
A Review of Research into Emerging Stock Markets

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Abstract

Emerging stock markets have been the subject of extensive scrutiny since their emergence as a separate investment category some twenty years ago. This review article explores the major debates which have taken place in the emerging stock market literature, including (1) the definition of what constitutes an emerging stock market, (2) the diversification benefits of incorporating equities from emerging markets into an investment portfolio, (3) the predictability of returns in emerging stock markets and (4) the character and volatility of emerging market equity returns. This review analyses the existing research into emerging markets and also indicates areas where future research might prove useful.

1. Introduction

Recent years have seen a tremendous growth in the opportunities for developed country investors to acquire shares in emerging stock markets (ESMs). Specialist unit and investment trusts have been set up which invest wholly or primarily in the securities traded on these smaller stock exchanges and increasingly, large financial institutions have introduced an ESM component in their global security portfolio. This increasing interest in emerging markets has generated a fast-growing body of academic research. This review article summarises the findings of this research, highlights the major controversies and indicates possible avenues for future research.

A variety of topics is examined in the ten sections of this paper. Section 2 briefly

outlines the background to the concept of emerging market investment and explains the different ways in which the term 'emerging market' is defined. Sections 3 and 4 present an overview of, and the motivations for, foreign portfolio investment in emerging stock markets. The risk-return characteristics and diversification properties of emerging stock markets are analyzed in sections 5, 6 and 7; which also considers the nature of the possible gains from ESM diversification. Section 8 examines whether emerging markets have become more fully integrated into the system of international security markets in recent years and considers the potential of these markets for diversification in the future. Section 9 discusses the predictability of emerging market share returns, and the possible implications of this apparent predictability for portfolio investment strategies. Section 10 focuses on emerging stock market volatility. In particular, the nature and the determinants of both the time-series and the cross-sectional behaviour of ESM volatility are explored. A final section offers conclusions and suggests areas where future research might be valuable.

2. The definition of an emerging market

The concept of emerging market investment dates back to before the turn of the century, with the formation in 1868 in the UK of the Foreign & Colonial Investment Trust, whose aim was to invest in the railway and trading companies of America. The promotion of shares in emerging equity markets as a form of institutional portfolio investment did not take place for over a hundred years. However,

during the past thirty years the recognition of emerging market securities as eligible portfolio assets has received an impetus from several sources. For example, the establishment in 1971 of a unit in the International Finance Corporation (IFC) responsible for capital market development succeeded in focusing the attention of the member countries of the World Bank Group on the importance of securities markets as an essential mechanism in mobilising domestic savings and in attracting foreign capital to developing economies. However, despite this emphasis on capital market development, it was not until 1987, with the formation of the Templeton Emerging Markets Fund in the USA, that investment in emerging markets became a recognised investment category. Nevertheless, there remains no universally accepted operational definition of what precisely constitutes an emerging market, with a wide range of definitions employed in both the academic and the professional literature.

One of the earliest attempts to classify emerging markets into homogenous groupings was made by Errunza (1983). While this classification affords no definition, it does provide a guide as to the financial markets that the term 'emerging markets' may embrace. Errunza suggested that the term subsumes three general categories of financial markets, although these are by no means mutually exclusive. The first category includes the old-established markets, many of which have been in place for over a century. For example, the first attempt to establish a stock market in Caracas, Venezuela, took place as early as 1805, when a group of businessmen founded the Commerce Exchange. Indeed, many markets in the Latin American region date back to the 1800s. The second category identified by Errunza includes those markets that owe their growth and development to special situations. For

example, active government support, turmoil in the Middle East and OPEC money are three factors largely responsible for the growth in size and sophistication of the Jordanian market. The third, and final, category includes new markets which have been organised to foster economic growth. An example of such a market is Korea, which has grown over the ten years from the beginning of the 1980s to the start of the 1990s from being a small market, largely unknown to international institutional investors, to becoming one of the worlds leading emerging markets. For example, by 1994 Korea had attracted 4.6 per cent of total net assets invested in emerging markets, and approximately ten per cent of the total number of funds that invest in emerging markets (1994-1995 Micropal Directory of Emerging Market Funds). This classification highlights the fact that the definition of an emerging market is not solely a question of age or size. Indeed, Kuczynski (1994) argues that the term refers to stock markets that 'are developing from an incipient stage toward a more modern and mature stage', (p.10). Thus, he argues that the key ingredient of the definition of an emerging capital market is the market's close relationship to economic growth and trade, and the financial development is therefore simply a reflection of the pace of economic expansion.

The definition of what constitutes an emerging market that has so far met with the widest acceptance is that proposed by the IFC; this organisation considers all stock markets in developing countries to be emerging. In defining 'developing', the IFC adopts the criteria of the World Bank, which classifies countries according to their income status; low and middle income countries are regarded as developing. In 1994, low income countries had a per capita GNP of US\$725 or less, while middle income countries had a per

capita GNP of between US\$726 and US\$8955 (IFC, 1996). This definition has been adopted in numerous academic studies (Speidell and Sappenfield 1992; Wilcox 1992a, 1992b; Hartmann and Khambata 1993; Harvey 1994, 1995a, 1995b). A review of the emerging market literature reveals a marked difference between the definition adopted by academics and the definition employed by practitioners. Practitioners tend to focus on a more narrow definition than that of the IFC, emphasising those markets where the purchase and sale of securities by global investors is achievable in practice, and where investment may be made in an orderly and relatively safe manner (Mobius, 1994; Barry and Lockwood, 1995; Helliard, Lonie, Power and Sinclair, 1996). For example, Mark Mobius, President of Templeton Emerging Markets Fund, declares that emerging markets are defined by some market analysts as being those markets which are not part of the United States, Canada or the EAFE (Europe, Australia and Far East), provided that (1) there is a fully functioning stock exchange or active OTC market, (2) foreign portfolio investors have access to securities, and (3) there is free repatriation of capital and income or, alternatively, the currency is convertible. According to Mobius, by 1992 only 24 stock markets fulfilled this criteria. Furthermore, a Wall Street Journal report devoted to emerging markets reveals that practitioners also consider other factors when deciding on what constitutes an emerging market; one practitioner is quoted as saying that politics can play a role in such definitions (Wall Street Journal Europe, 1993).

The essence of this disparity, and the possible inappropriateness of the definition laid down by the IFC is captured by Barry and Lockwood (1995) who state that: 'Investors tend to focus their attention on a

more narrow definition [than the IFC] that emphasises those developing countries in which capital markets are increasing in size, activity or sophistication', (p.16). Direct evidence on this issue is documented in a study by Helliard *et al.* (1996) on investors' perceptions of barriers to investment in emerging markets. In interviews with a wide range of professionals including fund managers, analysts, economists, brokers, traders and custody and settlement staff at 18 financial institutions in London, Edinburgh, Dundee and Perth, it appeared that the definition of emerging markets varied considerably across the institutions surveyed. Whilst some institutions regarded the more developed markets of Hong Kong and Singapore as 'emerging', others limited the use of the term to the more embryonic markets of China and Russia. This led the authors to conclude that 'the IFC definition...is therefore not always regarded as appropriate by practitioners', (p.3).

Thus, there is no definitive answer to what constitutes an emerging market. Since financial institutions have adopted investment in emerging markets as a specific objective, the term has been variously defined, with definitions based on a number of factors including, *inter alia*, *per capita* income, market turnover, degree of freedom from regulations and restrictions on inflows and outflows of funds and capital market size. Certainly the term does not refer to a static group of markets, but rather to one that is rapidly evolving. For example, the 'emerging markets list' has expanded significantly since the changes in the economic policies of the former Communist countries have included recourse to 'capitalistic' methods of finance. Furthermore, this expansion is set to continue as serious efforts are made to establish or revive markets and to liberalise foreign

investment regulation in the African and Asian regions.²

3. *The global investment stampede*

The last decade has witnessed a significant transformation in the operation of global financial markets. The increased integration and liberalisation of many developed markets has prompted a flurry of cross-border investment activity.³ But in recent years the spotlight has tended to focus increasingly on the developing world. A phenomenal growth in the capital inflows from the industrialised markets has accompanied the relaxation of foreign investment restrictions in many emerging markets.⁴ Over the 1989-93 period, total net capital flows to all developing countries reached a level which was unparalleled since the international debt crisis in the early 1980s (Gooptu, 1993). More importantly however, a larger proportion of the increasing capital flows to emerging markets reflects the growing importance of portfolio investment.⁵ In particular, gross portfolio flows increased by more than sevenfold over the period 1989-1993, reaching a level of \$55.8bn (World Bank, 1993).

Equity financing - comprising direct equity purchases by foreign investors, investment through country funds,⁶ and American Depository Receipts (ADRs)⁷ or Global Depository Receipts (GDRs)⁸ - is an essential component of these portfolio flows. Until recently, cross-border equity flows to developing countries have been sparse, totalling only \$3.5bn in 1989. But the picture is changing. Equity flows quadrupled over the 1989-93 period, reaching a level of \$13.2bn in 1993. In short, developing country equity markets are evolving from virgin territory to an increasingly well-developed and well-researched arena for global finance.

