the Saudi stock market suits the alignment with emerging and developed markets, enhancing the financial market's efficiency and competitiveness. These reforms may positively affect the private sector, attract investors, and provide them the right investment environment and doing business.

The interaction between oil price volatility, stock market returns fluctuations, and the Saudi private sector is considered as an essential focus of research that we try to study in this paper. One of the vision 2030 is to encourage the private sector to diversify its economy, create jobs, and be independent of the oil sector. Although the efforts required by the government to promote privatization and diversify the economy, the private sector still insufficient and contributes less than 40 percent of GDP. The private sector's contribution to GDP fluctuates between 18% and 39% for the last four decades. The private sector should play a large role in the development and economy diversification. The government should encourage investment, and oil resources should play an essential role in developing the private sector. Due to the large fluctuations in world oil prices, oil receipts are volatile and can disrupt government plans to export and import oil countries.

According to the Organization of the Petroleum Exporting Countries (OPEC), Saudi Arabia's oil reserves amounts are around 18 percent of the world's oil reserves. On average, it produced about 10 million barrels per day of crude oil representing about 13 percent of the global output. With this rate of production, reserves would last about 70 years. To maintain its position in the world and lead the welfare of its population, authority in the Kingdom launched the Saudi vision 2030 to reduce oil resources dependence and develop alternative sources of income.

One of its main challenges is to promote and strengthen the private sector and adapt the rules of a modern economy in the Kingdom. Its objective is to increase the private sector's contribution from 40% to 65% of GDP and to increase foreign direct investment from 3.8% to the international level of 5.7% of GDP. This decision to improve the private non-oil sector was taking due to two leading causes. The first is that reserves of the Kingdom in terms of petroleum would last about 70 years. The second is the variability and the uncertainty that knows the petroleum sector. Prices in the market are too volatile and uncertain. Many works treated the uncertainty of oil prices in the world. They concluded that oil shocks were responsible for many crises and recessions in many countries, especially countries dependent on oil. For example, Hamilton (1983), one of the pioneers investigating the impacts of historical oil price shocks on the U.S. economy, concluded that oil shocks were responsible for several recessions in the U.S., in which higher oil prices led to lower economic growth. Mehrara and Oskoui (2007) indicated that oil price shocks are considered as the main source of output fluctuations in some oil-exporting economies such as Saudi Arabia.

Methods

This research uses time series data on a quarterly, monthly, and daily frequency for October 1998, June 2019. All data were collected from the Bloomberg database. Daily data are used to capture oil prices, and stock market returns uncertainties. We consider the Brent oil price to calculate the proxy to the oil price uncertainty and the Tadawul All Share Index (TASI) to calculate the proxy of stock market return uncertainty. We consider the monthly and quarterly time series. Uncertainty variables are defined and determined in the next section. For the private investment measure, many variables can be regarded as according to the availability of data. In this paper, we use two variables as proxies to private investment: the Saudi Arabia Bank Claims on Private Sector Investments in Private securities and the amount of credit provided by banks to the private sector. We have considered these two proxies as firms borrow money from banks to finance investments, and therefore, data corresponding to credits can be considered as vital for economic activity.

Different empirical methods are proposed to measure uncertainty. One of the most approaches is to use the variable's conditional volatility to measure uncertainty (GARCH process). According to this process, we consider the time series y_t follows an A.R. (k)-GARCH(p, q) model defined as:

$$y_t = \beta_0 + \sum_{i=1}^{k} \beta_i y_{t-i} + \varepsilon_t \tag{1}$$
$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{p} \beta_j \sigma_{t-j}^2 \tag{2}$$

where y_t is the considered variable from which we try to compute uncertainty with zero mean and conditional variance σ_t^2. By using the methodology proposed by Bollerslev (1986), for example, we estimate equations (1)-(2). The conditional variance obtained from equation (2) is considered as a measure of uncertainty of the variable y_t. Extensions for GARCH models developed in empirical literature can be employed to measure uncertainty.

