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Reviewing the Relationships between Stock Exchange Price Indices and Their Determinants

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Abstract

This paper reviews studies that examined the relationships between stock market indices and their determinants in different countries using time-series models like vector autoregressive, vector error correction, and generalized autoregressive conditional heteroscedastic models. The results showed that the stock exchange price indices were significantly influenced by their determinants like macroeconomic variables.

Keywords: Stock; Market; Macroeconomic; Time-series models.

1. Literature review

This section deliberates the previous studies that conducted to examine the relationships between macroeconomic indicators and stock market indices using different time-series models. However, this section classified the literature review into three categories:

1.1. Vector autoregressive model

Bjornland and Leimtemo (2009) investigated the impact of macroeconomic variables (i.e., industrial production index, consumer price index (CPI), commodity price index, and interest rates) on the S&P500 using monthly time series data for the (1983−2002) period. The results revealed that macroeconomic variables are negatively influenced the S&P500.

Black, Fraser, and Groenewold (2003) examined the causal relationship between macroeconomic variables (i.e., 30-day Treasury bill rate and real gross domestic product) and S&P500 using quarterly time-series data for the (1947−2002) period. The results showed a short-run relationship between S&P500 and macroeconomic variables as well as a constant deviation of S&P500 from real gross domestic product over the period of study.

Gjerde and Saettem (1999) investigated the impact of macroeconomic variables (i.e., inflation rates, interest rates, industrial production index, exchange rates, oil prices, and consumption) on the Norway stock market index using monthly time-series data for the (1974−1994) period. The results showed that the Norway stock market index responded negatively to interest rates, exchange rates, inflation rates, and consumption, while positively to industrial production index and oil prices.

Hassapis and Kalyvitis (2002) analysed the short-run relationships between matured stock market indices of (Canada, France, Germany, Italy, Japan, the UK, and the USA)

and industrial production index using annual and quarterly time-series data to capture the relationship within two ranges. The results showed that stock market indices strongly related to industrial production index in the matured stock market.

In the Greek stock market, Dritsaki (2005) employed monthly time-series data for the (1988−2003) period to examine the causal relationship between macroeconomic variables (i.e., inflation rates, interest rates, and industrial production index) and stock market index. The results revealed bidirectional causal relationships between the Greek stock market index and macroeconomic variables.

Merikas and Merika (2006) investigated the impact of macroeconomic variables (i.e., employment growth, gross domestic product, industrial production index, investments, CPI, and retail sales) on the Germanic stock market index using annual time-series data for the (1960−2000) period. The results showed that the Germanic stock market index was negatively related to CPI, employment growth, while positively associated with gross domestic product, industrial production index, investments, and retail sales.

Using monthly time-series data, Kizys and Pierdzioch (2009) examined the impact of macroeconomic variables (i.e., short-term interest rates, exchange rates, CPI, and producer price index) on the major industrialized stock market indices of (Canada, France, Germany, Italy, Japan, the UK, and the USA). Their results suggested that the stock market indices were not systematically linked to the macroeconomic variables.

1.2. Vector error correction model

Binswanger (2003) investigated the long-run and short-run relationships between industrial production index and stock market indices of Canada, France, Germany, Italy, Japan, the UK, and the USA using monthly time-series data for the (1960−1990) period. The results showed the existence of long-run relationship between the above stock

market indices and industrial production index. Also, the industrial production index was positively related to the above stock market indices in long-run and short-run.

Chaudhuri and Smiles (2004) investigated the long-run relationships between macroeconomic variables (i.e., real gross domestic product, private personal consumptions expenditure, broadest money supply, and oil prices) and the Australian stock market index using quarterly time-series data for the (1960−1998) period. They found evidence of long-run relationships between the Australian stock market index and the examined macroeconomic variables.

In the Greek capital market, Filis (2010) analysed the long-run relationships among industrial production index, CPI, oil prices, and stock market index using monthly time-series data for the (1996−2008) period. The results showed that the Greek stock market index and oil prices had positive effect on CPI in the long run; oil prices had a significant influence on the Greek stock market index; oil prices was negatively influenced CPI; and no effect of oil prices on industrial production index and CPI. Finally, no long-run relationship documented between industrial production index and the Greek stock market index.

Employing daily time-series data for the (1994−2006) period, Hatemi-J and Morgan (2009) investigated whether the Australian stock market was information-ally efficient in the semi-strong form in relation to exchange rates and interest rates. The results revealed that the Australian stock market was not information-ally efficient with respect to the interest rates and exchange rates.

In the Japanese and the US stock markets, Humpe and Macmillan (2009) examined the impact of macroeconomic variables (i.e., industrial production index, CPI, broad money supply, and long-term interest rates) on S&P500 and the Japanese stock market index.

They found that S&P500 was positively related to the industrial production index and negatively related to CPI and long-term interest rates. Also, they found positive relationship between S&P500 and broad money supply. However, for the Japanese data, they found that stock market index was influenced positively by industrial production index and negatively by CPI and long-term interest rates.

Laopodis (2006) investigated the long-run relationships between macroeconomic variables (i.e., CPI, industrial production, and federal fund rate) and S&P500 using monthly time-series data for the (1970–2004) period. The results showed that all macroeconomic variables were co-integrated with the S&P500.

Masuduzzaman (2012) explored the long-run and short-run relationships between macroeconomic variables (i.e., CPI, interest rates, exchange rates, broad money supply, and industrial production index) and the UK stock market index as well as the Germany stock market index using monthly time-series data for the (1999–2011) period. The results showed that macroeconomic variables were co-integrated with the Germany and the UK stock market indices. The findings also indicated that there were long-run and short-run causal relationships between macroeconomic variables and both of Germany and the UK stock market indices.

