The Quarterly Review of Economics and Finance 61 (2016) 77–88

Contents lists available at ScienceDirect

The Quarterly Review of Economics and Finance

journal homepage: www.elsevier.com/locate/qref

The source of stock return fluctuation in Taiwan

De-Chih Liu*, Chih-Yun Liu

Department of Economics, National Taipei University, 151, University Rd., San Shia District, New Taipei City 23741, Taiwan

ARTICLE INFO

Article history:
Received 14 March 2015
Received in revised form
23 September 2015
Accepted 23 November 2015
Available online 8 December 2015

Keywords:
Stock return
Aggregate shock
Sectoral shock
Granular hypothesis

JEL classification:
G1
E3

ABSTRACT

This paper explores the nature of Taiwanese stock return fluctuation from 1992–2013. We employ a dynamic latent factor model that decomposes stock return fluctuations into aggregate, sectoral and granular components. In the full sample period we find that the aggregate factor contributes 45 percent of the stock return volatility, whereas the granular factor on average accounts for another 45 percent of stock return variation. When sub-sample analysis is executed, we again fail to reject the importance of aggregate and granular factors. These results are closer to the aggregate (and granular) paradigm rather than the sectoral paradigm.

1. Introduction

Understanding stock price behavior is fundamental to understanding capital market operation. Exploring the behavior of stock prices and identifying the factors that affect their dynamics have important implications for central bank policy makers and businesses. For stock market participants deeper and better understanding of the individual stock level dynamics within a newly industrialized economy (NIE), such as Taiwan, can provide useful policy implications for investment strategies.

In theory, the value of a stock is equal to the sum of discounted expected future cash-flows (Campbell & Shiller, 1988; Campbell, 1991). These discounted cash-flows reflect economic conditions (interest rates, economic growth, inflation, stock market development and investor sentiment). Empirical evidence from investigating the influence of factors on stock prices, returns and volatilities is abundant, thus far consensus has not yet been reached. For details about previous studies, see the work of Lucas (1978), Chen, Roll, and Ross (1986), Campbell and Shiller (1988), Fama and French (1988, 1992, 1993), Campbell (1991), Bekaert and Harvey (1997), De Santis and Imrahoroglu (1997), Caner and Onder (2005), Gupta and Modise (2013), Canepa and Ibnrubbian (2014), Chang, Hsu, and Mcaleer (2014), Yuan and Gupta (2014), Aissia (2015), Huang, Mollick, and Nguyen (2015), Hung, Huang, Lu, and Liu (2015), Quayes and Jamal (2015) provided in-depth information on the theoretical and empirical aspects regarding the source of stock return fluctuation.

A decomposition exercise will help us to further understand the stock return generating process over time given that a variety of factors influence the stock market. This study constructs a dynamic latent factor model to decompose stock returns into aggregate, sector-specific and individual-specific factors[1]. A large volume of works in the literature show that aggregate factors, such as monetary policies, oil prices and consumer confidence, have significant effects on stocks. For example, Thorbecke (1997) and Bernanke and Kuttner (2004) both found a significant relation between monetary policies and stocks in the United States. O'Neil, Penn, and Terrell (2008) found that the oil price and the stock returns were negatively correlated for the U.S., UK and France. Park and Ratti (2008) detected a similar result for U.S. and twelve European oil importing countries. Chen (2011) found a significant impact on consumer confidence in stock returns.

* Corresponding author. Tel.: +886 2 26748189x67176; fax: +886 2 26739880.
E-mail address: steveliu@mail.ntpu.edu.tw (D.-C. Liu).

[1] A strand in the literature deals with the volatility in stock returns issue by employing the ARCH/GARCH model (for example, Bonilla & Sepulveda, 2011King & Botha, 2015), which has advantages in forecasting the variance in stocks portfolios and examining whether stock returns are sensitive to oil prices. We thank the Anonymous Referee for pointing this out to us.

http://dx.doi.org/10.1016/j.qref.2015.11.006
1062-9769/

In contrast, relatively a few attempts have been made to study sector-specific factors behind stock return fluctuation. A wide range of factors, including capital structure, mode of production and government policy, contribute to distinct patterns in sectoral stock dynamics. For example, the automobile sector relies heavily on energy and steel materials, therefore energy and steel prices certainly have significant influence on the automobile sector, but may not be so significant in other sectors. Some policies or legislation are related specifically to a sector and hence will significantly affect that particular sector but not others. For example, opening-up traffic would have considerable effect on the transportation sector; the "electronic paper" trend may influence the paper and pulp sector and food safety scandals may affect the food sector.

Another stream of literature has explored the individual-specific factors that explain the sources of fluctuations in stock returns. Xavier (2011) recently emphasized that modern economies are dominated by large firms and idiosyncratic firm-level shocks can lead to nontrivial aggregate movements. Xavier (2011) suggested that "granular" (rather than aggregate) shocks might account for GDP fluctuations. The granular (individual-specific) factor, for instance M&A (mergers and acquisitions) will evidently affect the two firms involved; the release of a novel technology or product may stimulate a firm's prospects and naturally its stock price.

