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# Co-integration and causality analysis between stock market prices and their determinates in Jordan

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ABSTRACT

The current study examines the short- and long-term equilibrium relationship between the stock price index (SPI) and the macroeconomic variables in Jordan. Annual time series data over the 1978–2010 period for industrial production (IP), money supply (M2), exchange rate (EX), and discount rate (DR) were used. The ADF, bound testing approach, CUSUM, and CUSUMQ tests were applied to test the stationary and co-integration among variables. The results suggest the existence of a long-term equilibrium relationship between SPI and the macroeconomic variables (i.e., IP, M2, EX, and DR).



## 1. Introduction

Numerous studies have examined the relationship between the stock market and the state of the economy (Apergis and Miller, 2009; Kim, 2002; Nidhiprabha, 2010; Omran and Pointon, 2001; Rangel, 2011). In addition, intensive debate has emerged in the finance literature suggesting that emerging and developed financial markets might be able to promote economic growth. Results also indicate a positive correlation between economic growth and financial development. Thus, if the economy performs well, the stock market is likely to do the same in terms of returns (De Gregorio and Guidotti, 1995; Kirman, 1992). Most of these studies are based on economic and financial theories, such as market efficiency theory (Fama, 1965), quantity theory of money (Fisher, 1928; Friedman, 1956), capital asset pricing model (CAPM; Sharpe, 1964), and arbitrage pricing theory (APT; Ross, 1976).

Previous studies have focused on verifying the effectiveness of macroeconomic variables on the financial market (for example, Chen et al., 1986; Fama and Shwert, 1977). Several recent studies have confirmed a long-term equilibrium relationship between stock prices and relevant macroeconomic variables (e.g., Diamandis and Drakos, 2011; Ghosh, 2009; Gosnell and Nejadmalayeri, 2010; Hussain, 2011; Kearney, 2000; Kim et al., 2004; Maghyereh, 2002; Maysami et al., 2004; Rahman et al., 2009). However, emerging market stock price indices are characterized as having higher volatility than prices in more developed markets (Abugri, 2008). One question that has emerged and still needs more evidence relates to whether macroeconomic variables cause the volatility or structural breaks of an emerging market's stock index.

This study aims to evaluate the macroeconomic variables as causes of the SPI in one emerging market namely, the Amman Stock Exchange (ASE) in Jordan. The ASE is a well-established, small open market that provides a showcase for emerging markets in the world. The current paper adopts one of the contemporaneous time series analysis techniques, the autoregressive distributed lag (ARDL) model developed by Pesaran et al. (2001). ARDL is a popular and standard technique for examining co-integration among financial variables.

The ASE is regarded as one of the most important markets in the Middle East due to the different developments, innovations and regulations that have been carried out by sequential governments. Furthermore, this study is important for different parties like policy makers, domestic and foreign investors, corporations and other financial markets.

The main objective of this paper is to explore the variables impacting the SPI and causing sharp fluctuations. It also seeks to ensure whether it is possible for ASE to respond to macroeconomic variables as in the case of developed markets. In addition, this study attempts to determine the variables which are more effective on SPI in the Jordanian economy to test if there is any relationship between the macroeconomic variables (i.e., IP, M2, EX, DR) and SPI.

The rest of the paper is structured as follows: The next section sheds light on the Jordanian economy and the ASE. Section 3 reviews the literature. Section 4 provides data sources and definitions of the variables, while Section 5 discusses the methodology. Section 6 reports the empirical results. Finally, the conclusions, limitations, and managerial implications are presented in the last section.

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## 2. An overview of Jordan's economy

During the past decades, Jordan's economy was affected by several political events and conflicts that occurred in the Middle East, such as the Gulf-War in 1991 and the Iraqi-War in 2003. These conflicts caused massive resource shortages. For example, Jordan's economy suffered heavily as a result of the 1990–1991 Gulf-War as the Gulf countries' council decided to limit economic relations by declining the recruitment of workers, oil supplements, traditional export markets, and substantial foreign aid revenues. In addition, Jordan's favorable trade relations with Iraq had ended and years of heavily discounted and even free oil ceased. The IMF (1991) estimated that Jordan's GDP declined by 15% to 20% while the unemployment rate rose to almost 25%, making Jordan a primary victim (after Kuwait and Iraq) of the Gulf-War (Park and Agtmael, 1994). Additional, challenges to Jordan's economy was the Amman bombing in 2005 and more recently the 2011 Arab revolutions (Arab Spring) especially in Syria.

Despite the previous political and economic conditions, Jordan's economy managed to sustain an outstanding performance. Since 1999, Jordan has performed significant economic reforms, such as privatizing companies, opening the trade regime, and eliminating most fuel subsidies, thereby spurring economic growth in the past few years by attracting foreign direct investment. The budget deficit is likely to remain high, at 5% to 6% of GDP, and Jordan likely will continue to depend heavily on foreign aids to finance the deficit (Indexmundi, 2012).