4. *Behind the stampede*

Although regulatory changes in the international investment process account for much of the growth of foreign investment in emerging markets, they are probably not the sole cause of this capital stampede. First, 'pull' factors in developing countries and 'push' factors emanating from developed country markets, which have contributed to the enhanced profitability of emerging market investment, have fuelled a surge of interest in these frontier markets (Calvo, Leiderman and Reinhart, 1993; Chuhan, Claessens and Mamingi, 1993). Using a panel data approach, Chuhan et al. investigated the motivations for the observed large private capital inflows into the emerging stock markets (ESMs) in recent years. Specifically, they examined the relative importance of 'push' factors (that is, exogenous conditions in the international financial markets), and 'pull' factors (for example, endogenous domestic adjustment and reform policies) on US portfolio equity and bond flows to nine Latin American and nine Asian markets over the period January 1988 through September 1992. Their results confirmed the findings of Calvo, Leiderman and Reinhardt (1993) and indicated that global factors, such as US interest rates (which plunged precipitously over the period), and US industrial activity (which experienced a slowdown over the years 1989-1992), have been influential in motivating capital to flow out of the US and into the developing countries. Furthermore, they found country-specific factors, which reflect the opportunities and risks of investing in a particular country, to be at least as important in explaining these flows.^{9,10} Indeed, for the Asian markets, domestic variables were estimated to be three to four times more important than global factors in explaining the inflow of capital.

The high levels of real and nominal growth which have been earned by equities in many stock markets in developing areas, have also greatly increased the interest of foreign investors in the emerging markets (Hale, 1994; Kuczynski, 1994; El-Erian and Kumar, 1995; Smith and Walter, 1996). From the perspective of an international investor, these rapidly growing, less-traditional markets offer potentially higher rates of return, and provide an important means of enhancing portfolio performance (Greenwood, 1993). Furthermore, not only have investors expected extraordinarily high returns, but the international portfolio diversification (IPD) benefits have also been seen to be exceptional, due to the existence of relatively low correlations between emerging market stock returns and the returns of major market indices (Errunza, 1994; Speidell and Sappenfield, 1992). Additionally, the role of emerging markets in IPD has been enhanced in recent years. As the world economies have become increasingly interdependent, the correlations among the major equity markets have been rising. Consequently, the effectiveness of portfolio diversification via investment in developed markets has been somewhat reduced. But the returns in emerging equity markets have remained weakly and at times negatively correlated with those of the established markets of the world (Cabello and Ortiz, 1995). Indeed, a number of them actually display correlations with the US market that are on a downward trend, suggesting potential for increased risk reduction in the future (Speidell and Sappenfield, 1992).¹¹ The result is that international investors have been able to achieve both lower risk and higher returns by devoting a portion of their portfolio to the securities of emerging market firms (Divecha, Drach and Stefek, 1992; Speidell and

Sappenfield, 1992; Harvey, 1993, 1994). Attention has thus been drawn away from the conventional international investments of the past towards the promise of high-growth and diversification opportunities in parts of the world that had not previously participated in international portfolio investment.

5. Investing in emerging markets: the empirical evidence

The emergence of large financial flows to emerging markets has posed a number of important research questions concerning the potential benefits accruing to developed countries' investors from investing in these markets. A plethora of academic studies has investigated (1) the diversification benefits from direct investment in ESMs,¹² (2) the optimal method of achieving such benefits, and (3) the sources of these benefits. The arguments and evidence are convincing: they are unanimous in their suggestion that investors can reap substantial benefits from a strategy of careful diversification into equities traded in ESMs.

Evidence on the desirability of portfolio investments in the corporate securities of less developed countries was documented as early as the 1970s, in studies conducted by Levy and Sarnat (1970), Lessard (1973) and Errunza (1977).¹³ More recently, in the first comprehensive analyses of emerging markets, Harvey (1993, 1994, 1995b) provides an important contribution to the topical issue of diversification into such markets, with his examination of the impact of emerging equity markets on global investment strategies. Using monthly index returns for 20 ESMs, and data on 21 developed stock markets (DSMs) over the period January 1976 to June 1992, he investigated whether the addition of emerging markets to the portfolio optimisation problem enhanced the reward to risk profile for his

sample by shifting the mean-variance efficient frontier to the left. This analysis was based on allocations to (1) developed markets (2) developed and emerging markets, and (3) developed and emerging markets with an upper limit of 20 per cent placed on emerging market investment. Two basic investment strategies based on the same allocations were also evaluated. The first strategy involved choosing the minimum variance portfolio, and the second strategy was based on the objective of selecting a portfolio with a target volatility of 16 per cent. His graphical analysis of the mean-variance frontiers suggested that inclusion of emerging market assets into a globally-diversified portfolio greatly increased investment possibilities; a sharp movement upwards of the frontier occurred upon the introduction of emerging market securities, even when they were restricted to 20 per cent of the investment portfolio.

This finding corroborates past studies which suggest that theoretical gains exist from diversification into emerging stock markets because of a shift in the mean-variance efficient frontier (for example, Bailey and Stulz, 1990,¹⁴ Bekaert, 1993, 1995; Diwan, Errunza and Senbet, 1993). However, recognising that such an analysis is limited in that it says nothing about the statistical significance of diversification benefits, Harvey extended his work by calculating whether the risk-return combinations of developed markets offer investors the same possibilities as the combinations provided by developed and emerging markets, using the test statistic developed by Shanken (1986), Huberman and Kandel (1987) and Jobson and Korkie (1989). He found that the observed upward shift in the frontier was not only dramatic but also statistically significant. This finding confirms the earlier results of De Santis (1993), who used a somewhat different approach to investigate this same question. By exploiting

the mapping between the Hansen-Jagannathan bounds and the more traditional mean-variance frontier for asset returns, De Santis found that statistically significant changes in the volatility bounds occurred when emerging market returns were added to the investment opportunity set. These results indicate that investors who are already diversified across developed markets can significantly improve the performance of their portfolios by also investing in the stock markets of emerging economies.¹⁵ Performance measures for each of the strategies which were evaluated further confirmed the benefits from ESM investment: the strategies which included an emerging market component consistently outperformed other strategies that were restricted to developed markets only. Thus Harvey's conclusion that his results 'suggest an unambiguous benefit to diversifying into emerging markets' would appear to be wholly justified (1994, p.12).

The argument that ESMs have an important role to play in effective diversification has been cogently argued in the substantive literature. Consequently, researchers have set out to determine the best way of exploiting the 'diversification free lunch' that is currently available (Divecha, Drach and Stefek, 1992, p.50). In examining the effect of adding an emerging market equity component (the IFC Composite index) to portfolio A, a domestic portfolio of US shares, and portfolio B, a market capitalisation-weighted, indexed international portfolio, Hartmann and Khambata (1993) confirm the benefits from emerging market diversification: an investment of any size in the IFC Composite increased portfolio efficiency for both domestic and international investors, regardless of their risk attitudes¹⁶ - although they argued that an investment of less than 20 per cent in the IFC Composite was 'suboptimal from the standpoint of either

portfolio A or B', (p.97). Writing from the perspective of a UK investor, Avgoustinos, Lonie, Power and Sinclair (1994) found similar results. In particular, they argued that the case for emerging market diversification applies even when the ESM commitment is as high as 90 per cent of portfolio value, although their mean return per unit of risk (MRPUR) optimal portfolio had a slightly smaller weighting of 80 per cent towards emerging markets. This issue of optimal weighting however is contentious. For example, Divecha et al. (1992) argue that a diminution in diversification benefits occurs beyond a 20 per cent ESM component, while other writers advocate a still more prudent 10 to 15 per cent ESM weighting (for example, Speidell and Sappenfield, 1992; Poshakwale, 1996). In contrast to the unanimity expressed by many researchers regarding the existence of benefits from emerging market diversification, the issue of how large a portion of one's portfolio should be devoted to the securities of developing countries is controversial. In the end however, despite the controversy, all of these studies carry the same simple, but important message: international investors are foregoing substantial diversification benefits by underweighting the ESM component of their investment portfolios. The proportion of portfolios devoted to emerging market assets is well below even the most conservative of weightings (10-15 per cent) suggested by some commentators.¹⁷

The optimal composition of the emerging market component of a portfolio has also been addressed in several investigations. An important insight into this issue is provided in the Hartmann and Khambata (1993) study. Their analysis suggests that investment in an ESM component whose weights do not conform to weights in the IFC Composite

index can result in considerable improvements in the risk/return tradeoff. Furthermore, Hartmann and Khambata posit that diversification benefits vary according to the geographic composition of the ESM component: the risk, return and efficiency of their test portfolios altered dramatically with changes in the geographical composition - even when the emerging market investment represented only 20 per cent of the total portfolio. The subsequent results of Avgoustinos et al. (1994) corroborate this finding. Their MRPUR optimal portfolio consisted of four non-indexed ESM components from different geographical regions. Importantly, however, these analyses do not dispute that gains are available from investment in a single geographical area. Indeed, considerable evidence demonstrates the diversification value of investment which is concentrated in the emerging economies of a single region. For example, studies by Bailey and Stulz (1990), Greenwood (1993) and Poshakwale (1996) are unanimous in their conclusion that investment in Asian markets can yield substantial diversification benefits.¹⁸ A similar result has been obtained for the Latin American region, most notably in an early study by Lessard (1973).

