Chapter 11
On The Risk–Return Relationship in European and MENA Major Stock Markets During the 2008 Financial Crisis
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ABSTRACT
The purpose of this study is to examine the relationship between risk and return in financial markets. In particular, a comparative study is conducted to shed light on such association by using stock market data from Middle East and North Africa (MENA) and Europe. The exponential generalized autoregressive conditionally heteroskedastic in the mean (EGARCH-M) methodology is adopted to investigate the return generating process in financial markets under study during the 2008 financial crisis. Empirical findings show evidence that some MENA region financial markets generated more risk reward than European stock markets.

INTRODUCTION
The risk-return relationship (Merton, 1973, 1980) has become an important concern for investors and academicians. From a theoretical point of view, in equilibrium additional risk taken by an investor should be compensated through higher expected return according to theory (Merton, 1973, 1980). As a result, risk and return are expected to be positively related.

In practice, each investment instrument in the financial markets including stock, bonds, and derivatives is characterized by a return expectation and its associated risk. For instance, an investor who is willing to buy a given stock wants to understand the relationship between its volatility and returns. Such information is helpful for buy/sell/hold decision-making and portfolio diversification. Indeed, investments

DOI: 10.4018/978-1-4666-8729-5.ch011
can no longer be selected based on their returns but also by considering their respective risk measured by volatility. For example, a high (low) risk asset is expected to yield high (low) return. Thus, an asset with high return and low risk is preferable than another one with low return and high risk. In this regard, risk modeling is receiving a growing interest; for instance, in finance and energy applications (Lahmiri, 2012, 2013a, 2013b). This growing interest in the topic may have been motivated by the following three elements. First, the existence of economic theory that provides foundations of relationship between asset risk and return. Second, there exist several advanced econometric methods for time series analysis and modeling to capture variability in financial data. Third, there are several empirical studies that documented the subject across international market. In this regard, comparisons could be performed.

In finance, asset allocation should be made based on the relative relationship between return and risk. Surely, assessing expected returns relative to risk is crucial for portfolio strategists in order to efficiently allocate assets to form portfolio. In addition, forecasting the stock market is mostly accompanied with forecasting its volatility. Such task is very important to model the influence of assets to the market value. The GARCH-in-Mean (generalized autoregressive conditionally heteroskedastic in the mean: GARCH-M of Engle et al. (1987) is the most common model used to evaluate the time-varying risk-return relationship (French et al., 1987; Campbell & Hentschel, 1992; Bansal & Lundblad, 2002; Girard et al., 2002; Xing & Howe, 2003; Baillie & DeGennaro, 1990; Glosten et al., 1993; Nam et al., 2001). The GARCH-M model allows the introduction of the conditional variance, or some function of it, as a regressor in the mean equation. Thus, the validity of the positive relationship between risk and return can statistically be tested. Following GARCH-based processes, the conditional error follows a particular distribution with conditional variance defined as a linear function of past square errors and lagged conditional variance (Bollerslev, 1986; Engle et al., 1987; Corhay & Rad, 1994). Indeed, GARCH-based processes allow for volatility clustering. For instance, large changes are followed by large changes, and small by small. This pattern in volatility of financial time series has long been examined and found to be as an important feature of stock returns behavior (French et al., 1987; Campbell & Hentschel, 1992; Bansal & Lundblad, 2002; Girard et al., 2002; Xing & Howe, 2003; Baillie & DeGennaro, 1990; Glosten et al., 1993; Corhay & Rad, 1994; Nam et al., 2001).

The empirical literature using GARCH-M reported conflicting findings. In other words, empirical literature examining this issue is not unanimous. For instance, Baillie and DeGennaro (1990), Glosten et al. (1993), and Nam et al. (2001) have reported a negative relationship between risk and return, while French et al. (1987), Campbell and Hentschel (1992), Bansal and Lundblad (2002), Girard et al. (2002), and Xing and Howe (2003) have reported a positive relationship. Most previous works examined the risk-return tradeoff in developed countries (French et al., 1987; Campbell & Hentschel, 1992; Bansal & Lundblad, 2002; Girard et al., 2002; Xing & Howe, 2003; Baillie & DeGennaro, 1990; Glosten et al., 1993; Nam et al., 2001), and some attention has been paid to developing countries (Curci et al., 2002; Forgha, 2012). The purpose of this chapter is to compare the risk-return relationship in Europe and the Middle East and North Africa (MENA) region during the 2008 international financial crisis.

Indeed, the accurate characterization of the relationship between risk and return in financial time series data during a crisis period is critical for risk management and international capital allocation. Therefore, it is essential to compare such relationships between developed countries (Europe) and developing countries (MENA region). In addition, as the MENA region is attracting important foreign capital flows, international investors (in particular those from developed countries) should seek possible higher returns in such developing and emergent financial markets. For instance, financial crises have occurred during the
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