Fig. 1 shows the growth rate of Jordan's GDP, which was at 7.8% for the 1965–2011 period. It also indicates a gradually upward trend over the targeted period. Despite the effect of the global financial crisis and other events during this study period, Jordan's GDP reached JD 20.4 billion in 2011. During the 2000–2009 period, Jordan's economy slowed down largely due to the global and regional downturn. This was consistent with the global economic slowdown in 2009, where output growth fell sharply and economic activity was expected to rise modestly (Bekhet and Matar, 2012a,b; IMF, 2010).

In 2010, Jordan's economy showed strong signs of recovery after surpassing the inverse impacts of the global economic and financial crisis. These increases were direct results of the measures and actions on the banking and monetary level adopted by the Central Bank of Jordan CBJ (CBJ, 2009 & 2010). Yet the net FDI witnessed a sharp decline by JD 14.6 million in 2010. FDI as a percentage of market capitalization increased to 48.9%, 49.6%, and 51.3% for 2009, 2010, and 2011, respectively (Bekhet and Al-Smadi, 2012; Bekhet and Matar, 2011). In addition, the industrial production indicator gradually rose with a growth rate of 3.6% (see Fig. 2).

The exchange rate (EX); unemployment rate (UNM); and interest rate (INT) for Jordan's economy are shown in Fig. 3. The EX has long been stable due to the current peg to the US dollar, which has caused Jordan to bring down inflation (IMF, 2008). Furthermore, the annual growth rate of the EX, UNM, and INT indicators is 3%, 3.7%, and −0.008% respectively (see Fig. 3).

The Amman Financial Market (AFM) started its business in 1978 and has been operating as a regular stock exchange market. Its establishment provided important innovation for improving Jordan's financial sector, causing it to evolve towards a better use of domestic and foreign financial resources by achieving an efficient equity market. It has also eased the trading by serving Jordan's financial interests. However, the AFM was established as a non-profit, private institution with administrative and financial autonomy. The S&P Country Classification recently classified AFM as a frontier market. Nevertheless, it is ranked among the top ten global emerging stock markets and is one of the superior equity markets in the Middle East. AFM also witnessed rapid outgrowth, especially during the last decade. In addition, since 2007, Jordan has had full membership in the World Federation of Exchanges (WFE) and has been represented on the board of international accounting standards.

The main objectives of the AFM are to safeguard the interest rate of the national economy by motivating investment in financial instruments (stocks and bonds). It further manipulates the trading process (buying and selling) in financial instruments as well as provides financial data and statistics bulletins to achieve the AFM's goals. Fig. 4 shows a gradual development of the market capitalization (MC), value traded (VT) and the SPI. The growth rates for these indicators were 12.9%, 18.6% and 6.9% respectively (see Fig. 4).

## 3. Literature review

During the recent decade, the relationship between SPI and macroeconomic variables has been extensively researched in developed countries (e.g., Rahman et al., 2009; Rangel, 2011), yet there seems to be no consensus regarding the relationship in developing countries. Furthermore, several studies have employed the time series to examine the relationship between SPI and macroeconomic variables. Some studies have been based on the VAR model (e.g., Abugri, 2008; Nidhiprabha, 2010; Rahman et al., 2009), while others applied both VAR and VECM models (Ibrahim and Aziz, 2003). The GARCH model has also been applied in many studies (e.g., Hussain, 2011; Kim, 2002; Rangel, 2011). The VECM model (Maysami et al., 2004) and the ARDL model (Ghosh, 2009) have also been used.

In the current paper, we categorize the literature based on the direction of the causality test in three ways: bidirectional, unidirectional, and neutral directional relationships among variables.

First, the bidirectional causality relationship between macroeconomics and stock markets was found in different countries. In the United States for example, Beltratti and Morana (2006) found a strong bidirectional causality relationship between volatilities in the stock market and macroeconomic variables. Beltratti and Morana (2010) also suggested a bidirectional linkage between macroeconomic variables and real housing prices for Japan, the United States, the United Kingdom, Canada, and Europe. Jayaraman and Choong (2008) found bidirectional causality between exchange market pressure and external debt for Fiji. In Malaysia, Rahman et al. (2009) applied VAR-VECM models to explore the interactions between macroeconomic variables and SPI. Their results showed that the Kuala Lumpur Composite Index (KLCI) and interest rates are in a bidirectional situation whereas other variables have a unidirectional linkage with KLCI. Enisan and Olufisayo

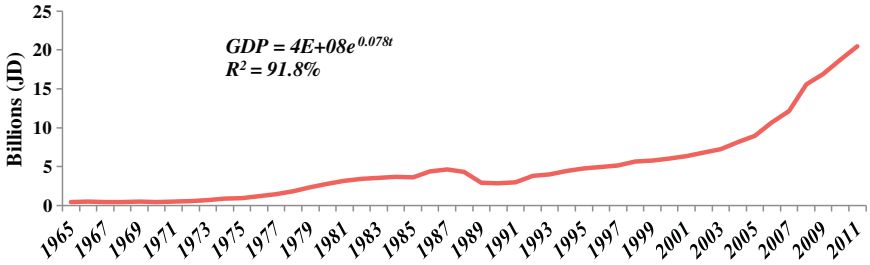


**Fig. 1.** GDP index for Jordanian economy.
Source: World Bank (2012), World Indicators (GDP), available at http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/JO.