6. An industry or a country effect?

Since the benefits of international diversification were first documented, attempts have been made to decompose risk and return into their component sources in order to explain the low comovement between these markets' returns, and the cross-sectional differences in the volatility of returns. In particular, researchers have examined the competing influences of country and industry effects in international stock returns. Recently, the focus of this country and industry research has turned to the emerging markets, although

empirical evidence remains scarce.

For 19 ESMs, Zervos (1996) quantified the importance of country and industry components in individual stock returns over the period 1976-1992. By employing a fixed effects model her analysis overcomes the problems inherent in the estimation procedure of earlier papers by Grinold, Rudd and Stefek (1989) and Divecha et al., (1992). Using the industry portfolio returns to approximate for industry factors and country index returns to proxy for national factors, these earlier papers were unable to disentangle the two components. Additionally, Zervos extended the analysis of these early papers by examining the behaviour of country and industry effects over time, and throughout a period when many of the sample countries removed barriers to inward investment. Thus, during the sample period many of the sample countries became more integrated into the world economy and thus became more susceptible to general movements in world stock returns. Hence, the country-specific component of returns may have diminished in importance over the time period, with a corresponding increase in the strength of the industry component. Similar to the results for emerging markets (Errunza, 1983; Errunza and Padmanabhan, 1988; Grinold et al., 1989; Divecha et al., 1992), and for most investigations into developed markets,¹⁹ Zervos found that although both country and industry specific disturbances are important factors in understanding emerging market returns, industry effects explain little of the cross-sectional differences in returns and return volatility across markets, and that the low correlations between markets are primarily due to country-specific sources of return variation.²⁰ Additionally, results indicated that country effects have become more significant through time, while the impact of industry effects have declined

sharply since 1986 - a result which contradicts the conventional wisdom that increasing market integration should have reduced the importance of country effects.²¹ Furthermore, in comparing emerging and developed markets, Grinold et al. and Divecha et al. suggest that whilst there exists a dominant country factor in returns from both sets of markets, country effects play a larger role in explaining emerging market returns than in explaining developed market returns, with industry effects explaining a larger portion of developed market returns than emerging market returns. Thus, security returns tend to be more homogeneous in the emerging markets than in developed markets.

This relatively greater homogeneity has important implications for the management of global investment portfolios. By investing internationally, a portfolio manager achieves risk reduction through the benefits of both geographical and industrial diversification. Importantly however, the robust finding that country effects are larger than industry effects in both emerging and developed markets suggests that the performance of international portfolios is largely country driven. Consequently, the most critical aspect of emerging market (and DSM) investment is country selection. The importance of country selection in emerging markets investment is exemplified in the Hartmann and Khambata (1993) study. The performance of three portfolios consisting of equally-weighted investments in three different emerging markets from three different geographical regions illustrated the enormous impact that country selection can have on both portfolio risk and return; huge disparities existed in the risk and return of each of the three test portfolios.

7. An overstatement of gains?

All too often the benefits from diversification

have been analyzed in the classical *ex post* mean-variance framework, which assumes that the required inputs to the analysis (returns, variances and covariances) are known with certainty (for example, Levy and Sarnat, 1970; Errunza, 1977; Bailey and Stulz, 1990, Diwan et al., 1993). Thus the gains from IPD are computed on the assumption that the portfolio manager is prescient; empirical studies do not therefore reflect the realities under which actual investment decisions are made. For the practitioner, the non-stationary nature of the inputs renders the selection of an optimal investment strategy extremely difficult. Such an exercise becomes even more precarious, however, if the variance-covariance/correlation matrices between market returns display inter-temporal instability, for it is *ex ante* stability of the correlation matrix that provides the fulcrum for the portfolio investment decision.

Although a substantial body of (conflicting) evidence addresses the issue of correlation matrix (in)stability in developed stock market relationships,²² very little research has examined this topic for ESMs. In the most comprehensive analysis of correlation matrix stability in emerging market relationships to date, Sinclair, Power, Lonie and Avgoustinos (1994) examine monthly return indices for nine ESMs from four geographical regions, over the period 1977-1992. Employing an array of techniques, the authors concluded that, except for the period spanning the October 1987 crash, 'no signs of stability were identified in any of the time-series patterns of the variance/covariance matrices', (p.17). This confirms the earlier results of Cheung and Ho (1991), who investigated the issue of stability for seven Asian-Pacific ESMs and four DSMs over the period 1977-1988. However, results from their principal component analysis indicated that

the correlation structure became more stable over longer time horizons. Additionally, cluster analysis revealed the existence of some prime clusters (for example, Malaysia-Singapore) which persisted over a long time period, although with the exception of these observations, the Asian-Pacific markets did not appear to have any stable clustering pattern. This evidence therefore, does not appear to obviate the general result that the correlation matrix is unstable over time.²³

Given the multitude of tests that have been performed on a broad cross-section of ESMs, over a lengthy time period, it seems reasonable to conclude that, despite the relative paucity of research examining this issue for emerging markets, the inter-temporal correlations between returns may be insufficiently stable to permit first, the generation of optimal portfolios on an *ex ante* basis and second, the exploitation of the theoretical gains available from IPD on an *ex post* basis. Although not in abundance, evidence does exist suggesting that the employment of a simple strategy to forecast covariance matrices can result in effective IPD (for example, Elton and Gruber, 1973; Elton, Gruber and Urich, 1978; Sinclair, Power, Lonie and Avgoustinos, 1994). Focusing exclusively on ESMs, Sinclair et al. investigated whether the theoretical gains documented in *ex post* analyses of IPD can also be achieved in practice. More specifically, using *ex post* mean returns and standard deviation of returns, and calculating the simple moving average of the correlation matrices over some past period as a forecast of the correlation matrices for the future, the authors examined whether, given the best possible estimates of means and standard deviations, an *ex ante* correlation matrix could achieve the same IPD gains as those earned on an *ex post* basis. Their results are

promising: in all subperiods examined, the *ex ante* strategy delivered approximately the same gains as the *ex post* strategy - indicating that the portfolio manager may be able to achieve a sizeable portion of the theoretical gains documented in *ex post* analyses of IPD.

8. Integration and the sustainability of emerging market diversification benefits

The historical evidence is therefore clear; the literature suggests that, due to competitive rates of return and low cross-country correlations, emerging markets have offered attractive investment and diversification opportunities for the foreign investor. In turn, these benefits have, most likely, attracted the large portfolio investment inflows to these markets in recent years. An important question concerning these diversification benefits however, is the extent to which they are sustainable in the future. Given that the benefits of diversification depend on the degree of market integration/segmentation and the degree of correlation among markets, the concern is that as emerging markets become increasingly integrated with world financial markets, return correlations will rise and hence the benefits from diversification will decline.

A number of approaches have been adopted in the finance literature to test for and measure the degree of market integration/segmentation.²⁴ The first approach has been to explicitly model barriers to capital flows and to determine whether a market integration or segmentation model best describes the structure of emerging capital markets. Errunza and Losq (1985a) developed and tested a 'mild segmentation' model and found tentative support for the mild segmentation hypothesis for a group of emerging markets. In a later paper, Errunza, Losq and Padmanabhan (1992) tested the two polar cases of (1) complete integration and (2)

complete segmentation, using stock level data for eight ESMs over the period 1975 to 1987. They rejected complete integration for all eight markets, and complete segmentation for five markets, and concluded that their results provided 'strong evidence in favor of a nonpolar structure', (p.968). Two problems render their analysis questionable however. First, all three hypotheses were rejected for India, thus casting doubt on their market classification scheme. Second, the use of the US as the world portfolio would appear to be a poor proxy given that, over the sample period, the US represented only two-fifths of the world market capitalisation (Buckberg, 1993, 1995). Additionally, their analysis sheds no light on the variations in the degree of integration/segmentation of emerging markets over time.