To measure uncertainty Andersen, Bollerslev, Diebold, and Laby (2001) proposed a method based on variable changes for a window of time. According to these authors, the realized

volatility obtained from a variable's high-frequency daily prices is the best proxy for variable uncertainty. The following equation is considered:

$$RV_{[D,t]} = \sum_{d=1}^{D_t}(P_{td} - P_{td-1})^2 \qquad\qquad (3)$$

In equation (3), $RV_{[D,t]}$ is the past realized variance of the variable, D_t is the number of working days in a month, and $(P_{td} - P_{td-1})$ is the logarithmic change of the variables between d and d-1.

Using data corresponding to Brent oil price and Saudi Arabia stock exchange index (TASI), we obtain the following uncertainty of oil price and stock index series as presented in Figures 1-4.

From these Figures, we can notice that volatility in oil prices is higher than stock market index volatility. These series are considered as proxies to the oil price uncertainty and stock market price uncertainty. In addition, we expect contradictory sign effects between oil price uncertainty and stock market index uncertainty on investment. We expect a negative effect of oil price uncertainty and a positive effect of stock market index uncertainty on investment.
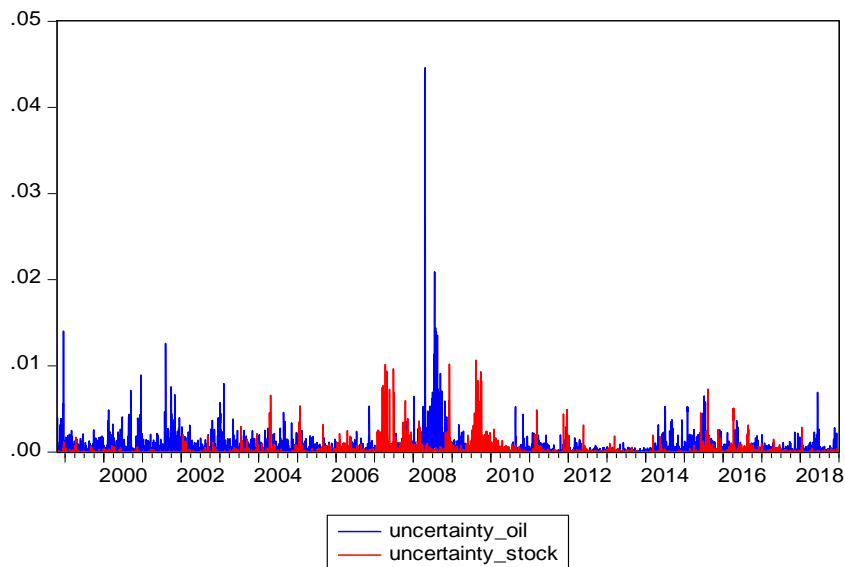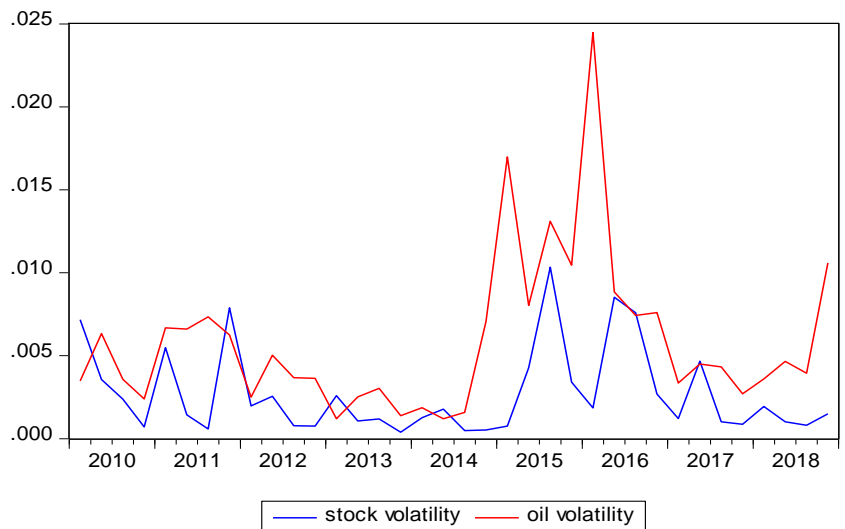

