

CAPITAL MARKET INTEGRATION:  
A REVIEW OF THE ISSUES AND AN  
ASSESSMENT OF NEW ZEALAND'S  
POSITION

A report prepared for the Ministry of Economic Development and the  
Capital Market Development Taskforce

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## Executive Summary

1. In integrated capital markets, assets are priced according to a common set of risks. By contrast, prices reflect country-specific factors in segmented markets.
2. Capital market integration offers the possibility of better capital allocation and greater economic growth, improved country risk-sharing, enhanced portfolio diversification, and a lower cost of capital. However, it also exposes a country to capital flight and imported credit crunches, inefficient capital allocation if information problems are significant, increased corruption incentives, and a failure to work well when most needed.
3. Recent microeconomic studies suggest that diversification and cost of capital improvements from integration may largely be exhausted in developed countries and hence are likely to be primarily confined to emerging countries. But longer-term macroeconomic evidence seems to indicate that the gains from capital market liberalisation have principally been enjoyed by developed countries.
4. Financial economists have developed a number of methods for identifying and measuring the degree of integration, both globally and for individual countries. These include: return correlations, tests of formal asset pricing models constructed under the assumption of perfect integration, cross-country equivalence of implied pricing factors, convergence of valuation ratios, and various foreign market participation metrics.
5. The overall picture painted by the limited number of existing applications of these methods to New Zealand suggest (i) a high degree of integration with Australia, (ii) greater integration with Asia-Pacific countries than those of Europe or North America, and (iii) no compelling evidence of a general segmentation problem.
6. However, these conclusions must be treated with considerable caution, given that most of the analysis on which they are based is often sourced

from relatively old data or from studies that are either preliminary and/or are not focussed on New Zealand. Thus, it remains possible that New Zealand could achieve, and benefit from, additional capital market integration. Further work – applying the most recently-available New Zealand data to the methods noted above – is required to determine whether or not this is the case.

7. Existing studies suggest that the achievement of additional integration is largely driven by factors that are either beyond New Zealand's control or on which it already scores highly. However, paying much closer attention to investor property rights may well be helpful in this regard.

# 1 Integration of national capital markets: definition, consequences and evidence

## 1.1 Definition

What exactly is meant by the term ‘capital market integration’? And how does this differ from ‘market segmentation’? Emiris (2002) neatly summarises the distinction as follows:

“If markets are completely integrated, assets possessing the same risk characteristics will have the same price even if they are traded on different markets. In completely integrated capital markets, investors face common and country-specific or idiosyncratic risk, but price (identically in all markets) only common risk factors, because country-specific risk is fully diversifiable. When markets are partially integrated, investors face both common and idiosyncratic risks and price them both. If markets are completely segmented, investors face and price only country-specific sources of risk. In this case, the same projects in two countries can have different expected returns, since the sources of risk and their prices may differ across markets.”

In other words, any two markets that are perfectly integrated effectively operate as one entity, with investors in those markets facing – and pricing – a common set of risks. By contrast, two markets that are perfectly segmented operate as separate entities with investors facing – and pricing – risks unique to each market. Partially integrated markets fall somewhere between these two extremes, exactly where depending on the extent to which integration has occurred.

In segmented markets, the capital investment of firms in one country is limited to the savings provided by that country’s consumers, whereas integration allows firms to access savings from other countries. This de-linking of investment from domestic savings occurs, for example, when:

- investors in one country are able to purchase capital market securities in another country;
- firms in one country are able to raise capital (by selling new securities) in another country;

- firms in one country list their securities (new or existing) in the capital market of another country.

## 1.2 Consequences

Why does the topic of capital market integration so exercise the minds of economists and policy-makers? The reason is straightforward: integration holds out the promise of significant opportunities, but also exposes a country to additional risks.

Greater integration of capital markets offers four principal, and inter-related, benefits:

- *Better allocation of capital*

Countries in which there is a shortage of investment capital (and hence offer a high rate of return) are able to access surplus capital from countries where investment returns are low. As a result, capital is allocated to more productive uses, the overall return on investment rises, and economic growth is enhanced.<sup>1</sup>

- *More efficient risk sharing*

Access to foreign capital markets allows countries to de-link consumption from output, thus enabling an intertemporal smoothing of consumption and hence an improvement in national welfare. For example, the effects of a temporary recession can be softened by borrowing from abroad in order to sustain aggregate consumption (with the debt then repaid during a future output upswing).<sup>2</sup>

- *Enhanced portfolio diversification*

One of the most enduring principles in all of finance is *diversification*: adding more imperfectly-correlated securities to a portfolio allows investors to reduce portfolio risk without any sacrifice of expected return. Accessing foreign capital markets not only results in a wider range of securities with which to implement this strategy, but also, at least potentially, offers securities whose returns are only weakly correlated with

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<sup>1</sup>For a more formal illustration of this point, see Levi (1990, pp7-9).