The second approach has been to assume market integration and the validity of a particular asset pricing model. Tests have centred on the use of both the single factor capital asset pricing model (CAPM) and more complex multifactor models. In a single factor CAPM, tests of market integration and diversification benefits are identical; deviations from integration amount simply to unexploited diversification benefits. Using the world portfolio as a benchmark for measuring risk, Bekaert (1993, 1995) and Harvey (1993, 1995a, 1995b) reported that the single factor CAPM was unable to explain the cross-sectional variation in emerging market returns - thus confirming the benefits from diversification. Moreover, Bekaert noted that, for the more recent time period, betas have increased for most emerging markets - a result that he claimed 'indicate(d) a higher degree of integration with the industrial world', (1995, p.91). Buckberg (1993, 1995) confirmed the increasing integration of emerging financial markets. Testing the conditional International Capital Asset Pricing Model (ICAPM) over

two different time periods, she found that 14 of the 20 ESMs considered were integrated over the 1985-1991 period, but that many of the same markets rejected the model using data from 1977-1984 - indicating that fewer emerging markets were integrated in this earlier period. Noting that this earlier period marked a time when emerging markets were effectively isolated from world capital markets, Buckberg conjectured that the rising equity capital inflows from developed markets that took off in the late 1980s served as the mechanism for this integration and the associated decline in diversification benefits. Using a multifactor model, Harvey confirmed this finding that emerging markets were becoming increasingly integrated over time. In particular, Harvey found first, that global risk factors insufficiently characterise returns in emerging markets, and second, that the exposures of many emerging markets to these global risk factors have increased in recent years. Harvey attributed this increased ability of exposures to account for the cross-sectional variation in emerging market returns as evidence of greater, although not full, integration. Similarly, Bekaert and Harvey (1995) developed an asset pricing model where risk exposures and premiums were allowed to change over time conditional on world and local market factors, and found that some emerging markets have become more integrated. However, their results also suggested decreasing integration for some markets.

Integration tests utilising specific asset pricing models however, are hampered by the lack of a well-established asset pricing framework. Thus, it is unclear whether to attribute rejections to (1) the model or to (2) a lack of integration. This, coupled with recent evidence suggesting the existence of significant time variation in emerging market

returns,²⁵ has led to a third approach to measuring integration. More specifically, researchers have attempted to test whether ESM returns can be predicted using a common set of world factors. The finding of commonality in factors driving predictability is then suggestive of integration. However, on employing both global and local variables to investigate the predictability of returns in emerging markets over time, Bekaert found no clear pattern on how predictability has changed for individual emerging markets over time. For example, he discovered that predictability arising from global factors was actually stronger in the pre-1985 period for five markets, compared to the 1985-1992 period.

The fourth approach to investigating market integration is to examine actual investment patterns. Any evidence of 'home bias', although not rejecting capital market integration, would suggest that investors act as if markets are segmented. On examining US equity investment in emerging markets over 1978 to 1991, Tesar and Werner (1993, 1995) documented a significant home bias towards domestic securities; over the sample period, 96 per cent of the equity portfolio chosen by US residents was invested in domestic equities. However, they found that the amount recently invested in emerging markets, as a share of total US foreign investment, was proportionate to the global market capitalisation value of these markets - suggesting that, at the margin, they are becoming part of the global investment orbit. Consequently, the evidence suggests that emerging markets are becoming *de facto* integrated.

The evidence to date therefore indicates that emerging markets have become more integrated in recent years. The concern now is that, with this increasing economic and capital

market integration, a diminution in diversification benefits will occur and consequently, the appetite of the international investment community for the shares traded in emerging markets will be reduced. However, a number of qualifications are in order. First, despite the evidence that emerging markets have become a larger part of the global financial market since the late 1980s, empirical studies investigating the gains from IPD for emerging market investment over the same period indicate that such investment has continued to offer significant diversification benefits for international investors (for example, Speidell and Sappenfield, 1992; Avgoustinos et al., 1994); so long as markets are imperfectly integrated, diversification will reduce risk. Second, Bekaert (1993, 1995) found no significant relationship between the risk-return tradeoff and market integration and measures of market openness, suggesting that the concern of increasing capital market integration leading to lower diversification benefits may in fact be ill-founded.²⁶ Third, market integration does not eliminate all of the reasons for international investors to invest in these emerging markets; investors in emerging stock markets may gain access to shares in industries that either do not exist or are inaccessible in the domestic market. Additionally, this broader choice of securities amounts to a wider range of investment opportunities even if capital markets are fully integrated and cross-country correlations are high (Lonie, Power and Sinclair, 1993). Fourth, a new wave of markets are still in the very early stages of development (for example, markets in Africa, Central America, Eastern Europe and the Middle East), and they therefore represent new frontiers that promise investors similar rewards to those provided by the larger emerging markets over the last decade.

9. The predictability of emerging market returns

Recent years have seen a proliferation of papers in finance investigating the predictability of rates of return, in both the developed and emerging equity markets. The approaches used to test for return predictability over time can be divided into two categories. The first approach has attempted to measure the extent to which stock prices are forecastable from past price behaviour alone. The second approach uses information variables observable at the start of the holding period to forecast returns over the period. The evidence suggests the presence of predictable time-varying components in returns earned by emerging market equities. Moreover, results from at least one approach (the information variable approach) suggest that this predictability can be successfully exploited to reap substantial gains from an IPD strategy directed towards the emerging markets (Harvey 1993, 1994).

The notion of a random walk is central to testing the ability of past returns to predict future returns. Random Walk theory, when applied to share prices, assumes that successive price changes are independent and identically distributed over time. Thus, if prices follow a random walk, then the price change of yesterday should not be related to the price change of today, or any other day. This in turn implies that historic returns cannot be used to successfully predict future returns. The principal test of the hypothesis is to investigate whether share price movements are serially correlated. Results from these analyses have generally indicated that daily, weekly and monthly emerging market returns are predictable from past returns. For example, Claessens et al. (1993, 1995) estimated the first and second order autocorrelations for the monthly returns of 20 ESMs over the period 1976 to 1992, both at

the market index level and, alternatively, using size-based sub-portfolios of each market's shares. Results from their analysis of national indices indicate that first-order autocorrelations were significant for nine of the twenty emerging economies, with seven markets displaying first-order autocorrelations higher than 0.2. These highly autocorrelated returns, which are indicative of return predictability and possible inefficiencies, are in sharp contrast to the findings for the index returns of developed markets, where autocorrelations are typically close to 0.0. A similar picture emerged when the size-based portfolios in each market were examined: significant autocorrelations were found for 25 of the 76 portfolios. Additionally, there appeared to be no pattern in the autocorrelations across the portfolios. The evidence therefore indicates a high predictable component in the returns from emerging markets that is unrelated to size. Such a conclusion has extensive support: similar results are documented (1) by Cooper (1982), Buckberg (1993, 1995), Harvey (1993, 1994, 1995a, 1995b) and El-Erian and Kumar (1995) for the daily, weekly and monthly index returns of a broad cross-section of ESMs, (2) by Bailey and Stulz (1990) for the daily index returns of nine Pacific Basin capital markets, (3) by Poshakwale (1996) for the daily index returns of four Asian markets, and (4) by Ramcharran (1995) for the weekly index returns of the Trinidad and Tobago Stock Exchange. Furthermore, the evidence of Buckberg and Harvey suggests that autocorrelations of index returns for many emerging markets are not lower for the more recent time period - indicating that, despite the increased integration of emerging markets with the rest of the world, the predictability of returns and prices has not declined.²⁷

A second technique adopted in the literature

to test the random walk hypothesis in emerging market share price movements examines the number of 'runs' in the data. Despite overcoming a number of the shortcomings inherent in tests using serial correlation, runs analyses have yielded essentially similar results. Studies by, for example, El-Erian and Kumar (1995), Ramcharran (1995) and Poshakwale (1996) found a statistically significant difference between the actual and expected number of runs for the returns of their sample countries, suggesting the absence of randomness that was indicated by their serial correlation analyses.²⁸

A third, and more sophisticated, approach adopted in the literature to study the predictability of stock market returns has been the application of variance ratio models. These tests are more sophisticated in the sense that they not only test for the presence or absence of a random walk component in emerging market returns, but also attempt to measure the importance of any random walk component to the behaviour of the data series. Applying the Lo-MacKinlay (1988) test statistic to the monthly returns of 20 emerging economies over the period 1976 to 1992, Claessens et al. rejected the null hypothesis that rates of return are independent and identically distributed for several markets. More specifically, using holding periods of two and four months to form the variance ratios, the authors rejected the random walk hypothesis for the index returns of seven economies, with test statistics suggesting positive autocorrelations in both two and four month return horizons. Furthermore, the variance ratios were higher for the four-month period than for the two-month period, with the rejections also at higher significance levels for the four-month period. Estimating the variance ratios at the portfolio level also led

to a rejection of the random walk hypothesis; this rejection was similar for both small-size portfolios and large-size portfolios. Specifically, using two month holding-period returns, the hypothesis was rejected for 15 of the 76 portfolios and, using four month holding-period returns, for 23 portfolios. Again, the number of rejections was higher for the longer horizon. Additionally, the results showed a close correspondence between the economies for the different tests of independence; the variance ratios for both the portfolio results and the individual index findings were negative for the same markets. Results from variance tests performed by Spyrou (1996) provide further supporting evidence: both the Lo-MacKinlay test statistic and the Cochrane (1988) measure of persistence rejected the random walk hypothesis for the monthly index returns of all ten ESMs studied, thus, clearly indicating the presence of a predictable component in equity returns.²⁹ Results from these variance ratio tests generally confirm the results obtained with the autocorrelation approach.