Figure 1. Daily uncertainty
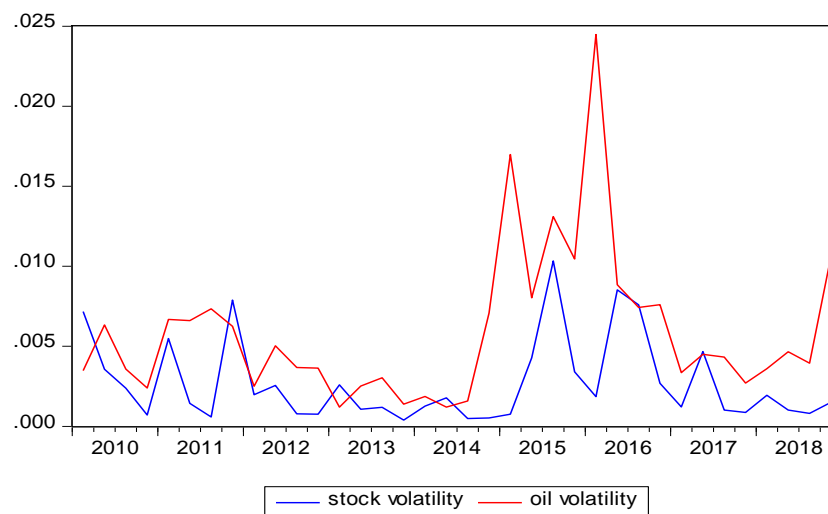

Figure 2. Monthly uncertainty

Figure 3. Quarterly uncertainty

Results and Discussion

In this paper, the monthly and quarterly time series are considered for the empirical analysis of oil price and stock market index uncertainties on Saudi Arabia investment. The primary independent variable is I_t which represents the proxy to investment in the private sector. This paper considers INV$_1$ to represent the Saudi Arabia Bank Claims on Private Sector Investments and INV$_2$ to represent banks' amount of credit to the private sector. These variables are expressed in logarithm.

Oil represents the oil price expressed in log, and stock represents the stock market index TASI expressed in log. Unc$_{oil}$ is a measure of oil price uncertainty, and Unc$_{stock}$ is a measure of stock market index uncertainty. Table 1 represents descriptive statistics of variables at a quarterly frequency for the period 1998:1 – 2018:4.

Table 1. Descriptive statistics

	Mean	Std	Min	Max	Skewness	Kurtosis	Order of Integration	Jarque-Bera
$INV_{1,t}$	4.334	.314	3.852	4.771	-.0592	1.448	I(1)	16.85***
$INV_{2,t}$	2.255	.312	1.737	2.63	-.423	1.687	I(1)	15.46***
Oil price	62.377	31.899	11.403	123.323	.515	1.840	I(1)	8.122***
Stock market index TASI	6580.68	3332.79	3.210	4.266	.735	4.434	I(1)	14.233***
Unc$_{oil}$	.00844	.00833	.0012	.0533	3.363	16.088	I(0)	7.81***
Unc$_{stock}$	.00427	.00659	.00031	.0365	3.305	14.696	I(0)	7.92***

The superscripts ***, ** and * indicate the 1%, 5% and 10% significance levels, respectively.

The descriptive statistics show a leptokurtic distribution for the oil price uncertainty and stock market index uncertainty implying then fatter tails. Non-normality is confirmed for all series according to the Jarque-Bera statistic. To determine the order of integration of the series, we use the test of stationarity ADF. Results show that oil price uncertainty and stock market uncertainty are stationary. While time series related to private investment, oil price, and stock market price index are I(1). Based on these descriptive statistics, GARCH and ARDL estimations are employed. In what follows, we report and discuss the empirical results.

For the GARCH estimation, our model will be:

$$\Delta lnI_t = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta lnI_{t-i} + \gamma_1 Unc_{oil} + \gamma_2 Unc_{stock} + \varepsilon_t \qquad (4)$$

According to this model and using the efficient method of estimation, we obtain the following results.