<sup>2</sup>This, of course, assumes that output fluctuations are imperfectly correlated across countries, i.e., not all countries are in recession at the same time. For a more detailed discussion of the risk sharing mechanism, see Obstfeld and Rogoff (1996).

those available in the domestic market – thereby maximising possible diversification benefits.

- *Lower cost of capital*

Capital market integration can lead to a lower cost of capital via two avenues. First, the cost of equity capital is proportional to domestic market volatility in a segmented market, but depends only on the covariance with ‘world’ returns in an integrated market. Given that such covariances are typically much lower than local variances, this directly lowers securities’ expected returns and hence the cost of capital.<sup>3</sup> Second, firms can broaden their shareholder base and enhance liquidity – both of which lower required returns and the cost of capital (see Merton, 1987) – by listing on a foreign exchange. A lower cost of capital should stimulate investment and enhance economic growth.

In addition, capital market integration exposes financial intermediaries to foreign competition, sharpens the disciplines imposed on policy makers, and encourages development of domestic capital markets. But moving from segmentation to partial integration, or from partial to full integration, also carries with it the risk of some less desirable outcomes:

- *Capital flight*

While greater integration allows, and encourages, more foreign capital to flow into domestic capital markets, it also allows it to flow out again, with potentially adverse consequences for the domestic economy. For example, wholesale withdrawal of foreign capital in response to a domestic shock that, perhaps only temporarily, reduces the country’s attractiveness as an investment destination puts significant pressure on its currency and interest rates, thus exacerbating the effects of the shock.

- *Credit crunch*

In a similar vein, domestic firms that come to rely on rolling over financing from foreign lenders may encounter difficulties when international credit conditions tighten. Any inability to renew financing, or to do so

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<sup>3</sup>That is, country-specific risk factors are diversifiable – and so do not require compensation – in an integrated market. In effect, foreign investors bid up the prices – and thus lower the expected return – of local securities in order to obtain the diversification benefits discussed above.

at reasonable cost, has obviously adverse consequences for aggregate domestic consumption.

- *Systemic information problems*

The usual information problems associated with financial markets are inevitably greater for cross-country transactions, so – as predicted by the theory of the second best – capital may inadvertently flow into areas where the expected return fails to cover its opportunity cost.<sup>4</sup>

- *Corruption*

Greater integration may, paradoxically, facilitate increased corruption activity. Because improved detection methods and legal systems have made it more difficult for corrupt officials to conceal the proceeds of their graft domestically, smuggling abroad has become more necessary, a process that is assisted by integration. Indeed, corruption and per-capita GNP appear to be negatively correlated in countries with more integrated capital markets, but not in segmented countries.<sup>5</sup>

- *Collapsing correlations* The observed tendency of asset correlations to all head towards 1.0 in the presence of a crisis suggests that the benefits of international diversification may disappear exactly when they are most needed. Historically, such has been the fate of many investors, as exemplified by the 1929 address of the Alliance Trust Company chairman:<sup>6</sup>

“Trust companies...have reckoned that by a wide spreading of their investment risk, a stable revenue position could be maintained, as it was not to be expected that all the world would go wrong at the same time. But the unexpected has happened, and every part of the civilized world is in trouble...”

Such a lament would no doubt echo loudly with many investors today.

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<sup>4</sup>See Stiglitz (2000).

<sup>5</sup>See Neeman et al. (2008).

<sup>6</sup>Quoted in Bullock (1959).

### 1.3 Evidence

Given the above debate surrounding the consequences of capital market integration, it is instructive to briefly consider the empirical evidence on this issue.

- *Portfolio diversification*

Early studies by Grubel (1968), Levy and Sarnat (1970), and Solnik (1974) all illustrate the practical benefits available to US investors from international diversification. For example, Solnik finds that an internationally diversified portfolio has only 11.7% of the variance of a typical security, compared to a figure of almost 27% for a portfolio containing only United States stocks. More recent studies have suggested that such gains also exist in other markets and other countries: Hunter and Simon (2004) uncover significant benefits from international bond diversification, even during periods of weakness or high volatility in these markets; Meyer and Rose (2003) find that diversifying internationally helped protect New Zealand investors from the effects of the Asian crisis.