A more recent paper by Richards (1996) expands on this research by (1) testing for the long-horizon predictability of returns in emerging stock markets, based on their own history, and (2) employing tests that have previously been applied only to data on developed markets. In particular, using quarterly data for 16 ESMs over the period December 1975 to September 1995, Richards adopted the regression approach of Fama and French (1988), to examine the predictability of returns for horizons of up to three years. Although hampered by the relatively short data sample available, the results from Richards' analysis indicated that the null hypothesis of no temporal dependence in returns could be rejected in several cases, therefore providing some evidence of emerging market return predictability, both in

the short and long term.³⁰ Additionally, results for short horizon returns appear to be qualitatively consistent with the autocorrelation estimates of Claessens et al., (1993, 1995) in one and two month returns; all rejections at the three and six month horizons suggested a pattern of positive autocorrelations. However, results for longer horizons (12, 24 and 36 months) revealed a pattern of negative autocorrelations, which are indicative of price reversals. In particular, six of the nine rejections made at longer horizons indicated negative autocorrelations.

By employing the 'winner-loser' methodology developed by Debondt and Thaler (1985) in their study of US equities, Richards also tested for the long-horizon predictability of relative returns earned in emerging markets. Results suggested emerging market return predictability, in both the short and long term. More specifically, at short horizons, returns appeared to be positively autocorrelated, indicating that those countries initially identified as winners (losers) continued to exhibit overperformance (underperformance) in the subsequent period. However, at longer horizons of one year or more, there was evidence of negative autocorrelations in returns, suggesting that countries have a tendency to undergo a reversal in their relative performance.^{31,32}

Seasonal or cross-sectional patterns in rates of return can also be considered under the rubric of return predictability; evidence of persistent cross-sectional patterns in equity returns would suggest that returns might be predictable. For example, if stock returns exhibit recurrent seasonality, such that returns differ according to the day of the week or month of the year in which they are measured, then investors can predict higher or lower returns for particular time periods. Although evidence is scarce, cross-sectional analyses of ESM return behaviour have

recently been undertaken (Aggarwal and Rivoli, 1989; Lee, Pettit and Swankoski, 1990; Kim, Chung and Pyun, 1992; Lee, 1992; Claessens et al., 1993, 1995; Poshakwale, 1996; Spyrou, 1996).

Investigating the existence of a seasonal (monthly) effect at both the index and portfolio level for the returns of 20 ESMs, Claessens et al. found only limited evidence of a seasonal effect. For example, results from their non-parametric Kruskal-Wallis test indicated rejection of equality of mean returns for all months for only three of the twenty markets examined. Additionally, on testing the relationship between return seasonality and size-based portfolios, little evidence was found to support the argument that seasonal effects varied with the market capitalisation of the shares. The authors also tested whether mean returns for (1) the turn-of-the-tax-year-month, and (2) January were significantly higher than for any other month of the year. Results showed that, unlike developed markets, the turn-of-the-tax-year effect is not prevalent in many emerging markets. Furthermore, no relationship was found between this effect and market size. Similarly, no January seasonal effect was found. This result is consistent with the findings of Lee (1992) for the Korean stock market, and is generally confirmed by Spyrou (1996), who concluded that, for his sample of ten markets, there was only 'very weak' evidence of a January effect, (p.21). Conflicting evidence can be found in Aggarwal and Rivoli (1989), Kim et al. (1992) and Lee (1992). For example, focusing on the Korean market over 1980 to 1988, Kim et al. found evidence of a January effect, which actually became more pronounced over the period 1984 to 1988 as the market became increasingly globalised.

Further evidence on seasonality is documented by Spyrou, who also tested for

day-of-the-week effects. In particular, he tested the Weekend or Monday effect, which implies that mean daily returns are significantly lower (or even negative) on Mondays, than on any other day of the week. Results from both parametric and non-parametric tests (for ten ESMs over the period 1990 to 1994) indicated a statistically significant negative Monday return and a statistically significant positive Friday return. Similar results have been reported in studies by Aggarwal and Rivoli, Lee et al. and Poshakwale for a sample of Asian markets. This evidence is therefore indicative of a strong and predictable pattern in the daily returns of emerging market shares.

The evidence from a battery of tests, and on a large and varied sample of emerging markets, clearly suggests that a significant predictable component exists in the rates of return earned in these emerging markets. In particular, the results indicate first, that past prices may contain information relevant for the prediction of future prices both in the short and long term, and second, that many emerging markets exhibit predictable patterns in daily returns. Furthermore, this predictability is not related to firm size.

Recently, researchers have used a number of information variables, both global and local, to examine whether predictable components exist in the returns earned on investments in emerging markets. The approach has attempted to replicate the information set which is available to investors when they predict prices. That is, information variables known at the start of the holding period, time $t-1$, are used to forecast returns over the holding period. Results from these analyses have offered powerful insights into the predictability of returns for emerging market equities.

To analyse the predictable variation in ESM

returns, Harvey (1995b) ran linear regressions of the monthly index returns from 20 ESMs on three sets of information variables. The first set consisted of four global information variables, which were identical for all markets.³³ The second information set comprised four local variables, which were specific to the country under examination.³⁴ The third set of variables combined both the world and local information variable sets. Including both sets of factors in the regressions allowed for an assessment of the relative importance of global versus local components in the predictability of ESM returns. Results from the regressions are striking, and suggest a significant predictable component in ESM returns. For example, regressions on the world information variables showed nine of the twenty markets to be significantly influenced by world information, while the regressions on the local information variables suggested local information was important for 11 markets (at the five per cent level of significance). Regressing emerging market returns on the combined information set showed 12 regressions were significant at the five per cent level, while 14 regressions were significant at the ten per cent level of confidence. Using slightly different information sets, Bekaert (1993, 1995) and Harvey (1993, 1994) report similar results.³⁵ Perhaps the most striking findings emerge from the investigation of the relative importance of the global and local variables in Harvey's analysis. For example, on performing an exclusion test of the local information variables, he found that, in the 12 countries with significant regressions, ten were affected to a large extent by local information. Additionally, variance ratios suggested that local information accounted for more than half of the predictable variance in the returns of emerging markets. Supporting evidence is again documented in the studies of

Bekaert and Harvey. This finding is, of course, consistent with the notion that some of these markets are segmented from world capital markets. Although, in examining the movements in predictability over time, Bekaert found no discernible pattern. For example, he discovered that predictability arising from global factors in five markets was actually stronger in the period 1976-1985 than in the 1986-1992 period.

An interesting point to emerge from these studies concerns the predictive power of lagged local returns in explaining future equity performance. Given that returns in emerging markets are widely reported to be highly autocorrelated, it may be expected that local rates of return should predict future returns. Harvey found however, in his combined information set regressions, that only three countries had significant coefficients on the lagged local return variables. Similarly, Bekaert found that some of the rejections of the null hypothesis of no predictability were driven by the predictive power of the local dividend yield, and not the lagged local return. This finding is consistent with the results of Buckberg (1993), although she indicated that in a 'number of cases' return predictability was 'substantially improved' by the addition of lagged local returns into the regression equations (p.176).

The above literature focuses only on the statistical significance of the predictable time variation in ESM returns. A more relevant issue for the formulation of *ex ante* investment strategies is the exploitability, or economic significance, of this observed predictability. Although the economic significance of using past returns to predict future returns has not been investigated, (in a univariate model at least), recent work has focused on the performance of dynamic investment strategies based on a conditioning information set consisting of both global and

local variables (Harvey, 1993, 1994). The results suggest that portfolio strategies using conditioning information to predict emerging market returns produced impressive out-of-sample performance over the period 1980 to 1992. Moreover, performance was also considerably better than the performance of the traditional (unconditional) asset allocation strategies. The comparison of performance measures for the conditional and unconditional minimum variance strategies revealed that, for each allocation, the conditional strategy earned a higher return for each unit of risk. However, the most startling differences relate to the target volatility strategies. For example, the conditional developed and capped emerging market allocation realised a return of 39.3 per cent, while its unconditional counterpart achieved a poor 12.09 per cent return. Similarly, and even more dramatically, the conditional developed and emerging market allocation posted an impressive 54.96 per cent return, while the unconditional strategy managed a poor 13.48 per cent return. Differences in performance between the strategies were also manifested in the year-by-year performance; while the conditional target volatility allocations experienced a small negative return of 0.49 per cent in 1982, the unconditional allocations sustained serious losses in several years. The analysis therefore indicates that, while the low correlations of emerging market returns with developed market returns improve investment opportunities, the 'most striking advantage' of ESM investment relates to the high degree of predictability of the returns; exploiting this predictability can lead to a sharp improvement in portfolio performance, (p.20).