This paper extends the extant literature into two important dimensions. First of all, how much on average could these three factors explain the stock fluctuation over the entire market? Second, how could these three factors provide for the fluctuation change over time? In comparison with other methodologies, such as vector auto-regressions (VARs), structural vector autoregression (SVAR) model, generalized autoregressive conditional heteroskedasticity (ARCH/GARCH) model, the dynamic factor model has two main advantages. First, it is able to handle a large number of dynamic factors. Second, the dynamic factor model works well with a large cross section of data (Kose, Otrok, & Whiteman, 2003, 2008). Kose et al. (2003, 2008) showed that the dynamic latent factor model has the distinctive advantage to simultaneously characterize contemporaneous shock spillovers as well as the dynamic propagation of business cycles without a priori restriction on the directions of spillovers or the structure of the propagation mechanism. The Bayesian techniques for estimating the dynamic latent factor model have the advantage of straightforward measure posterior coverage interval for parameter functions[2].

This paper is organized in the following way. Section 2 reviews the relative literature and develops the hypotheses[3]. Section 3 provides the specifications for the dynamic latent factor model. Section 4 reports the empirical results. Section 5 synthesizes the key elements of this paper.

2. Literature review and development of hypotheses

2.1. Aggregate-factor hypothesis

Economy-wide shocks (e.g. oil shocks, monetary policy and investor sentiment) are no doubt important. In the literature most studies found a significant effect between oil price shocks and stocks, not only in the industries that need crude oil as production input, but in most industries. Bernanke (1983) and Pindyck (1991) claimed that changes in oil price create uncertainty about future production costs, income and economic growth. Firms may postpone irreversible investments to obtain short-run profits, and in this way, oil price fluctuations may influence stock returns. The sources of oil price shocks, the effect on inflation, the degree of dependence on oil imports and the oil-related sectors are the relevant factors between the oil price and the stock returns. Sadorsky (1999) and Papapetrou (2001) found a negative relation between oil price shocks and aggregate stock returns in the U.S. and Greece. Kilian and Park (2009) indicated that the relationship between oil price shocks and stock prices is based on the effect on the final demand for goods and services. Wang, Wu, and Yang (2013) recently showed that positive aggregate and precautionary demand leads to a higher degree of co-movement among stock markets in oil-exporting countries than in oil-importing countries. The oil price significantly influences economic output performance for an oil exporting country, thereby strongly affecting its stock market. In contrast, Apergis and Miller (2009) found no significant effect between structural oil price shocks and stock prices in developed countries.

The literature also indicated that stock returns are affected by the monetary policy. The main theoretical mechanism for the monetary policy impact on stock returns is the balance sheet channel and the bank lending channel (Bernanke & Gertler, 1989, 1990, 1995; Thorbecke, 1997). The balance sheet channel emphasizes that a tight monetary policy shock increases the information and agency costs associated with external finance and decreases the value of the firms' assets that act as collateral for new loans. This decreases access to bank loans and external finance in general, forcing the firm to decrease its level of investment and ultimately reduces cash flow and stock returns. In contrast, the bank lending channel emphasizes that a tight monetary policy shock causes banks to simultaneously decrease the supply of loans and charge higher interest rates for new loan contracts, causing a decline in firms' cash flows and stock returns. As a result, from both channels a tight monetary policy has a negative impact on firm cash flow. A number of empirical studies have found that monetary policy actions have a significant impact on stock market returns (Patelis, 1997; Rigobon & Sack, 2003; Galí & Gambetti, 2015; among others). For example, Hussain (2011) utilized high frequency data to investigate whether the return and volatility of major U.S. and European equity indices will respond to monetary policy announcements. The results show that new monetary policy decisions significantly influence the stock index return and volatility, both in European and U.S. markets.

The classical theory indicates that competition among rational investors will result in an equilibrium in which prices equal the rationally discounted value of expected cash flows. Even if some investors are irrational, classical theory emphasizes that their demands are offset by arbitrageurs, counteracting the effect of irrational investors on prices. Despite practical effective factors, the mental condition of the society is also significantly relative to stock returns. Baker and Wurgler (2006) explored how investor sentiment affects the cross-section of stock returns. They argued that investor sentiment has a significant impact on stock returns in two distinct channels. In the first channel the sentiment drives the propensity to speculate among investors. Thus, the subjectivity of unsophisticated investors value stocks from much too low to much too high. The second channel emphasizes that the difficulty of arbitrage varies across stocks but sentiment is generic. A number of researches have shown that arbitrage tends to be particularly risky and costly for young, extreme growth, or distressed stocks. In other words, those stocks that are the hardest to arbitrage also tend to be the most difficult to value. Baker and Wurgler (2006) constructed a composite proxy for investor sentiment (including the closed-end fund discount, NYSE share turnover, number and first-day returns of IPOs, and the dividend premium) and also employed an orthogonalized index that eliminates potential systematic risk factors due to macroeconomic fundamentals. They found significant predictive capacity for both indices for stock selections (such as small stocks,

[2] In contrast, maximum likelihood estimation are subjecting to the dimensionsality problem (Kose et al., 2003, 2008).

[3] We thank the anonymous referee for kindly providing this idea.