However, the most exhaustive study of international diversification – Goetzmann et al. (2005) – suggests a more cautious conclusion may be warranted. First, as their Figure 3 (reproduced here as Figure 1) shows, the low return correlations underpinning the observed benefits of international diversification are largely an artifact of the post-WWII period. Second, the average cross-country correlation has risen significantly since 1990. Third, correlations have been at their highest during periods of greatest integration. As they tellingly note (p21):

“(Integration) allows investors to diversify across borders, but it also reduces the attractiveness of doing so.”

In short, there is a clear ‘paradox of integration’.

Goetzmann et al. (2005) also show that recent diversification benefits have largely been driven by an expansion of the investment opportunity set due to the appearance of capital markets in emerging countries. By contrast, the increasing correlations between developed markets have severely reduced the benefits of diversification across those



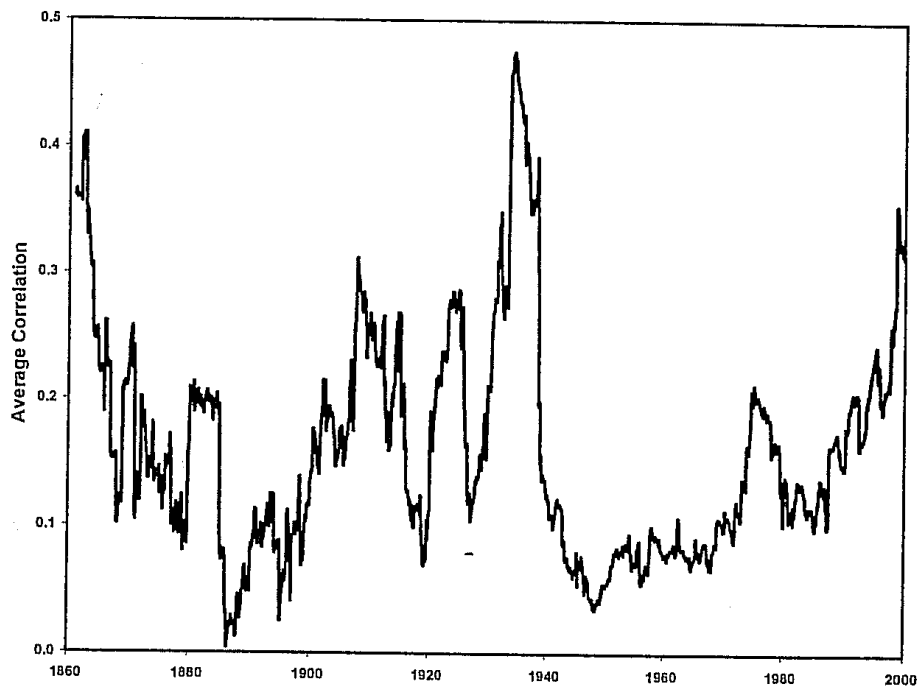


Figure 1: Average international 5-year return correlations. Source: Goetzmann et al. (2005, Figure 2).

countries.<sup>7</sup> Consistent with this view, Costello et al. (2008) conclude that investing in Australian markets no longer provides any significant diversification benefits to foreign investors.

- *Cost of capital*

Researchers have used a variety of methods to estimate the impact of greater market integration on the cost of capital. Henry (2000) examines the local stock market response to the relaxation of controls on foreign participation in 12 countries and finds a strong upward revaluation – implying a fall in the cost of capital. In a similar analysis of 20 emerging countries, Bekaert and Harvey (2000) use an explicit proxy for the cost of capital and estimate that this falls by between 5 and 75 basis points following stock market liberalisation.

Miller (1999) investigates the impact of international dual listings and reports a positive – and permanent – revaluation in the stock prices of

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<sup>7</sup>Another long-term study of capital market returns - albeit with fewer countries than Goetzmann et al. (2005) - by Dimson et al. (2002) arrives at a similar conclusion.

Table 1: Studies Examining the Benefits of International Diversification — Examples and Summary of Findings

Significant Benefits	Insignificant Benefits	Uncertain/Conditional
Grubel (1968)	Costello et al. (2008)	Goetzmann et al. (2005)
Levy and Sarnat (1970)		Dimson et al. (2002)
Solnik (1974)		Lewis (2006)
Hunter and Simon (2004)		
Meyer and Rose (2003)		
Ang and Bekaert (2002)		
de Santis and Gerard (1997)		

firms undertaking such listings. Errunza and Miller (2000) take this approach a step further by explicitly calculating the cost of equity capital for non-American firms and estimate that this falls by approximately 42% following a listing in the United States.

