North American Journal of Economics and Finance 29 (2014) 22–35

Contents lists available at ScienceDirect

North American Journal of Economics and Finance

Detecting predictable non-linear dynamics in Dow Jones Islamic Market and Dow Jones Industrial Average indices using nonparametric regressions

Marcos Álvarez-Díaz [a], Shawkat Hammoudeh [b,c,*], Rangan Gupta [d]

[a] Department of Economics, University of Vigo, Galicia, Spain
[b] LeBow College of Business, Drexel University, Philadelphia, United States
[c] IPAG Lab, IPAG Business School, France
[d] Department of Economics, University of Pretoria, Pretoria, South Africa

ARTICLE INFO

Article history:
Received 23 January 2014
Received in revised form 3 May 2014
Accepted 12 May 2014

JEL classification:
C58
G11

Keywords:
Islamic and conventional equity markets
Forecasting
Nonparametric regressions
Point prediction
Success ratio

ABSTRACT

This study performs the challenging task of examining the forecastability behavior of the stock market returns for the Dow Jones Islamic Market (DJIM) and the Dow Jones Industrial Average (DJIA) indices, using non-parametric regressions. These indices represent different markets in terms of their institutional and balance sheet characteristics. The empirical results posit that stock market indices are generally difficult to predict accurately. However, our results reveal some point forecasting capacity for a 15-week horizon at the 95 per cent confidence level for the DJIA index, and for nine-week horizon at the 99 per cent confidence for the DJIM index, using the non-parametric regressions. On the other hand, the ratio of the correctly predicted signs (the success ratio) shows a percentage above 60 per cent for both indices which is evidence of predictability for those indices. This predictability is however statistically significant only four-weeks ahead for the DJIM case, and twelve weeks ahead for the DJIA as their respective success ratios differ significantly from the 50 percent, the expected percentage for an unpredictable time series. In sum, it seems that the forecastability of DJIM is slightly better than that of DJIA. This result on the

* Corresponding author.
E-mail addresses: marcos.alvarez@uvigo.es (M. Álvarez-Díaz), hammousm@drexel.edu, shawkat.hammoudeh@gmail.com (S. Hammoudeh), rangan.gupta@up.ac.za (R. Gupta).

http://dx.doi.org/10.1016/j.najef.2014.05.001

forecastability of DJIM adds to its other findings in the literature that cast doubts on its suitability in hedging and asset allocation in portfolios that contain conventional stocks.

1. Introduction

One of the most challenging topics in Finance has been the attempt to predict accurately the dynamic future evolution of stock market returns. The financial markets are usually characterized by complex, unpredictable and apparently erratic dynamics (Gupta et al., 2014a; Hsieh, 1991). This fact, well-known as efficient market hypothesis, does not support stock market predictability. According to this hypothesis, the price of a financial asset reflects all information which can be obtained from its own past values (Fama, 1970). The acceptation of this hypothesis implies that past information does not explain current market activity and, therefore, the dynamics of financial prices can be well approximated by a random walk. Financial returns are assumed to be independent and behave as a white noise process and, consequently, it is not possible to obtain accurate predictions or devise a profitable investment strategy from past values of the returns.

In spite of the general acceptance of the efficient market hypothesis, some empirical evidence has questioned the adequacy of this hypothesis. Specifically, there exist considerable studies showing that the dynamics of the stock returns include some nonlinear deterministic component (Addo, Billio, & Guégan, 2013; Ajmi, Hammoudeh, Nguyen, & Sarafrazi, 2014; Brooks, 1996; Hsieh, 1989; Kocenda, 2001; Serletis & Gogas, 2000). These studies all conclude that if the nonlinear component is important and captured, it would be possible to improve significantly the forecasting accuracy using nonlinear methods. Moreover, other studies have gone one-step further and have demonstrated that stock returns are to some extent predictable (see for example, Chen & Hong, 2010; Dangl & Halling, 2012; Guidolin & Timmermann, 2007; Lo & MacKinlay, 1998).

Most of the research accomplished until now is carried out using data from well-established conventional stock markets or well-known conventional financial indices (Chen, Leung, & Daouk, 2003; Leung, Daouk, & Chen, 2000). However, an open question which is of great interest for academics and practitioners is whether it is possible to investigate the existence of non-linear predictable structures, using data for less well-established and unconventional financial indices or stock markets. These markets and their indices have been growing in importance in recent years and are expected to continue to gather momentum in the future as more countries and institutions accept them. One of those financial markets is the global Islamic stock market which is better represented by the Dow Jones Islamic Market index, the DJIM index.

The Islamic equity markets are seemingly different from the well-known and well-established conventional markets in the United States and other developed countries. These markets are not well-known in the financial literature and have different characteristics which may make them more or less difficult to model and forecast than their conventional counterparts. They prefer investments in growth and small capitalization stocks, which are not as liquid as the conventional standard stocks. They also restrict speculative financial transactions such as financial derivatives because they have no underlying real transactions. These derivatives include futures and options, government debt issues with a fixed coupon rate, and hedging by forward sale, interest-rate swaps and any other transactions involving items not physically in the ownership of the seller (e.g., short sales).

Studies have also shown that restricting leverage, which is defined as the percentage of debt in the total assets or market capitalization, like in the Islamic finance industry, reduces liquidity (Frieder & Martell, 2006). The issues of liquidity and presence of a second trading market, or the lack thereof, in the world of Islamic finance have also been a matter of continuing debate.[1] Moreover, the tax laws do

[1] The Islamic bonds known as *sukuks* have no secondary market and are held to maturity because asset managers may not be able to find other Islamic investment alternatives to invest in.