10. Emerging stock market volatility

Recent empirical literature on emerging stock

markets has concentrated on their volatile nature. Generally, emerging stock markets have been characterised by both high average volatility and a wide dispersion of volatility. Furthermore, both the magnitude and the range of volatility in ESMs are much greater than that found in DSMs.³⁶ Noting these essential characteristics of emerging markets, recent empirical investigations have attempted to provide an understanding of (1) the nature, and (2) the determinants, of both the time-series and cross-sectional behaviour of emerging market volatility.

In examining the temporal behaviour of volatility, Richards (1996) tested the proposition that emerging stock market returns have become more volatile in recent years. The motivation for his research arises from the concern that, in recent years, emerging markets have become more volatile, and will continue to experience greater volatility, as the 'scale of institutional involvement' increases (Howell 1993a, p.82). This concern stems largely from the view first, that institutional investors demonstrate 'herdlike' behaviour in their investment decisions (Gooptu, 1993), and second, that foreign portfolio investment consists primarily of volatile 'hot money', with positive inflows in a strong economy and negative inflows in a weak economy. This behaviour of portfolio flows is believed to have a potentially deleterious effect on emerging economies, as well as introducing excessive volatility into stock prices (Velasco, 1993). The results from Richard's analysis seem to suggest that for the 1975 to 1995 period, there was 'no tendency for an increase' in volatility while the period 1992 to 1995 was actually characterised by lower volatility than the earlier sample period - despite greater participation in emerging markets by foreign institutional investors, (p.476). This result is supported by several

studies that examine the behaviour of stock prices following capital market liberalisation. For example, Bekaert and Harvey (1997) found that, in most of their sample countries, volatility decreased following market liberalisations. Similarly, on estimating changes in volatility around stock market openings for 20 ESMs, Kim and Singal (1993) found a 'significant decrease' in volatility after a one-year lag, (p.382). However, further analysis indicated that domestic factors, rather than market opening, accounted for the observed volatility changes.³⁷ This is confirmed by Jun (1993) who examined the effect of capital market liberalisation in Korea and found insignificant contemporaneous effects on the volatility of returns. These findings also corroborate Bekaert (1993, 1995) who found that (1) volatility was unrelated to his measure of market openness, and (2) volatility was negatively correlated with his measure of market integration. Similarly, in addressing the concern about the impact of international investment on emerging market equity return volatility and turnover, Tesar and Werner (1993, 1995) found no evidence of a relationship between the volume of US transactions in emerging market equities and local market return volatility or turnover - thus suggesting that US investment activity does not contribute to either return volatility or higher turnover in ESMs. In sum, the results from these analyses suggest that the fear that greater participation by foreign investors in emerging markets will lead to greater ESM price volatility may in fact be ill-founded.³⁸

A further concern voiced by some commentators relates to longer-term volatility. In particular, it has been suggested that share prices in emerging markets may be subject to regular persistent swings away from fundamental values, followed by strong price

reversals (for example, Velasco, 1993; Smith and Walter, 1996). Indeed, in a provocative article, Krugman (1995) argues that recent equity increases in emerging markets are a 'classic speculative bubble', possessing no more substance than the investment mania in Dutch tulips in the seventeenth century, (p.35). Richards (1996) investigated the possibility of long swings in share prices, followed by return reversals. The results appear to lend credence to the 'apprehension expressed by some authors about the possibility of speculative bubbles in emerging markets', (p.481). Richards also considered the possible importance of fads or bubbles in emerging markets, by comparing the magnitude of both the autocorrelation coefficients and the return reversals of emerging markets with those of the developed markets. This comparison indicated that (1) neither emerging nor developed markets demonstrated full mean reversion, and (2) while the magnitude of reversals in emerging markets was larger than in developed markets in absolute terms, the reversals may in fact have been smaller in relative terms when considering the magnitude of the ranking period return differentials - therefore suggesting that over the 1975-1995 sample period, fads or bubbles in emerging markets have not been more important than those in some developed markets.

Another strand of the literature has attempted to explain both the time-series and cross-sectional variation in emerging market volatility. For example, Bekaert and Harvey (1997) investigated the time-varying influence of world factors on the variance of returns from 19 ESMs over the period 1976 to 1992. Of their 19 sample countries, 17 had experienced significant capital market liberalisations during the sample period; consequently, they facilitated an examination of the influence of world factors on emerging

market volatility across regimes. The results indicated that, over the full sample period, the average proportion of volatility attributable to world factors was typically small; in only three countries was the explanatory power of world factors greater than ten per cent. However, the influence of world factors increased following capital market liberalisation; in 11 of the 17 countries that underwent liberalisation, world factors assumed greater significance in the post-liberalisation period. For example, Mexico experienced a threefold increase in the proportion of variance explained by world factors, while in several markets the increase was more than double. In light of these results, Bekaert and Harvey argued that there is a link between the importance of world factors in explaining emerging market returns and the level of market integration; world factors strongly influence volatility in more integrated emerging markets, while local factors play a more prominent role in segmented emerging markets.³⁹ Noting the wide dispersion in volatility across emerging markets, Bekaert and Harvey also attempted to explain the cross-sectional variation in volatility. In particular, they constructed variables that proxied for four different sources of volatility differences: (1) asset concentration, (2) the stage of stock market development and the degree of market integration, (3) microstructural effects, and (4) macroeconomic influences and political risk. Results suggested a significant negative relation between volatility and the ratio of market capitalisation to GDP (stock market development), the size of the national trade sector (degree of market integration), and the credit rating of a country (political risk).⁴⁰ A significant positive relationship was found between volatility and changes in the foreign exchange rates (macroeconomic influences).

In contrast, asset concentration and microstructural effects appeared to explain little of the cross-sectional dispersion in emerging market volatility.⁴¹ Further evidence on cross-sectional emerging equity market volatility is documented in Erb, Harvey and Viskanta (1995b), who found a sharply negative relation between inflation and volatility. In particular, average inflation explained 29 per cent of the cross-sectional variation in the average equity return volatility.

A number of empirical investigations into ESM volatility have detected patterns in the behaviour of volatility over time. In particular, evidence from several studies indicates a clustering, or persistence, in the volatility of returns from emerging markets. For example, using a GARCH-M (1,1) model to analyse emerging market stock return volatility over the period 1976 to 1992, Fraser and Power (1996) found that returns in eight of the nine emerging markets they considered could be characterised as an ARCH or GARCH process, suggesting a tendency of volatility shocks to persist over time. This finding is consistent with the results obtained by Sewell, Stansell, Lee and Pan (1993) for a group of five Asian stock markets, and with the results of Koutmos, Negakis and Theodossiou (1993), who found a high degree of persistence in the volatility of equity returns traded on the Athens stock exchange.

In an attempt to explain the underlying behaviour pattern of emerging market volatility, Fraser and Power investigated whether the flow of information to these markets can at least partially explain the observed persistence in share return volatility.⁴² In particular, using the unexpected changes in market value as a proxy for the arrival of information to the marketplace, Fraser and Power tested whether

the observed ARCH or GARCH effects found in emerging market returns disappeared on inclusion of their news variable into the model. The results indicated that, for most of their sample markets, the observed volatility persistence was related to the flow of information to these markets; with the exception of Mexico, the ARCH or GARCH effects disappeared on addition of the news proxy to the model.⁴³ In a subsequent paper, Fraser and Power (1997) examined two competing information arrival hypotheses for five Pacific Rim markets, the UK and the US market: (1) the simultaneous information arrival hypothesis,⁴⁴ and (2) the sequential information arrival hypothesis.⁴⁵ The results from the analysis showed the behaviour of return volatility differed markedly across markets. Indeed, Fraser and Power concluded that 'one of the striking features of the results' was the 'relative heterogeneity among the different markets', (p.14). For example, the sequential information arrival model was supported only in the Malaysian market, while the Hong Kong market was the only market supportive of the simultaneous information arrival model. The western developed markets in the sample produced no evidence favouring either information arrival hypothesis. On investigation of the relationship between stock market performance and future volatility, Fraser and Power also found that returns in the Malaysian market showed particular sensitivity to market conditions, as reflected in the direction of past price changes.⁴⁶ Essentially, the disparate behaviour of return volatility across these markets, which is indicated by the results, advocates the necessity of individual country analyses.

11. Conclusion

In recent years, emerging stock markets have attracted the attention of the international investment community. This increased

investor interest has prompted a wave of ESM research and the substantive literature has grown enormously since 1990. This review article has examined the huge volume of research undertaken in this area, and attempted to explore the major debates which have taken place in the ESM literature. A number of important points have emerged from the studies reviewed in this paper.