Other authors shed indirect light on the link between integration and the cost of capital. For example, Lins et al. (2005) find that the sensitivity of investment to cash flow decreases significantly for emerging market firms that list on a United States exchange, suggesting that such firms experience a weakening of financial constraints and hence, presumably, a fall in their cost of capital.

Although this evidence all tends to point towards a beneficial impact of integration on the cost of capital, some caution is warranted. First, as Bekaert and Harvey (2000) note, the existence of such gains depends crucially on the new opportunities providing diversification benefits to international investors. Since correlations between developed markets have risen sharply in recent years – see the Goetzmann et al. (2005) evidence discussed above – it seems likely that the potential cost of capital improvements resulting from further integration between such countries is likely to be small. Some support for this view is provided by the Lins et al. (2005) study of United States listings by foreign firms – they report no change in the investment-cash flow sensitivity for firms from developed countries. This suggests that at least this avenue to a lower cost of capital is essentially closed to developed countries.

Table 2: Recent Studies Examining the Cost of Capital Response to Increased Market Integration — Examples and Summary of Findings

Positive Response	Zero/Negative Response	Uncertain/Conditional
Henry (2000)	NA	Bekaert and Harvey (2000)
Miller (1999)		Lins et al. (2005)
Errunza and Miller (2000)		Lewis (2006)
Smith and Sofianos (1997)		
Tandon (1997)		

- *Economic growth*

Somewhat surprisingly, given the uniformly positive impact of financial market liberalisation on the cost of capital, macroeconomic studies of the relationship between liberalisation and economic growth have produced very mixed results. Although Quinn (1997) reports a positive relationship in 64 countries between 1960 and 1989, Rodrick (1998) finds exactly the opposite correlation in 100 countries between 1975 and 1989. Edwards (2001) deepens the puzzle by showing that the correlation is positive in high-income countries, but negative in low-income countries. Why this should be the case when diversification benefits - and hence cost of capital improvements - have elsewhere been shown to be greatest in emerging countries has yet to be satisfactorily resolved. Adopting a more micro-focused approach, Bekaert et al. (2007) argue that *de jure* (and possibly *de facto*) capital market integration is more important for realising growth opportunities than is financial development, external finance dependence, and investor protection measures.

Table 3: Recent Studies Examining the Effect of Capital Market Liberalisation on Economic Growth — Examples and Summary of Findings

Positive Response	Zero/Negative Response	Uncertain/Conditional
Quinn (1997)	Rodrick (1998)	Edwards (2001)
Kose et al. (2008)	Prasad et al. (2007)	

- *Risk sharing*

Similar ambiguity exists with regard to the impact of capital market integration on risk sharing. On one side, several studies conclude that

the relationship has been modest at best. For example, Sorenson and Yosha (1998) and Melitz and Zumer (1999) examine the extent of risk sharing in pre-monetary union Europe and find that only 40% of potential risk sharing was achieved on average, and that most of this occurred through credit, rather than capital, markets. Similarly, Kose et al. (2007) conclude that the average level of international risk sharing in 69 countries over the 1960–2004 period was well below the level predicted by theory, and that the reduction in consumption volatility that had occurred was largely confined to developed countries. However, Artis and Hoffman (2008) argue that this disappointing outcome is largely a statistical illusion induced by the failure of these studies to account for an across-the-board drop in output volatility.

Table 4: Recent Studies Examining the Effect of Capital Market Liberalisation on Country Risk Sharing — Examples and Summary of Findings

Positive Response	Zero/Negative Response	Uncertain/Conditional
Artis and Hoffman (2008) Kim and Sheen (2007)	Kose et al. (2007) Sorenson and Yosha (1998) Melitz and Zumer (1999)	Kose et al. (2003)

Moreover, risk sharing is not an end in itself, only a means to the ultimate end of improving aggregate welfare. Thus, the observance of relatively low levels of cross-country risk sharing need not imply that there are unexploited (in the sense of being welfare-enhancing) opportunities. In this context, a particularly relevant paper by Kim and Sheen (2007) examines the history of risk sharing between Australia and New Zealand. Similar to the European evidence noted above, they find that approximately 60% of risk-sharing opportunities between the two countries during the 1960–2002 period was unexploited. However, they also note that this figure dropped sharply following the mid-1980’s deregulation in both countries — from 72% during 1960–1983 to 55% during 1984–2002. Most importantly, they estimate the welfare gains — as measured by certainty-equivalent consumption — of full risk sharing in the latter period to be negligible, suggesting the two countries have little to gain from additional risk sharing.

