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Trade openness and the informational efficiency of emerging stock markets ☆

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ABSTRACT

This paper examines the empirical link between trade openness and the informational efficiency of stock markets in 23 developing countries. Our fixed effects panel regression results document a significant negative relation between trade openness and stock return autocorrelations only when the *de facto* measure is used. On this basis, we argue that a greater level of *de facto* trade openness is associated with a higher degree of informational efficiency in these emerging stock markets because the former signals higher future firm profitability, and investors tend to react faster to information when there is less uncertainty about a firm's future earnings or cash flows. Further analyses find no significant association between the extent of financial openness and the degree of informational efficiency.

1. Introduction

In this era of globalization, many of the world economies are becoming more open to international trade. For instance, in the database compiled by Wacziarg and Welch (2008), 25% of the 141 sampled countries had liberalized trade by the end of the 1970s. In the subsequent decade, another 21 economies initiated legal trade policy reforms. The 1990s witnessed the strongest wave of trade liberalization, with an additional 47 countries joining the long list of open economies. Only 35 countries remained closed as of 2001, which was the end of their sample period. Trade volume as a share of gross domestic product (GDP) has also grown sharply over the past three decades, especially for developing economies that were largely closed before 1970. This is evidenced by their 141% increase in the total trade/GDP ratio over the 1975–2005 period. These phenomena have contributed to a huge body of literature that analyzes the effects of trade openness, especially its impacts on the economic performance of developing countries (for a survey, see Santos-Paulino, 2005). Although the scope of research in recent years has moved beyond the goods markets to the financial sector (see, for example, Baltagi et al., 2009; Braun and Raddatz, 2008), only two studies (*i.e.*, Basu and Morey, 2005; Li et al., 2004) explicitly examine the association between trade liberalization and stock market informational efficiency in developing countries.[1,2]

On the theoretical front, Basu and Morey (2005) develop an asset pricing model with a non-trivial production sector to explore the effect of trade openness on the autocorrelation patterns of stock returns. Their model shows that the opening of trade in the form of removing non-tariff barriers on the import of foreign intermediate inputs is crucial to the informational efficiency of stock market, where stock prices should eventually follow a random walk after trade liberalization. More specifically, in a closed economy with a binding constraint on the availability of intermediate inputs, the home country's production technology is subjected to diminishing returns to scale. Since a financial asset represents an ownership claim to the capital stock in the economy, the observed behavior of asset prices should also reflect the same diminishing returns property of the

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[1] The stock markets in developing countries are classified as emerging stock markets by the Standard and Poor's Emerging Markets Database (EMDB).

[2] Nevertheless, the studies by Li et al. (2004) and Basu and Morey (2005) measure different aspects of informational efficiency. The former employ the market model *R*-square statistic to infer the amount of firm-specific information being impounded into individual stock prices, whereas the latter utilize the variance ratio and unit root tests to examine the uncorrelatedness of past price changes. Using Fama's (1970) taxonomy of information sets, Basu and Morey (2005) consider the weak-form efficiency which is the focus of our paper, whereas the closest category for Li et al. (2004) would be the semi-strong-form as the information being considered is wider than past price changes.

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capital stock. A testable proposition resulting from the theoretical model of Basu and Morey (2005) is that the stock return autocorrelations are non-zero in a closed economy, with values that range from negative to positive numbers depending on the degree of risk aversion and production technology.[3] However, when trade barriers are removed, the level of imported intermediate inputs grows on par with the capital stock. Consequently, the return to capital does not fall as the economy grows and hence the growth process becomes self-sustaining. Building on the theoretical linkage between production technology and asset prices, Basu and Morey (2005) then show how the technological gain from trade openness gets transmitted to the equilibrium stock prices, generating an empirically testable proposition that the stock returns exhibit zero serial correlation in an open economy. Their theoretical model further shows that financial opening alone, that is, without trade reform, does not lead to a weak-form efficient stock market.

After formulating the theoretical model, Basu and Morey (2005) bring their proposition to the data by using the trade liberalization dates compiled by Sachs and Warner (1995) and two statistical tests, variance ratio and unit root tests. Subject to the availability of stock return data, the authors examine the efficiency of nine markets during the period in which their economies were closed to trade. The results of both statistical tests show that the stock prices generally behave as a random walk in these pre-trade liberalization periods, which is inconsistent with their model prediction. This random walk behavior continues to hold during the post-liberalization periods, for which the authors apply the same variance ratio and unit root tests to the stock return data of 24 markets. Basu and Morey (2005) give two explanations for their unexpected finding that those sampled markets are efficient even before trade liberalization: (1) the statistical tests employed are of low power and hence are unable to test reliably for the random walk hypothesis in the pre-liberalization period; and (2) the actual effects of trade liberalization may arrive well before the official trade liberalization dates, as traders may become aware of a country's commitment to open trade in advance of its announcement.