Nasseh and Strauss (2000) examined the long-run relationships between macroeconomic variables (i.e., industrial production index, business survey of manufacturing orders, consumer prices, and short-term & long-term IR) and stock market indices of six European countries (i.e., France, Germany, Italy, Netherlands, Switzerland, and the UK). They utilized quarterly time-series data for the (1962–1995) period. They found long-run relationships between stock market indices and macroeconomic variables in the selected countries.

Patra and Poshakwale (2006) examined the long-run and short-run relationships between macroeconomic variables (i.e., inflation rates, broad money supply, trading volume, and exchange rates) and the Greece stock market index using monthly time-series data for the (1990−1999) period. They found that all the examined variables were consistently related to the Greece stock market index in the long-run and short-run with the exception of exchange rates. Furthermore, the results showed that the Greek stock market was information-ally inefficient during the period of study.

1.3. Generalized autoregressive conditional heteroscedastic models

Beltratti and Morano (2006) employed the Markov Switching generalized autoregressive conditional heteroscedastic (GARCH) model to examine the relationship between macroeconomic variables (i.e., industrial production index, CPI, federal funds rates, and narrow money supply) using daily time-series data. The results showed that the conditional volatility of macroeconomic variables influenced the volatility of S&P500.

Using monthly time-series data for the (1965−2008) period, Bhar and Malliaris (2011) investigated the impact of macroeconomic variables (i.e., inflation rates, interest rates, unemployment rates, industrial production index, and Treasury bill rates) volatilities on S&P500. They revealed that the volatilities of macroeconomic variables significantly influenced S&P500.

Brenner, Pasquariello, and Subrahmanyam (2009) examined the influences of macroeconomic variables (i.e., CPI, unemployment rates, nonfarm payroll employment, and federal fund rates) on the conditional volatility of S&P500 utilizing monthly time-series data for the (1986−2002) period. The findings showed that macroeconomic variables significantly influenced the conditional volatility of S&P500.

In the US market, Chen (2009) utilized the Markov Switching GARCH model to investigate the impact of macroeconomic variables (i.e., interest rates, inflation rates, broad money supply, narrow money supply, industrial production index, unemployment rates, exchange rates, public debt, and federal fund rates) on the S&P 500 volatility. The monthly time-series data for the (1952−2007) period was used and the results revealed that interest rates and inflation rates were the most variables affected the S&P500 volatility.

In the Czech Republic market, Hsing (2011) employed quarterly time-series data for the (2002−2010) period to examine the impact of macroeconomic variables (i.e., real gross domestic product, government borrowing, broad money supply, domestic real interest rates, exchange rates, inflation rates, and Foreign interest rates) volatilities on the stock market index. The results showed that the volatility of real gross domestic product was positively related to the stock market index, while the volatilities of government borrowings, domestic real interest rates, inflation rates, broad money supply, exchange rates, and foreign interest rates were negatively associated with the stock market index.

Hsing and Hsieh (2012) utilized quarterly time-series data for the (2000−2010) period to inspect the volatility influences of macroeconomic variables (i.e., industrial production index, broad money supply, Treasury bill rates, government borrowings, exchange rates, inflation rates, and interest rates) on the Polish stock market index. The results showed that Polish stock market index was positively related to industrial production index, while negatively related to government borrowings, Treasury bill rates, broad money supply, exchange rates, and interest rates.

Kim, McKenzie, and Faff (2004) analysed the impact of macroeconomic news announcements (i.e., trade balance, gross domestic product, nominal retail sales, CPI,

unemployment rates, and producer price index) on the mean and volatility of returns in the US stock, bond, and foreign exchange markets. The findings showed that these markets responded in meaningful way to the act of releasing news by the government. However, the news in relation to trade balance was found to have the greatest impact on the mean return in the foreign exchange market. In the bond market, news related to the gross domestic product, nominal retail sales, and unemployment rates was found to be important. For the US stock market, CPI and producer price index information was found to be significant.

Morelli (2002) examined whether the conditional volatility of macroeconomic variables (i.e., industrial production index, real retail sales, broad money supply, inflation rates, and exchange rates) explained the volatility of the UK stock market index by utilizing monthly time-series data for the (1967–1995) period. Moreover, the study used unrestricted vector autoregressive model to explain the causality directions between macroeconomic variables and the UK stock market index. Based on the GARCH model estimations, the results showed that the conditional volatility of selected macroeconomic variables did not explain the volatility of the UK stock market index. In terms of unrestricted vector autoregressive model estimations, the results revealed a unidirectional causality from macroeconomic variables (i.e., industrial production index, real retail sales, broad money supply, inflation rates, and exchange rates) and the UK stock market index.

Mun (2012) employed GARCH model to investigate the joint effects of macroeconomic variables (i.e., CPI, narrow money supply, industrial production index, treasury bill rates, interest rates, and exchange rates) on the conditional volatility of the S&P500 and Japanese stock market index using monthly time-series data for the (1984–2006) period. The results showed that the conditional volatility of Japanese stock market index was

significantly influenced by the US macroeconomic variables. Also, the Japanese macroeconomic variables were significantly influenced the S&P500.

In the US market, Rangel (2011) employed the Exponential GARCH model to examine the impact of macroeconomic variables (i.e., CPI, industrial production index, federal funds rates as a proxy of short-term interest rates, and unemployment rates) on the conditional volatility of S&P500. The researcher used daily time-series data for the (1992−2008) period. The findings showed that inflation rates and short-term interest rates increased the conditional volatility of S&P 500, while unemployment rates decreased the conditional volatility of S&P 500.

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