Return and volatility linkages between oil prices and the Lebanese stock market in crisis periods

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ABSTRACT

This paper examines the return and volatility linkages between oil prices and the Lebanese stock market by applying the newly developed VAR-GARCH (Vector Autoregressive-Generalized Autoregressive Conditional Heteroskedasticity) model to weekly data from 30 January 1998 to 30 May 2014. To better understand the impact of the global financial crisis, we divide the data into three sub-periods: the pre-crisis period (02 February 1998–28 December 2007), the crisis period (02 January 2008–30 June 2009), and the post-crisis period (01 July 2009–30 May 2014). Contrary to previous studies showing the two-way transmission of return and volatility from oil prices to the stock markets of oil-exporting countries, our empirical results for the whole period reveal weak unidirectional return and volatility transmissions from oil prices to the Lebanese stock market. While the interrelationship between oil prices and Lebanese stocks increased during the crisis, it eased significantly in the post-crisis period. Our empirical results are important for policymakers involved in shock prevention and for portfolio managers seeking optimal portfolio allocation.

1. Introduction

Besides return links between oil prices and stock markets [13], the issue of a volatility link or transmission has recently attracted significant attention from investors and regulators. Within the oil-stock nexus, volatility transmission refers to the impact of changes in the volatility in oil (stock) on the volatility of stock (oil). Evidence suggests that volatility can propagate across assets generating serious challenges for market participants. For example, oil prices and volatility shocks could cause a slump in the stock markets and the wealth of market participants which could in turn dampen consumer spending and prospects of growth. Especially in turmoil periods, when return and volatility linkages between markets vary dramatically [8], those challenges encourage better risk-assessment. Confronting these challenges, investors need to adjust their asset allocation in order to make their portfolios better resist turmoil periods, whereas regulators engaged in maintaining financial stability need to take appropriate actions during times of market turmoil to repair financial markets and to prevent shocks across markets [7].

While several channels exist through which oil and stock markets could be linked, the most evoked one concerns the financial channel [21]. Based on the discounted cash-flow method, a stock price is equal to the present value of its future earning streams. Higher oil prices lead to an increase in the cost of production and, consequently, a possible decrease in corporate earnings. In parallel, higher oil prices cause an exogenous inflationary shock, which often increases the level of interest and discount rates. Accordingly, either lower expected earnings or higher discount rates translate into a lower stock price.

Prior studies, however, have indicated confounding effects of oil price changes on stock market activities, suggesting that effects differ between oil-exporting and oil-importing countries [12]. While there is a consensus on the existence of a positive relationship between oil shocks and stock market activities in oil-exporting countries [21], this relationship is mixed in purely oil-importing countries. Furthermore, recent empirical studies have focused on return linkages by employing co-integration and causality techniques (see [13,30,34] among others) and have thus overlooked volatility linkages. As indicated earlier, understanding the volatility transmission between global oil prices and stock markets is crucial for portfolio managers and policy-makers who are concerned with risk management. In this regard, a limited number of studies on both return and volatility linkages have focused on either

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developed or developing oil-exporting countries [2,19,26], ignoring the case of purely oil-importing countries in the Middle East region. Only two papers have considered the case of oil-importing stock markets [13,39]. The former examined return linkages in Lebanon, while the latter assessed risk spillovers in Jordan. To address this literature gap, the present paper examines both return and volatility linkages between global oil prices and the Lebanese stock market, which is an unexplored research area.

To carry out the aforementioned analysis, we employed a VAR-GARCH (Vector Autoregressive-Generalized Autoregressive Conditional Heteroskedasticity) framework capable of modelling all data simultaneously, allowing for the conditional variances and co-variances of oil prices and Lebanese stocks to influence each other [3]. The VAR-GARCH framework was recently used by Mensi et al. [28] to model return and volatility transmissions across international energy and cereal commodity markets. This methodological framework has several advantages over the VAR (vector autoregressive) model and the causality techniques that were used by Dagher and El Hariri [13]. The VAR method disregards nonlinearities and conditional heteroskedasticity [32], whereas the causality test does not capture the magnitude of return linkages; it only displays their sources. Although Dagher and El Hariri [13] attempted 'to capture the dynamics of the interrelationships between the variables through impulse responses and variance decomposition' they overlooked the volatility transmission between the examined variables and its implications for portfolio management. We applied the proposed methodology to weekly data from 30 January 1998 to 30 May 2014, taking into account the role of the global financial crisis, to assess the dynamic relationship between oil prices and Lebanese stock returns and volatilities and to shed light on diversification possibilities. Our decision to use weekly data to the detriment of higher frequency data was based on the under-reaction hypothesis in the oil market as documented by Driesprong et al. [14]. These authors argue that it 'take(s) time before information about oil price changes become[s] fully reflected in stock market prices', suggesting that investors react at different points in time to changes in oil prices.