Table 2. Results based on GARCH model (monthly data)

	$\Delta INV_{1,t}$	$\Delta INV_{1,t}$	$\Delta INV_{2,t}$	$\Delta INV_{2,t}$
Constant	.0111	.0145***	.0139*	.0148***
ΔINV_{t-1}	.0327	.0243***	.280***	.482***
Δoil_t	-.0754	-.0604***	.0206	-.0288
$\Delta stock_t$	.192**	.198***	.0792**	.0858***
Oil_unc	-.128	-.116***	.234	-.423**
Stock_unc	.413***	.481***	.261	.703**
Method	OLS	IGARCH(1,1)	OLS	GARCH(1,1)
ARCH(q)	Yes	No	Yes	No

The superscripts ***, ** and * indicate the 1%, 5% and 10% significance levels, respectively.

By examining the coefficient estimates, results in Table 2 show that oil price uncertainty and stock market price uncertainty have contradictory impacts on private investment in Saudi Arabia. From GARCH estimations where heteroskedasticity was proven for all models, we obtain a negative effect of growth oil price as well as a negative and significant effect of oil price uncertainty on private investment, implying then that large volatility and instability of oil price discourage private investment. On the other part, stock market price growth and stock price uncertainty have a significant positive effect, and then these variables enhance private investment in Saudi Arabia.

The Results highlighted that an unanticipated increase in oil price uncertainty is associated with a decrease in the private sector. In contrast, an unexpected rise in stock market price uncertainty positively impacts the private sector. At the same time, it will be very cautious when oil price fluctuations are large. Large fluctuations in oil prices lead to an increase in uncertainty and the economy's slowdown, especially in the private industrial sector. For these reasons, the main objectives of the Saudi vision 2030 are to support the private sector and reduce dependence on the oil sector by increasing non-oil exports.

Short-run, long run, and ARDL estimation

In this section, and in order to distinguish between short-run impact and long-run impact of the stock market and oil price uncertainties on the private sector, we employ the autoregressive distributed lag (ARDL) model. Consequently, the ARDL models are applicable when variables are integrated of different orders or combinations of both types. They are robust methods for treating the long-run relationship between variables in case of a small sample size. For doing this, we follow the methodology developed by Pesaran, Shin, and Smith (2001). They proposed to use the ARDL bounds testing approach to use cointegration techniques. Wald and F-statistics are used to test whether the lagged levels of the variables are significant or not in a conditional unrestricted equilibrium error correction model. This approach is empirically useful in our case because it does well in small samples and it does not require pretesting of the variables for unit roots. We use the ARDL error correction specification to analyze the long-run relationships and short-run dynamics. The ARDL specification is written in the following form:

$$\Delta lnINV_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i}\Delta lnINV_{t-i} + \sum_{i=0}^{q-1} \beta_{2i}\Delta lnoil_{t-i} + \sum_{i=0}^{q-1} \beta_{3i}\Delta stock_{t-i} +$$
$$\sum_{i=0}^{q-1} \beta_{4i}\Delta Unc_{oil,t-i} + \sum_{i=0}^{q-1} \beta_{5i}\Delta Unc_{stock,t-i} + +\gamma(lnINV_{t-1} - \theta X_t) + \varepsilon_t \qquad (5)$$

where γ represents the speed of adjustment coefficient, $\theta = \frac{\Sigma_{j=0}^{q} \delta_j}{\alpha}$ is the long-run coefficient and X_t represents the vector of independent variables. $\beta_{1i} - \beta_{5i}$ and ε_t represent respectively the short-run coefficients and the white-noise error terms. The existence of long-run relationship between variables can be tested by the following hypothesis: $\delta_1 = \ldots = \delta_j = 0$. The results of the ARDL estimation are presented in Table 3.

According to the ARDL estimations results presented in Table 3, both estimations give similar results and the same conclusions. The error correction term is found to be negative and significant. For the first model, we obtain an estimated coefficient of about -.0472, implying then that 4.72% of the previous shocks' disequilibrium is corrected back to the long-run equilibrium in the current quarter. Results also show that private investment is negatively and significantly related to oil price uncertainty in the long-run, and it is positively and significantly linked to the stock market. Stock market uncertainty has no impact on the private sector in the long-run. Regarding the dynamic short-run effects, oil price uncertainty is positively and strongly related to private investment, while the effects of stock market uncertainty are negative.

