Testing for international equity market integration using regime switching cointegration techniques

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Abstract

Using MSCI total return index data, this paper analyses the degree of international equity market integration using modern cointegration techniques. The existence of a long run equilibrium across equity markets is important since it implies a violation of weak form market efficiency. Short run deviations away from equilibrium can be expected to reverse, thereby implying a degree of market predictability. This analysis adds to the existing literature by considering a regime switching cointegration relationship that allows for multiple structural breaks over time. The analysis provides scant evidence in favour of market integration with a single regime treatment. There is, however, significant evidence to support a two-regime Markov switching long-run equilibrium relationship that has evolved since the 1970s.
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1. Introduction

This paper considers the degree of market integration across individual country equity indices using modern cointegration techniques. Previously, several studies have attempted to model relative

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equity market performance using cointegration with the aim of identifying a long run equilibrium relationship to which individual indices can be expected to converge towards over time. The search for such relationships is motivated from the observation that increasing globalisation across national markets in conjunction with increasing capital mobility will have acted as a unifying force across financial markets. If cointegration is found to exist, then deviations of one market away from the aggregate market trajectory can be expected to reverse over the medium to longer term. Several authors, for example Kasa (1992), Corhay, Tourani Rad, and Urbain (1993) and Masih and Masih (2002), have argued that such long run cointegrating relationships do indeed exist implying that individual market indices are governed by a common global factor over the long run.

In a related strand to the literature, researchers have also documented what have been termed Winner–Loser reversals, see Richards (1995) and Balvers, Wu, and Gilliland (2000). Here the conjecture holds that markets or individual equities that have experienced superior (inferior) performance can be expected to underperform (outperform) over the medium to longer term. Cointegration, in implying the existence of a long run equilibrium, complements the reversal literature in the sense that markets that have moved away from equilibrium can be expected to gravitate back towards that equilibrium given sufficient time.

While arguments in favour of increased integration such as these have some appeal at a heuristic level there are equally compelling arguments at a deeper theoretical level to suggest that equity index cointegration is unlikely given the free movement of capital. Proponents of weak form market efficiency, for example Richards (1995), argue that cointegration is unlikely since the existence of a common long run equity market relationship implies that deviations away from equilibrium can be expected to reverse over the longer term. Cointegration, therefore, implies a violation of weak form market efficiency since knowledge of the long run equilibrium implies predictability of any market that has moved sufficiently far away from the long run relationship.

A further implication of equity market cointegration concerns the potential benefits arising from diversification across international equity markets. If markets are indeed governed by a common long-term trend, the benefits of diversifying portfolios into international assets clearly becomes suspect. This follows because a common long run trend implies relatively high long-term cross-market correlations, thereby diluting any potential diversification benefit over the long run.

Theoretical considerations aside, the empirical evidence so far as cointegration across equity markets is mixed. Previous empirical work has focused upon differences in tests for cointegration and several competing techniques have found alternative results depending upon the level of statistical sophistication employed. For example, Kasa (1992) and Corhay et al. (1993) find in favour of cointegration while Richards (1995) provides a dissenting view. All of these studies employ the Johansen (1988) system based approach to test for cointegration while Corhay et al. (1993) also use the Engle and Granger (1987) procedure. The difference across the findings of Richards (1995) and Kasa (1992) arise from the fact that Kasa (1992) uses asymptotic critical values to test for cointegration while Richards (1995) adjusts critical test statistics to allow for finite sample bias.

Other studies have found differences in the level of cointegration depending upon the particular time period under consideration. Earlier studies find little evidence while later studies report evidence in the affirmative, see Blackman, Holden, and Thomas (1994) and Masih and Masih (2002). Blackman et al. (1994) use a combination of the Johansen (1988) and Engle and Granger (1987) procedures while