



# Portfolio diversification effects of trading blocs: The case of NAFTA

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Received 24 July 2005; accepted 28 August 2005

Available online 29 September 2005

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## Abstract

This study investigates the evolving nature of North American Free Trade Agreement (NAFTA) stock market interdependencies and their association with diversification gains from the perspective of US investors. The issues are addressed for both short- and long-run interdependencies through correlation of stock market returns and cointegration of stock market prices. The basic findings include: (1) the existence of a long-term relationship (a cointegration relation) which is time-varying and statistically unstable and (2) diversification gains with cointegration not consistently lower than without cointegration. Thus, per-unit-of-risk diversification gains to US investors from NAFTA stock markets are determined by return volatilities, return correlations and domestic market performance. Based on increased return volatilities and return correlations and the very small per-unit-of-risk diversification gains even when the US stock market performs poorly, US investors' diversification gains have diminished since the implementation of NAFTA.

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*JEL classification:* F36; G15; F21

*Keywords:* Equity market interdependencies; NAFTA; Trading blocs; Cointegration

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## 1. Introduction

The passage of the North American Free Trade Agreement (NAFTA) in 1994 has reduced (if not completely eliminated) barriers to trade and capital flows and thus reinforced economic

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interdependencies among its member countries: Canada, Mexico and the US. Inasmuch as stock markets should reflect prospects for the underlying economies, fewer institutional constraints and increasing economic integration in the NAFTA area potentially can lead to stronger short- and long-run comovements or interdependencies of stock market prices and returns in the three NAFTA countries. Conceptually, these relationships should affect the magnitude of diversification gains from cross-border investments in NAFTA stock markets. This study is intended to investigate the evolving nature of NAFTA stock market interdependencies and their association with diversification gains from the perspective of US investors. These two aspects of NAFTA equity markets have not been sufficiently examined or quantitatively verified in prior empirical work.

Numerous studies (e.g., Koch and Koch, 1991; Koutmos, 1996; Michaud et al., 1996) have consistently detected international stock market linkages in the short-run through contemporaneous correlation or determination, lead–lag or Granger–causal relations, or volatility transmission across national stock market returns. The evidence has been particularly strong during and after tumultuous events including the US stock market crash of 1987 (Masih and Masih, 1997) and the Asian Financial Crisis of 1997 (In et al., 2001). Informational efficiency of international stock markets (Eun and Shim, 1989), contagion effects during market turmoil (Climent and Meneu, 2003) and financial market globalization including deregulation and improvements in communication technology (Park and Fatemi, 1993) are among possible factors contributing to increasing short-run interdependencies across national stock markets.

Evidence of long-run international stock market interdependence, however, appears comparatively conflicting. Cointegration analyses based on Engle and Granger (1987) and Johansen (1988) have been the techniques typically employed in prior studies to investigate this interdependence. If cointegration is detected across national stock market price indices, they are expected to comove together over time to retain cointegrating or long-run equilibrium relations.

Blackman et al. (1994) and Masih and Masih (2002) relate cointegrating relations across various national stock markets primarily to financial market globalization with findings especially pronounced during periods of economic uncertainty such as the US stock market crash of 1987 (Parhizgari et al., 1994) and the Asian financial crisis of 1997 (Ratanapakorn and Sharma, 2002). Conversely, Kanas (1998) and Climent and Meneu (2003), among others, detect very weak or no evidence of cointegration within similar groups of national stock markets.

More recently, with monthly data covering the period January 1979–June 2002, Phengpis and Apilado (2004) investigate cointegration of stock market price indices from major European Monetary Union (EMU) countries relative to non-EMU countries. Their results clearly indicate two cointegrating relations within the first group but none within the latter group, implying that the absence of cointegration across national stock markets cannot be generalized across groups of countries. In fact, strong economic interdependence can emerge as an important contributing factor to cointegration of stock markets across national boundaries, a finding supported by similar findings in earlier studies of EU stock markets such as those of Serletis and King (1997) and of Latin American stock markets such as those of Chen et al. (2002).

Studies directed toward NAFTA effects on stock market integration provide differing results and implications. With monthly data from November 1987 until March 1997, Ewing et al. (1999) find no evidence of cointegration among stock market price indices in the three NAFTA countries (even with the inclusion of a dummy variable to account for the implementation of NAFTA in January 1994). In a related study, Ewing et al. (2001) report no evidence of daily volatility transmission among NAFTA stock markets during the pre-NAFTA period (1992:06:02–1993:12:31). They however detect significant volatility transmission from the US to the Canadian and Mexican stock markets, but not vice versa, during the post-NAFTA period (1994:01:03–1999:10:28). These two

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