- *Conclusion*

Although the above summary of the literature in this area is by no means exhaustive, it nevertheless illustrates the ambiguity that exists about the effects of capital market integration. On the one hand, reflecting the paradox of integration, recent microeconomic studies suggest that diversification and cost of capital gains from integration may largely be exhausted in developed countries and hence are likely to be primarily confined to emerging countries. On the other hand, longer-term macroeconomic evidence seems to indicate that the gains from capital market liberalisation have principally been enjoyed by developed countries. One obvious explanation for this is that developed countries have better institutions and policies that allow them to capture the benefits of integration in ways that emerging countries cannot, but Kraay (1998) and Arteta et al. (2003) find evidence suggesting that the impact of capital market openness on growth is largely unaffected by various development and institutional measures. Another possibility, unexplored in the literature, is that there are lags in exploiting the microeconomic gains from integration. Thus, developed countries, having liberalised, and hence integrated, earlier, have reaped the benefits that are still to accrue to emerging countries. If so, and if the current crisis results in moves back towards segmentation, then emerging countries may end up having been doubly stung: having incurred the costs of capital market liberalisation, they may now find the benefits whisked away from them just as they might otherwise have been about to bear fruit.

## **2 Integration of national capital markets: measurement and New Zealand evidence**

The evidence summarised in section 1 suggests that the gains from capital market integration have largely been captured by developed countries and that any further gains are likely to accrue primarily to emerging countries. Since New Zealand is a developed country, this implies that concerns about a lack of integration with world markets may be redundant and that any attempts to move towards further integration are unlikely to yield significant

benefits. However, many studies of the effects of capital market integration do not employ New Zealand data, and in those that do the New Zealand experience is largely swamped by that of much larger countries. Moreover, New Zealand's small size and relatively low-activity capital markets are also features of many emerging markets. Consequently, it remains possible that New Zealand's capital markets are less integrated with the rest of the world than might be expected on the basis of the literature on developed markets, and hence could benefit from additional integration. Clearly, what is required is a more detailed assessment of the current level of New Zealand integration — just how integrated are New Zealand capital markets with those of other countries?

Answering this question requires a means of identifying and measuring integration. In this section, I outline the various methods devised by economists for doing so, and describe and interpret relevant New Zealand evidence.

## **2.1 *De jure* and *de facto* barriers to integration**

In estimating the degree of financial integration, macroeconomists have focussed on (i) the absence of formal restrictions to international financial investment (*de jure* integration) and (ii) the level of international capital flows (*de facto* integration). Measure (i) has typically been based on the IMF's assessment on 'restrictions on payments for capital transactions' (line E2 in the annual Exchange Arrangements and Exchange Restrictions table), or some extension thereof, resulting in a zero/one dummy variable that classifies a country as open or closed. On this basis, New Zealand is obviously categorised as open, although episodes such as that recently involving Auckland Airport suggest this assessment should perhaps be qualified.<sup>8</sup> In any event, such a measure is crude at best: the presence of direct barriers to international investment may not indicate segmentation if these barriers can be easily circumvented, as is often the case. Moreover, their absence need not indicate integration if other indirect barriers — such as asymmetric information, differences in tax policies and financial reporting standards, and cultural biases — are significant.

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<sup>8</sup>Quinn (1998) attempts to categorise the intensity of controls. However, this makes no difference to New Zealand's ranking.

Table 5: Foreign Capital Stocks: 1990 and 2000

(Foreign Assets + Foreign Liabilities)/GDP		
Country	1990	2000
Australia	1.00	1.73
Canada	1.18	1.71
Finland	0.95	4.00
France	1.22	3.68
Germany	1.22	2.76
Iceland	0.72	1.50
Japan	1.11	1.00
New Zealand	1.27	2.00
South Africa	0.50	1.53
Switzerland	4.01	9.09
United Kingdom	3.52	6.22
United States	0.81	1.66

*Source:* Obstfeld and Taylor (2004)

Turning to (ii), this has often been assessed by looking at the evolution of capital flows (relative to GDP) over time. For example, based on data in Obstfeld and Taylor (2004), Table 5 provides measures of ‘aggregate’ foreign capital stocks (i.e., foreign assets plus liabilities as a proportion of GDP) for selected countries. Two features stand out in this table. First, the international financial centres of Switzerland and the UK – presumably highly integrated – experience high levels of international capital flows relative to GDP, suggesting that this ratio can indeed serve as a rough proxy for capital market integration. New Zealand sits approximately in the middle of the group of countries in Table 5 with ratios of similar magnitudes to Australia. Second, with the notable exception of Japan, all countries saw a significant rise in this ratio between 1990 and 2000. By this yardstick, New Zealand has lagged somewhat behind – an increase of only 57% versus a rise of over 300% for Finland. Although not shown in the table, Obstfeld and Taylor note that the 1990s increase in capital flows/GDP ratios occurred primarily in developed countries, suggesting the growth was primarily about ‘diversification finance’ rather than ‘development finance’.

