ECONOMIC FREEDOM AND STOCK MARKET INTERDEPENDENCE: EVIDENCE FROM THE AUSTRALASIAN REGION

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Abstract- This study investigates the impact of economic freedom on the stock market interdependence between Australia and ten Asian countries (China, Hong Kong, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea and Thailand). The empirical analysis is carried out using panel data regression. The results show that freedom relating to doing business, government spending policies, and foreign direct investment significantly impacts stock market interdependence between Australian and the selected Asian countries. These results have important implications for policymakers as well as investors within the Australasian region. JEL classification: C32, C33, G01, G15, O16.

Keywords- Economic freedom, stock market interdependence, AGDCC GARCH

I. BACKGROUND OF THE STUDY

The objective of this study is to examine the impact of economic freedom, foreign direct investment (FDI), stock market development and trade openness on the stock market correlations of Australia and ten Asian countries (China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore and Thailand). For this purpose, the study constructs panel data using annual data on economic freedom from 1996 to 2013. To measure the stock market time-varying relationship between Australia and Asian markets, the study uses an asymmetric generalized dynamic conditional correlation (AGDCC) GARCH model. The time-varying correlations between these stock markets are measured using weekly data from 1996 to 2013 and extracted end-of-year correlations to match with certain determinants of stock market linkages (economic freedom). Further, the annual data on FDI inflows, stock market capitalization and trade openness are also collected for the same period. To analyse the impact of economic freedom, FDI, stock market development and trade openness on the stock market correlations of Australia and Asian markets, the study uses panel regression models.

The increasing financial liberalization of equity markets over the last three decades has attracted great interest among academics, policy makers and practitioners. This has been mainly to explore the impact of these reforms on both financial markets and the development of the economy. Researchers have shown great interest in these markets as the liberalization of equity markets has provided an opportunity, for the first time, for foreign investors to invest in domestic equity markets, and for domestic investors to invest directly into foreign markets (Bekaert and Harvey, 2003). Further, these reforms have significantly helped investors to reduce the risks to their portfolios by providing an opportunity to diversify their investments into other developing markets. This is due to the fact that the stock markets of developing countries are not fully integrated with the developed markets (Darrat et al., 2000). On the other hand, the stock markets of developed countries are highly integrated. This means that changes in these market returns are highly correlated. The explanation for this is that a large proportion of returns volatility in a developed country is the result of the changes in returns of other developed markets (Bekaert and Harvey, 2002).

The liberalization of financial markets in nations has created enormous investment opportunities for global investors. This liberalization also leads to a better allocation of limited resources among the potential investments. Darrat et al. (2000) argue that if there are no restrictions on capital flows across national boundaries and no transaction costs, then it can be expected that two assets with similar risk profiles should be priced the same, regardless of origin. High transaction costs and the presence of numerous restrictions on capital flows can lead to inefficient allocation of scarce resources, and can cause markets to become segmented. For this reason, researchers are keen to understand the level of stock market integration and the factors that drive this interdependence over time.

A number of studies have identified the factors that drive stock market interdependence. Some of the studies indicate that a significant bilateral trade linkage between countries can have considerable influence on their stock market relationship (e.g., Chen and Zhang, 1997; Pretorius, 2002; Forbes and Chinn, 2004; Chambet and Gibson, 2008; Tavares, 2009). Other studies document that the macro fundamentals and market related variables have a substantial impact on stock market interdependence over time (e.g., Bracker et al., 1999; Pretorius, 2002; Johanson and Soene, 2003; Jithendranathan, 2005). However, the previous studies have not explored the impact of economic freedom indicators on stock market correlations. Particularly, this study examines...
several indicators that represent economic freedom; these include business freedom, financial freedom, fiscal freedom, freedom from corruption, government spending, investment freedom, monetary freedom, property rights and trade freedom. The factors relating to economic freedom play an important role in determining foreign capital inflows into countries. Therefore, these factors have a substantial role in explaining the degree of stock market correlations over time, and have important policy and practical implications. Policy makers are more interested in knowing the factors that drive foreign capital inflows and outflows. This understanding will assist them to formulate appropriate policies to stabilize their financial systems and to act against capital flight. Similarly, an understanding of the factors that drive stock market correlations is particularly useful to portfolio investors who wish to diversify their investments into foreign markets in order to gain higher risk-adjusted returns.