Table 3. ARDL estimation

	Model1: $\Delta INV_{1,t}$	Model2: $\Delta INV_{2,t}$
Adjustment		
$lnINV_{t-1}$	-.0472***	-.0468***
Long-run		
$lnoil_t$	.184	.189
$lnstock_t$	1.363***	1.359***
$Unc_{oil,t}$	-1.89**	-1.683**
$Unc_{stock,t}$	2.107	1 .877
Short-run		
$\Delta lnINV_{t-1}$	-.207*	-.200*
$\Delta lnINV_{t-2}$	-.171*	-.166
$\Delta lnstock_t$	.0928***	.0932***
$\Delta lnstock_{t-1}$	.0697**	.0693**
$\Delta lnstock_{t-2}$	-.0771**	-.0776**
$\Delta lnstock_{t-3}$	-----	-.0852*
$\Delta Unc_{oil,t}$	.945***	.945***
$\Delta Unc_{oil,t-1}$	.761***	.755**
$\Delta Unc_{oil,t-2}$	.576**	.568**
$\Delta Unc_{stock,t}$	-.635***	-.627***
Constant	-.136***	-.107
R-squared	.567	.565

The superscripts ***, ** and * indicate the 1%, 5% and 10% significance levels, respectively.

Table 4. Diagnostic tests

Specification/Test	Statistic [p-value]		Outcome
	Model1	Model2	
Breusch-Godfrey/ Autocorrelation	.044 [.833]	.029 [.863]	Reject Autocorrelation
White/Heteroscedasticity	93.15 [.446]	93.58 [.434]	Reject Heteroscedasticiy
Jarque-Bera/Normality	5.00 [.0820]	5.34 [.0693]	Accept Normality
F-statistic Bounds test/ Cointegration	8.106 [.000]	7.974 [.001]	Accept Cointegration

Table 4 presents the main diagnostic tests regarding these estimations. We conclude that the results are robust for both models. We also did not find any problems of autocorrelation, heteroscedasticity, or normality. Another significant effect is the calculated F-statistic bounds test, which is equal to 8.106 for the first model. This indicates the evidence of the long-run relationship in the model at the 1% level of significance, implying then accepting the cointegration hypothesis between private investment, oil price, and the stock market.

Results show that oil price uncertainty affects private investment in both the short-run and long-run but with different signs, while stock market uncertainty has a negative effect on private investment in the short run only. Large fluctuations in oil price dampen investment. Investors in the private sector will be fearful of the future's economic situation and fear achieving large losses that negatively affect their decisions and actions. These results affirmed the research findings of Carruth, Dickerson, and Henley (2000) and Elder and Serletis (2010).

Conclusion

This paper examined the effects of oil price uncertainty and stock market uncertainty on investment in the private sector in Saudi Arabia. Given that the Saudi economy is one of the most countries dependent on the oil sector, it always depends on the oil price volatility as more than 80% of its exports come from oil exports. Therefore, periods of high uncertainty in oil prices may lead to a slowdown in the Saudi economic activity, and investors do not expect future situations. Furthermore, the Saudi government adopts different reforms, programs, and policies to increase its supports and aids to the private sector. Nevertheless, the instability of oil revenues due to the higher variability of oil price sometimes negatively impacts private sector investment as government support diminishes in periods of recessions and the decline of oil price.

On the other hand, high fluctuations in stock market returns have significant impacts on private companies. During the crisis period, investors' optimism and pessimism about future decisions influence investment in the private sector. This paper aims to study the impact of oil price and stock market uncertainties on the private sector in Saudi Arabia.

By using GARCH and ARDL estimations to quarterly Saudi data covering the period 1998:1–2018:4, results show that, in the long-run, oil price uncertainty has a significant negative influence on private sector investment. At the same time, this impact is positive and significant for the stock market. Therefore, oil price uncertainty can be considered as a channel of transmission of adverse shocks to the private sector. Also, we conclude a short-run relationship between oil price uncertainty, stock market uncertainty, and private sector investment. These results confirm the dependency of Saudi's economic growth on oil exports and motivate policymakers to look for other resources to guarantee omic econ development in the country. In another way, diversification is necessary for the government to reduce unemployment and develop the private sector. It is within this framework that fits the Saudi vision 2030.

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