## 2.2 Equity market correlations

Actual capital flows, and hence stocks of assets and liabilities will also reflect a number of factors unrelated to financial market integration, such as trade

openness and monetary and fiscal policies. As a result, financial economists have adopted more micro-based measures of integration that focus directly on activities in capital markets. Of these, the simplest are equity market return correlations.<sup>9</sup> Formally, if  $R_i$  and  $R_j$  are returns in countries  $i$  and  $j$  respectively, then the *correlation coefficient* for these returns is given by

$$\rho_{ij} = \frac{\text{cov}(R_i, R_j)}{\sigma_i \sigma_j}.$$

where  $\text{cov}(R_i, R_j)$  is the covariance of  $R_i$  and  $R_j$ , and  $\sigma_i$  and  $\sigma_j$  are the corresponding return standard deviations. Note that  $\rho_{ij}$  is a number between  $-1.0$  (perfect negative correlation) and  $1.0$  (perfect positive correlation). The idea underlying correlation calculations is that because the price of a security is the same in all markets under perfect integration, price changes (i.e., returns) will be perfectly correlated across individual markets. By contrast, cross-country returns will be largely independent in perfectly segmented markets. In short, higher correlations indicate greater integration.

To shed some light on international – including New Zealand – return correlations, two sources of data are employed. One – taken from Goetzmann et al. (2005) – calculates correlations using up to 200 years of returns, i.e., a very long-term series. The other focuses on the more recent 1990-2007 period using data made available by the World Federation of Exchanges (WFE).<sup>10</sup> In the first case, the estimated statistic is the correlation of local stock index returns with an equal-weighted world portfolio. In the second case, individual pair-wise correlations are estimated for all countries in the table with the average of these then calculated and reported. Both measures therefore estimate the extent to which local stock returns co-vary with a global index.

These correlation estimates appear in Table 6. Most correlations hover around the 0.5 mark, although Ireland’s and Korea’s are notably lower.<sup>11</sup> The

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<sup>9</sup>In principle, similar calculations could be undertaken for bond markets. However, secondary bond markets in most countries are highly illiquid, thus largely precluding the use of data over any reasonable frequency, and hence restricting analysis to markets such as Eurobonds that operate largely ‘outside’ national borders. Moreover, even where reliable data are available, the close relationship between interest rates and monetary policy means that it is difficult to infer much about financial market integration from bond return correlations. Similar concerns also apply to the other methods of measuring ‘integration’ discussed in this section.

<sup>10</sup>See <http://www.world-exchanges.org/statistics>.

<sup>11</sup>The lower long-term estimates for Germany and Japan is likely to reflect the disloca-



Table 6: Equity return correlations with equal-weighted portfolios

In the WFE column, the reported equity return correlation for each country is calculated as the average of the country’s individual correlations with the other countries appearing in the table. The Goetzmann et al. (2005) column reports the country’s equity return correlation with that of an equal-weighted world portfolio. Numbers in parentheses denote the number of years for which data are available in the Goetzmann et al. (2005) sample.

Country	WFE	Goetzmann et al. (2005)
	1990 – 2007	1800 – 2000
Australia	0.54	0.51 (126)
Canada	0.58	0.55 (87)
Finland	0.46	0.36 (79)
France	0.56	0.47 (145)
Germany	0.57	0.36 (55)
Indonesia	0.52	0.51 (13)
Ireland	0.37	0.38 (67)
Japan	0.45	0.34 (55)
Korea	0.29	0.30 (25)
Malaysia	0.51	0.61 (13)
New Zealand	0.50	0.53 (70)
Phillippines	0.52	0.39 (46)
Singapore	0.62	0.60 (31)
Taiwan	0.50	0.44 (16)
Thailand	0.38	0.52 (25)
United Kingdom	0.55	0.62 (201)
United States	0.31	0.49 (201)

correlation of New Zealand equity returns with the global index is estimated to be 0.53 over the last 70 years and 0.50 over the last 17, comparable to Australia’s estimates of 0.51 and 0.54 respectively, and consistent with a fairly strong degree of integration within global equity markets.