First, an abundance of academic evidence has provided a compelling rationale for the inclusion of emerging market securities in institutional portfolios; the conclusion that ESM securities possess excellent potential for combining the advantages of return enhancement and risk reduction is widely documented. However, institutional investors have been cautious when considering whether or not to invest in emerging markets; typically, they hold fewer ESM securities than the proportion recommended by portfolio theory. A powerful case therefore exists for increasing investment to emerging markets. Second, the evidence suggests that greater diversification benefits accrue from judicious country selection than from either industry or security selection. Furthermore, the importance of this country factor appears to be increasing over time. But some puzzles remain. Although researchers have identified the presence of large national factors in ESM returns, an explanation which comprehends (1) the cross-sectional differences in ESM returns, (2) variations in return volatility across emerging markets, and (3) the low correlations between these markets, has not yet been advanced. The focus of research must now shift to an examination of the forces which explain these strong independent country movements. Several different factors might explain this effect, including variables such as economic policy, political stability and investment barriers. Future research investigating the sources of these strong

national components of security returns should also determine the extent to which the key factors that influence returns are similar across markets or whether they vary across markets according to, for example, geographical location, market size or the degree of market integration or segmentation.

Third, evidence from a number of studies, employing an array of techniques, suggests that emerging financial markets have become increasingly integrated in recent years. Although market integration does not eliminate all the benefits from investment in emerging markets, it is generally expected that as returns from ESMs covary to a greater extent with returns from the rest of the world, diversification benefits (and predictability of returns and prices) will decline; this change may reduce the appetite of international investors for emerging market equities. A greater understanding of the features that make emerging markets viable instruments of portfolio diversification is therefore required as this benefit becomes increasingly difficult to achieve. Future research investigating the diversification potential of ESMs for more recent time periods would go some way in aiding our understanding of the extent to which the low correlations between ESMs and with developed markets are actually sustainable.

Fourth, a wealth of evidence suggests that (1) predictable time-varying components are present in ESM returns, and (2) exploiting these predictable trends can result in substantial investment gains. However, the source of this predictability is not yet fully explained. Without explicitly specifying an asset-pricing model, it is unclear whether this predictability in returns is evidence of market inefficiency, time-varying risk premiums, regime switches or other market inefficiencies. Fifth, seasonalities have been documented for

ESMs although the number of anomalies is small compared with that reported for developed markets. The presence of these anomalies has been attributed by a number of researchers to institutional factors such as national tax rates, the number of investors and the market trading mechanism.

Sixth, little is known about volatility in these markets compared with our relatively extensive knowledge of the variability of returns in developed stock markets. Recent studies of emerging markets have attempted to redress this imbalance, and add to our understanding of this topic, by analysing both the nature and the determinants of ESM volatility. Key findings indicate that market liberalisation measures have not reduced the risk and returns available to domestic investors. In fact, results from a number of studies suggest that ESM returns, although invariably volatile, may actually become less volatile following market liberalisation (possibly due to the fact that more investors now share a given amount of risk). The behaviour of return volatility differs markedly across markets - again reinforcing the need for individual country analyses. Future research which analyses higher frequency data at the individual company level, and covers a wider range of emerging markets, may yield fresh insights into the ESM phenomenon.

Endnotes

1. University of Dundee. The authors would like to thank the ESRC for generous funding of this research and two anonymous referees for valuable advice on an earlier draft of this paper.
2. For example, a recent decree has been issued in Tunisia ending a 1977 law that required any foreign purchase on the bourse to receive prior central bank

- authorisation, (*Financial Times*, 28 August 1995). Additionally, at the end of 1994, over a dozen countries in the sub-Saharan region had formal capital markets e.g. Zambia and Malawi, with several more in the process of setting up stock exchanges. For example, some commentators suggested the possibility of operational stock exchanges in Uganda and Tanzania by mid 1996, (*Financial Times*, 5 February 1996). Similarly, in Asia, plans were made to establish a stock market in Vietnam during 1996 in order to aid the recent privatisation process, whilst 13 January 1994 saw Nepal's stock exchange swing into action with transactions totalling \$1550, (*Financial Times*, 17 January 1994; 2 October 1995).
3. In 1993, gross capital outflows from the main industrial countries peaked at about \$850bn, compared with an average of about \$500bn over the previous nine-year period (Claessens, 1995).
 4. Levine and Zervos (1996) provide a summary of policy changes towards international capital flows for seventeen ESMs and nine DSMs, over the period 1980-1992. Most of the policy changes involved the liberalisation of capital and dividend repatriation policies, although some did involve the liberalisation of capital flow restrictions. See also Kim and Singal (1993) for a listing of significant liberalisations in IFC Emerging Markets Database (EMDB) markets. The limitations placed on the inward flow of foreign portfolio equity by many developing countries have been largely due to the fear of foreign 'hot money' and 'creeping takeovers', although 'these fears have not proven to be serious problems in practice', (Gill, 1993, p.55).
 5. This growth in inward investment contrasts with other episodes in which there have been large capital inflows to the developing countries, where bank financing typically played a dominant role.
 6. Country funds permit foreign investors to pool their resources and invest them in shares in the emerging markets. Until recently, country funds were the most efficient, and often the only vehicle through which foreign portfolio investors could invest in the ESMs. Consequently, they have proved to be popular avenues of investment. For a profile of the US-listed country funds, and a rundown of the advantages of closed-end country funds, see Porter (1993).
 7. ADRs are equity-based instruments that are publicly traded in the US securities markets, and are backed by a trust containing shares of non-US companies. ADRs are dollar-denominated, settle like a US security and pay dividends in US dollars.
 8. GDRs are equity-based instruments that are offered in the US Rule 144A (private placement) market as well as in the non-US markets. GDRs can be traded in several currencies and are settled via global book-entry clearing through the Depository Trust Company (in the US) as well as Euroclear and CEDEL (in Europe). For a lucid discussion of the advantages of investing with ADRs/GDRs, see Eun, Claessens and Jun (1993) and Evans (1993). Evans also discusses the ADR programs of a selection of Asian and Latin American companies.
 9. Several domestic equity, credit and

exchange market variables were used as country-specific factors. In particular, the study employed two equity market variables; price-earnings ratios and the rates of return on domestic stock markets, the country's credit rating, the secondary market price of a country's debt and the black market exchange rate premium.

10. On investigation of the factors that drive US portfolio choice, Tesar and Werner (1993, 1995) found only weak evidence of a relationship between US net purchases of foreign equity and financial variables, including US and foreign equity returns, US and foreign equity market growth rates and US interest rates. However, data problems may be partially responsible for this result (Howell, 1993b).
11. Additionally, 'global events' appear to have had a much smaller impact on ESM return correlations than on the correlations of DSMs. For example, Speidell and Sappenfield (1992) report that the October 1987 Crash and the Iraqi invasion of Kuwait in 1990 raised the average correlation of developed markets with the US by 0.45, but only increased the average correlation of emerging markets with the US by 0.15. Moreover, their data suggests that the correlations of several emerging markets with the US market were virtually unaffected by these events. Similarly, while all major markets declined substantially in October 1987, many emerging markets actually registered increases (Gill and Tropper, 1988).
12. An evaluation of the viability of country funds as perfect substitutes for direct holdings of ESM equities can be found in Bailey and Lim (1992), Diwan et al. (1993), Chang, Eun and Kolodny (1995) and Bekaert and Urias (1996). Generally, the evidence indicates that, although the potential diversification gains from investment in country funds are substantial, investors must purchase ESM shares directly to reap the full benefits from IPD.
13. Using the Mean-Variance paradigm and market-wide returns for a group of developed countries (DCs) and less developed countries (LDCs), Levy and Sarnat (1970) and Errunza (1977) evaluated the benefits of IPD over several time periods. Their results indicated that gains could be made from an IPD strategy. The most striking feature of their analyses was the significant proportion of LDC securities in the optimal portfolios. Lessard (1973) employed the multivariate methods of factor and principal components analysis, and MV efficient frontiers for a selected group of companies from four Latin American countries (Argentina, Brazil, Chile and Colombia) to demonstrate the diversification benefits among LDCs, and to show 'that a diversified portfolio of Latin American shares would be attractive to non-Latin American investors', (p.630).
14. In their analysis of Pacific Basin stock markets, Bailey and Stulz (1990) demonstrated that the benefits of IPD in terms of risk reduction 'depend to a great extent' on how the efficient frontier is computed. In particular, they found that by using a daily measurement interval, the inclusion of Pacific Rim shares into a US portfolio resulted in a 50 per cent reduction in risk, but that a longer holding period of one month resulted in a

reduction of only 30 per cent, (p.60).