In addition to the shortcomings highlighted by Basu and Morey (2005), there are other, more pertinent problems. First, although Sachs and Warner's (1995) trade liberalization dates allow researchers to gauge the differing effects of trade policy reforms on the degree of informational efficiency in each individual country, data availability renders it difficult to conduct a proper event study analysis.[4] Second, even in those countries for which stock data are available for the pre- and post-event windows, the changes in the return autocorrelations cannot be attributed solely to the official removal of trade restrictions. The existing literature also provides a number of theoretical models that make predictions about the determinants of return autocorrelations, such as the volatility of market returns (Sentana and Wadhwani, 1992) and trading volume (Campbell et al., 1993). Third, the empirical research design in Basu and Morey (2005) focuses on the all-or-nothing notion of absolute market efficiency, where the stock market under study is expected to undergo a complete transformation from an inefficient state to a perfectly efficient one after trade liberalization. In this regard, it is not only unrealistic to characterize market efficiency as a dichotomous zero–one variable, but this assumption precludes the extension from a single-country sub-period study to a broader multi-country investigation via cross-sectional or panel regression (for details and references, see the survey paper by Lim and Brooks, 2011).

To the best of our knowledge, the relation between trade openness and stock return autocorrelations has yet to be tested rigorously. In view of his finding that trade liberalization is a significant source of stock price appreciation, Henry (2000) suggests that there is positive value added to this line of inquiry. The lack of subsequent empirical studies provides the motivation for this paper. In our empirical investigation, we use the index of trade freedom provided by the Heritage Foundation and the total trade/GDP ratio to capture the degree of trade openness across countries and over time. The variance ratio statistic is employed to determine the autocorrelation patterns of stock returns, exploiting the property that the variance ratio is one plus a weighted sum of the autocorrelation coefficients for stock returns with positive and declining weights. Unlike the bulk of the earlier literature, we instead measure informational efficiency in the relative sense using the absolute value of the variance ratio minus one. In all model specifications, two competing theoretical determinants of index return autocorrelations are included, namely trading volume and market return volatility. The investigation also considers the role of financial openness for explaining the time series and cross-sectional variations in the degree of market efficiency.

Our fixed effects panel regression results using data for 23 developing countries over the sample period 1992–2006 reveal that a greater level of *de facto* trade openness is associated with a higher degree of informational efficiency in these emerging stock markets, even after controlling for trading volume and market return volatility. However, this positive relation between trade openness and stock market efficiency does not hold when the *de jure* measure is used, suggesting that official trade reforms are insufficient to take advantage of returns to scale if they are not accompanied by increases in the actual level of trade flows. Further analyses find no significant association between the extent of financial openness and the degree of informational efficiency, and this conclusion is robust to various indicators of stock market liberalization and capital account openness. Though our key finding is broadly consistent with the theoretical prediction of Basu and Morey (2005), we highlight the possibility of alternative channel that can give rise to a positive relation between *de facto* trade openness and stock market efficiency. Our conjecture is that trade openness signals higher future firm profitability and hence helps to reduce uncertainty about a firm's future earnings or cash flows. In this regard, Zhang (2006) finds evidence that greater information uncertainty about a firm's fundamentals exacerbates investors' under-reaction behavior and induces stronger short-term stock return continuation, suggesting that uncertainty delays the incorporation of information into stock prices.

The remainder of this paper is structured as follows. Section 2 discusses the issues related to our main metric of informational efficiency. The next section then provides a description of the stock data, the cross-country indicators of trade liberalization and the selected control variables. Section 4 utilizes panel regression to examine the association between trade openness and stock market efficiency. The role of financial openness is considered subsequently. The final section then concludes this paper, along with some recommendations for future research.

2. Measuring the degree of market efficiency

This section discusses two issues related to market efficiency, as follows. (1) Does the presence of significant serial correlations in stock returns indicate market inefficiency? (2) How should the degree of market efficiency be measured? In relation to (2), we employ a variance ratio statistic which automatically selects the value of optimal holding period, using a fully data-dependent method. In addition, we discuss the issue of how the problem of spurious index return autocorrelations induced by thin trading is addressed.

[3] The roles of risk aversion and technological returns to scale in determining the autocorrelation patterns of aggregate stock returns have been rigorously analyzed in the theoretical model of Basu and Vinod (1994). Other production-based asset pricing models that also address the time series behavior of stock returns include Balvers et al. (1990), Basu (1990, 1993), Cecchetti et al. (1990) and Basu and Samanta (2001).

[4] Stock data for emerging markets have only gradually become available in traditional data sources since the early 1990s. To further complicate matters, the convention in the event study literature is to set the window length between two and five years before and after an event (see, for example, Bae et al., 2006; Bhattacharya and Daouk, 2002; Fernandes and Ferreira, 2009).