Further insight into the New Zealand-Australia comparison is provided by Table 7 which reports the WFE return correlations of these two countries with each of the other 15 countries appearing in Table 6. Somewhat surprisingly, both Australia and New Zealand returns are most highly correlated with those of the Phillipines (0.78 and 0.82 respectively), with their own correlation of 0.77 being only the second-highest for both. The other singular feature of Table 7 is that, essentially without exception, Australian returns are more strongly correlated with those of western and more developed countries (Canada, Finland, France, Germany, Ireland, Japan, United Kingdoms induced by World War II.

Table 7: New Zealand and Australia return correlations with individual countries

Correlations of New Zealand and Australia stock market returns with a selection of individual countries. Based on WFE data between 1990 and 2007.

	New Zealand	Australia
Australia	0.77	1.00
Canada	0.51	0.63
Finland	0.18	0.29
France	0.36	0.58
Germany	0.39	0.63
Indonesia	0.61	0.50
Ireland	0.48	0.63
Japan	0.31	0.34
Korea	0.14	0.15
Malaysia	0.74	0.63
New Zealand	1.00	0.77
Phillippines	0.82	0.78
Singapore	0.65	0.66
Taiwan	0.63	0.54
Thailand	0.58	0.33
United Kingdom	0.51	0.65
United States	0.31	0.51

dom, United States) while New Zealand returns co-vary more with those of emerging Asia-Pacific countries (Indonesia, Malaysia, Phillipines, Taiwan, Thailand). This may suggest that Australia and New Zealand differ in the *manner* in which their capital markets are globally integrated – Australia being more integrated with European and North American markets, and New Zealand more integrated with Asian and Pacific markets.

Simple returns correlations are, however, not entirely satisfactory as measures of equity market integration. In the first place, interpretation of intermediate correlation values is by no means straightforward – although correlations of 1.0 and 0.0 can confidently be associated with integration and segmentation respectively, it is unclear whether a value of 0.5 indicates high or low integration. Presumably it suggests some positive level of integration, but how much exactly? Moreover, they estimate only a linear relationship between returns in different countries, thus potentially overlooking more complex relationships. In addition, they assume that the correlation is constant through time, when it is almost certainly time-varying. Finally, inter-market correlation coefficients can really only say something

about short-run linkages, while remaining silent on longer-run relationships. These issues – particularly the last – have led researchers to investigate more ‘sophisticated’ correlation measures, primarily based on the concept of *cointegration* developed by Engle and Granger (1987) and Johansen (1988). The idea here is that cointegration between two markets implies an absence of long-run arbitrage opportunities across these markets.

Several studies have examined the cointegration relationship between New Zealand and Australia. Narayan and Smith (2005) use monthly data from 1967 to 2003 and conclude that the New Zealand market is not cointegrated with either Australia or any of the G7 countries. However, several other papers dispute this finding. Chen et al. (2008) apply slightly different methods to more recent data (1990–2005) and find that the New Zealand market *is* cointegrated with Australia, although the latter is more strongly linked with the United States. Fraser et al. (2008) allow for time-varying correlations and show that New Zealand equity returns have become increasingly linked to those of Australia since the mid-1980s. Finally, Lok and Kaley (2006) examine a sample of Australia-New Zealand cross-listed firms between 2000 and 2002 and report not only that the two countries’ cross-listed stocks are cointegrated – indicating a long-run equilibrium relationship – but also that any cross-market differences in the prices of *individual* stocks is transient, i.e., arbitrage opportunities are quickly dissipated, indicating a high level of integration.

But there is only so much to be gleaned from return correlations – whether simple or ‘sophisticated’ – for at least two reasons. First, a high correlation may simply indicate a common exposure to cashflow shocks rather than the existence of a common pricing factor. Second, a low correlation may reflect international differences in industry weights rather than the lack of a common pricing factor. In short, high equity return correlations are neither necessary nor sufficient for integration, and low equity return correlations are neither necessary nor sufficient for segmentation.

### **2.3 Asset pricing models**

For the above reasons, researchers have investigated ways of extending the correlation approach that avoid at least some of these problems. A particularly common way of inferring capital market integration has been to search

for various systematic factors associated with common movements in country returns. In practice, this has involved testing the empirical implications of specific international asset pricing models to see whether global or industry or country (or regional) factors are most important for explaining cross-sectional variation in returns. That is, are cross-country asset returns primarily driven by a common (i.e., global) factor or factors, which would imply integration, or by industry-specific but country-common factors, which would also imply integration, or by country-specific factors, which would imply segmentation. Broadly speaking, such tests have produced ambiguous results. For example, Heston and Rouwenhorst (1994) and Bekaert et al. (2008) find that country factors are important, but Brooks and Del Negro (2004) argue that much of the apparent country effect is actually a regional effect, within which capital markets are highly integrated.