15. Interestingly, De Santis performed a regional disaggregation of his analysis and found that Latin American assets are associated with the largest changes in the frontier (and hence, the largest gains in portfolio performance).
16. This finding is based on an analysis and comparison of the minimum variance and maximum efficiency portfolios and, as such, says nothing about risk tolerance. The size of gains available from an emerging market diversification strategy appear to depend partly on an investor's level of risk tolerance. Hartmann and Khambata suggest that greater portfolio efficiency and returns can be achieved by investors with lower degrees of risk aversion. This suggestion is confirmed by Speidell and Sappenfield (1992) in their analysis of the effect of changes in risk tolerance on optimal portfolio weightings. Their results indicate that '...the greatest rewards will accrue to those investors who establish sizeable positions in emerging markets...', (p.67). Other writers have been more forceful in their argument. For example, Hauser, Marcus and Yaari (1994) state that, despite the low correlations between emerging and developed markets, 'only investors who can tolerate high levels of risk can gain by diversifying into emerging markets', (p.80).
17. A survey published in 1992 by Fund Research reports that the emerging markets sector 'probably represent(s) only around 0.5 per cent of institutional investors' total portfolio holdings', (*Financial Times*, 26 October 1992, p.II). While more recent reports do indicate institutional investors are increasing their asset allocation to emerging markets, the average allocation still remains well below the optimum allocations suggested in the academic literature. For example, Kleiman International, an independent research group, estimate that as a percentage of their total assets, the average allocation to emerging markets by US pension funds 'currently stands at 3.75 per cent' (*Financial Times*, 28 March 1996, p.47).
18. Although evidence is extremely limited, what has been questioned is the existence of long-run benefits from diversifying into Asian markets. Using cointegration analysis to examine the long-run relationship between five Asian -Pacific markets over the period 1981-1991, Hung and Cheung (1995) found evidence of cointegration for the second subperiod examined, 1987-1991. This implies the presence of common factors, which limits the amount of independent variation, and hence the benefits from IPD. When restricting their analysis to exclude exchange rate fluctuations however, Hung and Cheung found no evidence of cointegration over the whole sample period - a result which confirms the earlier analysis of Asian markets by Chan, Gup and Pan (1992).
19. See for example, Lessard (1974, 1976), Solnik and deFreitas (1988), Beckers, Grinold, Rudd and Stefek (1992), Drummen and Zimmerman (1992), Heston and Rouwenhorst (1994, 1995). All of these studies present evidence favouring a significant and dominant role for country effects in driving developed market security returns, although the role of industry effects is subject to some debate.
20. Roll (1992), in estimating the importance

- of industry composition in international stock return behaviour for 19 DSMs and 5 ESMs, found that industry factors played a more significant role in driving both ESM and DSM returns. However, estimation problems may be partially responsible for this result (Zervos, 1996, p.3).
21. Such a (surprising) result has also been obtained for developed markets. In investigating the relative importance of common factors across European equity markets, Beckers et al. (1992) found an increasingly significant country factor (and decreasing industry factor). Given the increasing harmonisation of economic and fiscal policies that has occurred in Europe in recent years, such a finding is certainly at odds with the intuitive feeling that European equity markets would increasingly be dominated by transnational factors.
 22. Empirical evidence supporting the stability of inter-temporal relationships among various DSMs can be found in Panton, Lessig and Joy (1976), Watson (1978, 1980) and Philippatos, Christofi and Christofi (1983). In contrast, evidence of unstable relationships among international stock markets is documented in studies by Makridakis and Wheelwright (1974), Maldonado and Saunders (1981) and Sinclair, Lonie and Power, (1992). Some studies do suggest however, that the degree of (in)stability is time dependent, (for example, Panton et al., 1976; and Meric and Meric, 1989).
 23. Stronger evidence of inter-temporal stability in the correlation matrix is documented in a more recent paper by Cheung (1993).
 24. It should be noted that the categorisation of the literature into various approaches that have been used to measure and test for the degree of market integration/segmentation is not intended to be an exhaustive categorisation; rather, the approaches reviewed here represent the most popular approaches adopted in the literature. Certainly other techniques have been used. For example, a recent study by Sewell, Stansell, Lee and Below (1996) employed chaos measures to examine capital market integration among five Pacific Rim countries.
 25. See, for example, Bekaert (1993, 1995), Harvey (1993, 1994, 1995a, 1995b) and Bekaert and Harvey (1995).
 26. Three measures of market 'openness' were constructed. The first measure was based on ownership restrictions. The second measure was based on a ranking according to quantity and quality of market and company information and the quality of accounting standards and investor protection. The third measure was based on the number of cross-listed securities and country funds.
 27. For contradictory evidence relating to a broad cross-section of emerging markets, see Errunza and Losq (1985b). Conflicting evidence has also been advanced for the markets of Brazil (Errunza, 1979) and Kenya (Dickinson and Muragu, 1994).
 28. Equally, on the basis of the runs test, Errunza (1979), Dickinson and Muragu (1994) and Errunza and Losq (1985b) advance further contradictory evidence.
 29. Conflicting results are reported in Ayadi and Pyun (1994) for the Korean stock

market.

30. Richards also tested for a very strong form of long-horizon predictability by conducting time-series tests for stationarity, or trend-stationarity, of return indices. He found the indices for all nine emerging markets examined, with the exception of India, exhibited nonstationarity, therefore containing a random walk component and not demonstrating the extreme form of predictability implied by stationarity.
31. A similar winner-loser effect has been reported for the Brazilian market by da Costa (1994), who detected price reversals in two-year returns.
32. Richards also investigated a very strong form of relative return predictability by performing tests for cointegration between return indices. In particular, Richards tested for (1) cointegration between the return index for nine emerging markets and the MSCI world market index, (2) bivariate cointegrating relationships between pairs of emerging markets, and (3) cointegrating relationships among four Latin American markets. In each case, Richards failed to reject the hypothesis of no cointegration - a result which indicates that extreme predictability does not exist between return indices.
33. More specifically, the world information set included lagged values of the MSCI world return, a US term structure premium, the US default risk yield spread, and the US dividend yield. This world information set follows that used by Harvey (1991) in his analysis of the predictability of returns in 17 DSMs.
34. The country-specific instrumental variables included lagged own country US dollar returns, local dividend yields, the change in the foreign exchange rate versus the US dollar, and a measure of the local short-term interest rate.
35. Bekaert (1993, 1995) used only five instrumental variables, with the world information set consisting of the US lagged return, the US dividend yield and the US interest rate, and with the lagged return and the local dividend yield representing local information. Using an expanded set of variables, Harvey's (1993, 1994) world information set included the lagged world return, the lagged return on a ten-country currency index, the lagged MSCI world dividend yield, the lagged MSCI earnings-price ratio and the lagged Eurodollar rate. In addition to the variables employed in his earlier analysis, Harvey's local information set included the lagged country earnings-price ratio.
36. For example, Smith and Walter (1996) report that for the sixty-month period ending March 1994, the annualised percentage of standard deviation of returns in a selection of Latin American and Asian markets was 27.99 per cent and 24.18 per cent respectively, as compared to 19.92 per cent for the combined European and Japanese markets and only 12.51 per cent for the US market. In addition to the large magnitude of emerging market volatility, these markets are also characterised by a wide dispersion of volatility. For example, Harvey (1993, 1994) reports that the volatility for twenty emerging markets over January 1976 to June 1992 varied between 18 per cent for Jordan and 105.6 per cent for Argentina, resulting in a

range of volatility of 87.6 per cent. This again contrasts with developed markets where, over the same sample period, the range of volatility for twenty-one markets was only 33 per cent.

37. Kim and Singal also found that while portfolio inflows to emerging markets increased following capital market liberalisations, the volatility of these inflows did not, implying therefore that foreign portfolio inflows do not have a destabilising impact on emerging economies.
38. Conflicting evidence can be found in Grabel (1995) and Levine and Zervos (1996).
39. A related finding is documented by Kim and Rogers (1995), who examined the effect of the announced opening of the Korean stock market in August 1991 on the relationship between the stock markets of Korea, Japan and the US. They found that, since the announced opening, 'volatility spillovers' from these developed markets, particularly Japan, have become more important in the determination of stock returns and volatility in Korea. This suggests then that, following emerging capital market liberalisation, the transmission of share price movements from developed markets may in fact be a significant determinant of volatility in emerging markets.
40. This is consistent with the results of Erb, Harvey and Viskanta (1995a), which indicated a strong negative relation between country credit ratings and volatility in both emerging and developed markets. In particular, they found that credit ratings explained 40 per cent of the cross-sectional variation in volatility.

Additionally, noting the *ex ante* nature of the credit risk measure, the authors showed credit risk to be a predictor of future volatility.

41. Focusing on the Taiwan stock market, Ma (1992) examined the determinants of volatility, with an emphasis on institutional and speculative factors. The main results to emerge from the analysis suggested that volatility was positively associated with trading volume and transaction taxes, and negatively related with price limits. Additionally, evidence indicated that margin requirements Granger-cause volatility. Finally, it appeared that volatility was higher in bearish markets than in bullish markets.
42. Ross (1989) suggests that volatility clustering may be explained by the non-linear flow of information to the marketplace.
43. Using a GARCH-M model, Choudhry (1996) investigated volatility persistence in six ESMS before and after the October 1987 stock market crash. He found evidence of significant changes in volatility persistence before and after the crash, although the changes were not uniform, and varied across individual markets. These results suggest that factors other than the crash may also have been responsible for the observed changes.
44. In this model, all investors receive all information arriving at the marketplace simultaneously, revise their expectations and trade.
45. The sequential information hypothesis states that information arrives at the marketplace sequentially, with investors receiving the information one at a time

and trading after each reception. This implies that both past returns and information arriving at the marketplace may be useful for predicting future volatility.

46. This sensitivity was also apparent in the developed markets of Japan and the UK.

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