The empirical studies of Yang et al. (2003), Campbell and Hamao (1992), Eun and Shin (1989) and Taylor and Tonks (1989) suggest that the potential benefits from international portfolio diversification are reduced due to the high degree of comovements among the stock markets. At the same time, some other studies (Pukhuanthong and Roll, 2009 and Brooks and Del Negro, 2004) document that since the late 1990s, international stock markets have become progressively more interdependent. A study by Kearney and Lucey (2004) also suggests that if the correlations among different stock markets increase, then the portfolio diversification benefits significantly decrease. Similarly, the earlier portfolio diversification studies of Grubel (1968) and Levy and Sarnat (1970) indicate that the motivation for investors to diversify their investments into international stock markets arises from low correlations between the domestic and foreign asset returns. Bekaert and Harvey (1995), Harvey (1995), Korajczyk (1996) and Chambet and Gibson (2008) empirically provided evidence in support of the view that the emerging and developed stock markets are less interdependent, and may offer considerable diversification benefits for the international investors. This suggests that it is important for portfolio managers to understand how the comovements of stock markets vary across time.

Early attempts to model capital control were made by Black (1974) and Stulz (1981) who represented barriers to international portfolio investment as proportional taxes on foreign asset holdings. Black (1974) assumed that the tax rate is positively associated with long positions and negatively associated with short positions. On the other hand, Stulz (1981) assumed that a positive tax applies equally to all the positions. Other authors, such as Eun and Janakiramanean (1986), Errunza and Losq (1989) and Hietala (1989), argue that investment barriers include prohibitions on particular cross-ownerships of assets. In the early 1990s, several studies (Divecha et al., 1992; Speidell and Sappenfield, 1992; Wilcox, 1992; Harvey, 1993) explored the return properties and potential diversification opportunities for global investors to invest in emerging markets. However, Bekaert (1995) argues that the restrictions on foreign investment may hamper the benefits that are expected from portfolio diversification. Further, this author argues that – provided the barriers to foreign capital are avoided – the capital moving from industrial countries to emerging economies has several positive impacts, including reductions in domestic capital costs and increases in economic welfare through the mobilization of efficient resources. Further, Bekaert (1995) identifies three important barriers to investment. The first barrier comprises the ‘legal barriers’ arising from differences in the legal status of foreign and domestic investors; for example, ownership restrictions and taxes. The second category of barriers are ‘indirect barriers’, such as differences in available information to domestic and foreign investors, accounting standards and investor protection. The third set of barriers deal with risk, and include liquidity risk, political risk, economic policy risk, macroeconomic instability and currency risk.

Numerous studies point out that both foreign direct investment (FDI) and portfolio investment into other countries are determined by several factors in the host countries. Therefore, this study aims to understand the extent to which the quality of economic freedom indicators play a pivotal role in explaining stock market correlations in the Australasian region. Particularly, this study aims to investigate the impact of economic freedom indicators on stock market linkages from the perspective of Australian and Asian markets.

This study uses four sets of economic freedom indicators such as, rule of law (property rights and freedom from corruption), limited government (fiscal freedom and government spending), regulatory efficiency (business freedom and monetary freedom) and open markets (trade freedom, investment freedom and financial freedom). It is well documented in the literature that the quality of economic freedom has significant and positive impact on the flow of resources (e.g. capital and trade) among the nations (Cornell and French, 1983; Bracker et al., 1999; Pretorius, 2002; Yartey, 2007; Beine et al., 2010; Darley, 2012; and Chortareas et al., 2013). This will therefore increase the dynamic interdependence among the nations and the limited resources will be utilized efficiently. For instance, Chortareas et al. (2013), report that the quality of economic freedom has substantial positive effect on financial markets’ efficiency. This indicates that the financial markets become more transparent in terms of disclosing available information to the investors,

and also quickly observes newly available information. The financial market efficiency increases the market integration among the nations. Likewise, Bracker et al. (1999), Pretorius (2002), and Beine et al. (2010) suggest that free flow of goods and services among the countries will increase the economic dependence and thus increases the stock market dynamics among the countries.