Our empirical results reveal weak levels of return and volatility transmission, albeit the impacts were running from oil prices to the Lebanese stock market. We also highlight the impact of the global financial crisis on the dependence between oil prices and the stock market.

Our contribution was threefold. First, we complemented the recent work of Dagher and El Hariri [13] by focussing on volatility transmission between global oil prices and the Lebanese stock market. Second, we computed optimal portfolio allocations based on oil and stock investments to assess whether the oil market can be used as an effective hedge against adverse movements in the Lebanese stock index. Third, we tested for the first time whether the global financial crisis affected the behaviour of return and volatility transmissions.

In the remainder of the paper, we present the particularity of the Lebanese stock market in Section 2, the literature review in Section 3, the data and methodology in Section 4, the empirical results and implications in Section 5, and the conclusion in Section 6.

2. The Lebanese stock market

Established in July 1920 under the French mandate, the BSE (Beirut Stock Exchange) is the sole exchange entity of Lebanon and one of the oldest stock exchanges in the MENA (Middle East and North Africa) region. In the early years, unregulated trading activities concentrated on gold and currency transactions. In 1945, the Lebanese parliament adopted a law to regulate trading activities which flourished with the enlisting of several banking and industrial firms. On 22 November, 1996, the BSE officially re-launched its trading activity after being halted for 13 years because of the civil war. In December 2014, different type of securities (common and preferred stocks, bonds, and global depositary receipts) belonging to 10 companies' stocks were listed. Securities are classified into four main sectors: banking, development and reconstruction, trading, and industrials (Table 1). Although the Lebanese stock market is fully accessible to foreign investors, it suffers from several structural and regulatory weaknesses, which include a relatively small number of listed firms, large institutional holdings, and low sectorial diversification. Recent efforts by the Lebanese government to encourage the capital market and to increase market transparency have gained ground following the establishment of Capital Market Authorities. Compared to other MENA stock markets, however, Lebanon has both the second smallest and the second least liquid exchange after Tunisia and Bahrain, respectively [8,9]. In 2014, the total market capitalization of listed companies reached $11.267 billion, whereas the value of traded shares stood at $530.230 million. Lebanon's stock market, at 25.20% of its GDP (Gross Domestic Product), is substantially lower than the 72% of GDP average of the other MENA countries.

The case of Lebanon is interesting for policy makers and investors regarding the effects of oil prices on the local stock market. Several opposing forces suggest that the impact of oil prices and volatility shocks on stock market activities may be mixed. On the one hand, rising oil prices would have negative impacts on the stock market activities of purely oil-importing economies. In this view, the dependence of the Lebanese economy on foreign oil imports to satisfy its energy needs makes the local economy extremely sensitive to on-going instabilities and volatilities in the oil market. For corporations, this may indicate higher production costs and lower profit margins. These factors in turn may adversely affect stock prices. On the other hand, we

Table 1
The Lebanese stock market in 2014.

Sector	Issuer name	Type	Ratio of market capitalization to total capitalization
Development and Reconstruction	Solidere	Common shares (classes A and B)	0.197
Banking	Bank Audi	Common and preferred shares, GDR	0.301
	B LC	Common shares	0.020
	Bank of Beirut	Common and preferred shares	0.059
	Byblos Bank	Common and preferred shares, GDR	0.129
	Banque BEMO	Common and preferred shares	0.014
	BLOM Bank	Common and preferred shares, GDR	0.250
Trading	Rasamny-Younis Motor Co.	Common shares	0.003
Industrial	Holcim Liban	Common shares	0.025
	S.L. des Ciments Blancs	Common shares	0.002

Note: GDR (Global Depositary Receipts). Source: official website of the Beirut Stock Exchange (www.bse.com.lb).