II. EMPIRICAL METHODOLOGY

Since the data on economic freedom indicators are available on an annual basis, so the application of time series models becomes complicated due to the short duration of the sample periods. This study therefore uses panel econometric models for the analysis, since they have many advantages when compared to cross-section and time series models, particularly when the sample period is smaller. For example, a panel data set can provide more information, and can control individual heterogeneity, which will then increase the efficiency of the econometric estimation. One of the important properties of the panel data set is that it includes as many cross-sections (countries) as possible with a reasonable time span of observations, as this will enrich the outcome of the analysis. Hence, these estimates are more reliable and provide stable parameters. Further, panel data estimation can help to overcome the problems associated with deficient distributions and the stationarity issues that are often experienced in time series frameworks (shorter duration).

This study aims to investigate the role of economic freedom indicators on stock market interdependence from the perspective of Australian and Asian markets. For this purpose, the study first applies panel unit root tests to determine the distributional properties of the data series. The study then uses the AGDCC GARCH model to measure the time-varying dynamic conditional correlations between the stock returns of Australian and Asian markets. Finally, the study empirically examines the impact of economic freedom indicators using the panel regression models. The panel regression framework of these models is described below.

\[
COR_{it} = C + \alpha_1 BUS_{it} + \alpha_2 CRP_{it} + \alpha_3 FDI_{it} + \alpha_4 FIN_{it} + \alpha_5 FIS_{it} + \alpha_6 GSP_{it} + \alpha_7 INT_{it} + \alpha_8 MON_{it} + \alpha_9 PRO_{it} + \alpha_{10} STK_{it} + \alpha_{11} TFRE_{it} + \alpha_{12} TOPN_{it} + \nu_{it}
\]

where \(COR\) is the dynamic time-varying correlation (Correlations), \(BUS\) is the ‘business freedom’ (Business), \(CRP\) is the ‘freedom from corruption’ (Corruption), \(FDI\) is the ‘net inflow of foreign direct investment as a percentage of GDP’ (FDI), \(FIN\) is the ‘financial freedom’ (Financial), \(FIS\) is the ‘fiscal freedom’ (Fiscal), \(GSP\) is the ‘government spending’ (Govtspending), \(INT\) is the ‘investment freedom’ (Investment), \(MON\) is the ‘monetary freedom’ (Monetary), \(PRO\) is the “property rights” (Property), \(STK\) is the ‘market capitalization of listed companies as a percentage of GDP’ (Stock), \(TFRE\) is the ‘trade freedom’ (Tradefree), \(TOPN\) is the ‘total trade (exports and imports) as a percentage of GDP’ (Tradepen), \(\nu\) is the ‘error term’, \(i\) and \(t\) represent cross-section and time-period, respectively.

2.1 Nature of data and measurement

To examine the impact of economic freedom indicators on stock market correlations of Australian and Asian markets, this study uses yearly data. First, the study uses weekly (Wednesday) closing price data on MSCI indices for Australian and Asian markets, including those in China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore and Thailand for the period January 1996 to December 2013. The required data have been collected from the Data Stream. The selected MSCI indices for this study are denominated in common currency (the US dollar) to take into account any exchange rate fluctuations. This is an important factor to consider, particularly from the perspective of the international investment community. Second, using these weekly data, the study estimates time-varying correlations between Australian and Asian markets by employing the AGDCC GARCH model. From these weekly correlations, the study extracts end-of-year correlations to use as the dependent variable in the panel regression models.

Third, the study estimates the impact of economic freedom indicators on stock market correlations using annual data from 1996 to 2013. The considered economic freedom indicators are business freedom (Business), financial freedom (Financial), fiscal freedom (Fiscal), freedom from corruption (Corruption), government spending (Govtspending), investment freedom (Investment), monetary freedom (Monetary), property rights (Property), trade freedom (Tradefree) and three other important variables such as foreign direct investment, net inflow as percentage of GDP (FDI), market capitalization of listed companies, as percentage of GDP (Stock) and total trade, as percentage of GDP (Tradepen). The study takes the difference in these variables between

\[\text{FDI}, \text{Market capitalization and trade openness has been collected from the World Development Indicators (WDI) online database supplied by the World Bank.}\]
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III. EMPIRICAL RESULTS

3.1 Descriptive statistics
Table 3 presents descriptive statistics on the first difference of the data series. The results show that correlations, business, corruption, government spending, investment and property have positive averages, while FDI, financial, fiscal, monetary, stock, free trade and trade openness have negative means. Among all the variables, stock has the highest standard deviation while correlations have the lowest. The normal distribution of the data series is examined using the Jarque-Bera test. Results from this test suggest that the null hypothesis of normal distribution is not rejected for asset correlations only at the 5% significance level, while the null hypothesis of normal distribution is strongly rejected for all other variables. This indicates that all the variables are not normally distributed, with the exception of correlations.

3.2 Unconditional correlations
The unconditional correlations among the variables are reported in Table 4. The results show that asset return correlations are positively correlated with corruption, FDI, government spending, monetary and stock; while business, financial, fiscal, investment, property, free trade and trade openness are negatively correlated. The positive correlations of asset returns with economic freedom indicators reveal that these variables contribute to higher stock market interdependence between Australian and Asian markets, while negative correlations imply that they segment stock market interdependence. Further, the results indicate that there is no evidence of major correlations among the economic freedom indicators.

3.3 Panel unit root tests
This study applied four types of panel unit root tests on the first differences of the data series to examine common – as well as individual – unit root processes. For example, the Levin et al. (2002) method tests the null hypothesis of unit root (assumes common unit root process across the cross-sections) against the alternative hypothesis of no unit root. On the other hand, the Im et al. (2003) test and the two Fisher type tests use Augmented Dickey and Fuller (ADF) (1979) and Phillips and Perron (PP) (1988) to test the null hypothesis of unit root (assumes individual unit root process across the cross-sections) against the alternative hypothesis of some cross-sections do not have a unit root. Table 5 presents the results of common as well as individual unit root tests. These results show that at first difference, the null hypothesis of unit root can be rejected at the 1% significance level for all the variables. These results therefore confirm that all the variables have a stationary at their first-order differences.

3.4 Time-varying conditional correlations based on AGDCC approach
The aim of this study is to empirically investigate the impact of economic freedom indicators on stock market interdependence from the perspective of Australia and Asian countries. For this reason, the study employs panel regression models to identify the impact of these variables on stock market interdependence. To measure stock market interdependence or correlations, the study applies the AGDCC GARCH model on the closing stock price indices of Australian and Asian markets. Figure 1 presents the results of AGDCC, which indicate that correlations are time-varying and increasing over time between Australian and Asian markets. Further, this analysis reveals that on average Australian stock market has high correlations with Singapore (0.58) and Hong Kong (0.57) markets and has lowest correlations with the Indian stock market (0.38). The correlations of the Australian stock market with Asian markets are consistently increasing until the start (2007) of the global financial crisis (GFC). In the post GFC (from 2011 onwards), the correlations between Australian and Asian markets have started declining. These results suggest that the stock market interdependence between Australian and Asian markets is slightly reduced in the recent past. The detailed analyses of the above models are presented below.

3.5 Impact of economic freedom indicators on asset correlations
To investigate the impact of economic freedom indicators and three other variables – FDI, stock and trade openness – on stock market correlations, this study applies a panel regression model. Table 6 reports the short-run results. Model 1 results show that only business (negative) and government spending (positive) have a statistically significant impact on the stock market correlations. Similarly, Model 2 results display that along with business and government spending, FDI (positive) also has a significant influence on the correlations. These short-run results suggest that the business freedom, government spending, and FDI inflows have substantial impact on the stock market interdependence of Australian and Asian markets.

Table 1: Panel regression results on economic freedom indicators

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<tbody>
<tr>
<td>Constant</td>
<td>0.01 (3.14)</td>
<td>0.2 (5.60)</td>
<td>-</td>
<td>0.01 (3.22)</td>
<td>0.2 (6.22)</td>
<td>-</td>
</tr>
<tr>
<td>BUSINESS</td>
<td>-</td>
<td>-</td>
<td>0.0 (4.5)</td>
<td>-</td>
<td>0.0 (5.24)</td>
<td>0.0 (17)</td>
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3The graphs and tables of the empirical analysis are not provided in this paper due to strict limited space, however can be provided upon the request.
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The economic freedom indicators, particularly business freedom and government spending, have significant negative and positive impacts on stock market correlations. This means that greater differences in business freedom of Australia and Asian countries, which indicates lower business freedom, lead to reduced stock market correlations, and vice versa. In the case of government spending, the more the difference between Australia and Asia, meaning the lower the freedom for government spending, the greater will be the significant positive impact on stock market correlations, and vice versa.

CONCLUSION

The objective of this study is to examine the impact of economic freedom indicators, FDI, stock and trade openness on the stock market correlations of Australia and ten Asian countries (China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore and Thailand). For this purpose, the study collected annual data on economic freedom indicators from 1996 to 2013. Similarly, annual data on FDI inflows, stock market development and trade openness were also collected for the same period. Using these annual data, this study constructed panel data set for empirical estimation.

To examine the impact of economic freedom, FDI, stock and tradeopen on the stock market correlations of Australia and Asia, the study employed panel regression models. The empirical results on economic freedom indicators suggest that the differences between business freedom, government spending and FDI have a significant impact on stock market correlations. This analysis suggests that economic freedom (differences between business freedom, government spending and FDI) indicators have a substantial impact on the stock market correlations of Australian and Asian markets.

The findings of this study make significant contributions to the body of knowledge on the determinants of stock market interdependence in the Australasian region. Further, this analysis also has important implications for policy and practice. First, to the best of our knowledge this is the first study to examine the impact of economic freedom indicators, FDI, stock and tradeopen on the stock market correlations of Australia and Asia. Second, in this context, this is also the first study to use the AGDCC GARCH model for measuring the stock market time-varying correlations between Australian and Asian markets. Third, the analysis of stock market interdependence and the role of economic freedom indicators make a significant contribution to the existing literature.

Fourth, these findings suggest that economic freedom indicators have a significant impact on stock market interdependence. Therefore, these findings have important policy implications. From the policy perspective, if stock markets are closely inter-linked or interdependent then there is a danger that shocks in one market may spill over to the other markets (the so-called “contagion effect”). Hence, it is important for policy makers to understand the factors that contribute to stock market interdependence. This study will therefore help them to formulate appropriate policies for smooth transition of resources across national boundaries for economic prosperity and risk-sharing. Finally, these findings also have important practical implications. For instance, portfolio diversification theories suggest that investors need to be aware of the extent of stock market interdependence.

If stock markets are less than fully integrated, then potential diversification benefits exist for international investors. This means that the diversification benefits fully depend on the level of stock market interdependence. Consequently, understanding the factors that drive stock market correlations is vitally important for investors if they are to take appropriate investment decisions. Further, this study reveals to global investors that they need to consider the differences in quality of economic freedom indicators between the origin and host countries to determine the degree of stock market linkages.

REFERENCES