The only study that appears to undertake this kind of analysis on New Zealand data is Chay and Eleswarapu (2001), who examine the importance of global versus country factors in explaining New Zealand stock returns before and after the mid-1980s deregulation. They find that prior to deregulation, New Zealand returns were exclusively determined by local factors, but that global factors were subsequently more important (although not exclusively so). However, their period of analysis ends in 1998.

Although potentially providing a rich vein of information, one problem with studies of this kind is that they tend either to be highly specific to a particular asset pricing model or are forced to engage in a ‘fishing expedition’ for relevant factors. Partly as a response, Ammer and Wongsam (2007) suggest exploiting the Campbell (1991) decomposition of returns into shocks to expected cashflows and shocks to expected returns, the idea being that only common correlation in the latter (market pricing) is relevant to capital market integration. Moreover, further decomposing expected return shocks into global, industry and country components allows identification of the correlations that are consistent with integration. For example, if within-country inter-industry co-movements in expected returns are an important component of the total co-movement, then this suggests that discount rates are largely driven by country factors and hence markets are largely segmented. On the other hand, if cross-country same-industry co-movements are important, this indicates a common risk exposure and hence a relatively high level of integration. Based on an analysis of eight large developed countries, Am-

mer and Wongsam conclude that global and industry factors are the primary drivers of expected returns, consistent with a high level of integration in these markets. Unfortunately, New Zealand is not among the countries they analyse.

## 2.4 Common discount factors

Another method for inferring and measuring integration, suggested by Flood and Rose (2005), involves looking for convergence in discount factors. Understanding this approach requires a little basic theory. In general (see Cochrane, 2001, pp.6–9), the time  $t$  price  $P_{jt}$  of asset  $j$  in country  $i$  is given by:

$$P_{j,t} = E_t[d_{i,t+1}x_{j,t+1}].$$

where  $x_{j,t+1}$  is the state-contingent payoff on asset  $j$  at time  $t+1$  and  $d_{i,t+1}$  is the *stochastic discount factor* (SDF) for country  $i$ . In words,  $x$  is the number of dollars generated by the asset in a particular future state and  $d$  is the present value of a dollar in that state; their product is then the present value of income generated by the asset in that state and so the price of the asset equals the expected product across all states. The insight of Flood and Rose is that all assets share the same SDF *in markets that are integrated*, i.e., there is no market-specific discount rate. That is, in an integrated market:

$$P_{j,t} = E_t[d_{t+1}x_{j,t+1}]$$

where  $d_{t+1}$  is the *common* SDF. Flood and Rose show that this equation can be rewritten as:

$$x_{j,t+1} = \delta_t[p_{j,t} - cov_t(d_{j,t+1}, x_{j,t+1})] + \epsilon_{j,t+1} \quad (1)$$

where  $\delta_t \equiv 1/E_t[d_{t+1}]$  and  $\epsilon_{j,t+1}$  is a zero-mean prediction error term. Equation (1) can be used to estimate  $\delta$  in different countries; under the null hypothesis of integration, these estimates are equal. Claus and Lucey (2008) apply this method to 2006 data from 10 countries in the Asia-Pacific region (including New Zealand) and then calculate standardised mean absolute differences (SMAD) as follows:

Table 8: Estimated discount rate convergence

Standardised mean absolute differences (SMAD) of estimated discount rates between (i) New Zealand and Australia and (ii) a selection of other countries from the Asia-Pacific region. Sourced from Claus and Lucey (2008).

	New Zealand	Australia
Australia	0.098	0.000
Hong Kong	0.032	0.100
India	0.075	0.128
Japan	0.037	0.072
Korea	0.034	0.132
Malaysia	0.111	0.028
New Zealand	0.000	0.098
Singapore	0.158	0.068
Taiwan	0.137	0.235
Thailand	0.020	0.116
<b>Sum</b>	<b>0.703</b>	<b>0.976</b>

$$SMAD_{ij} = E^S[|\delta_s - \delta_k|]/(\delta_s + \delta_k).$$

where  $E^S[\cdot]$  denotes the sample mean and  $s$  and  $k$  are country indexes. At each date, SMAD equals the absolute value of the difference between the deltas of two countries and expresses this as a proportion of the sum of the deltas; if the two markets are integrated, this number should be close to zero.

Claus and Lucey (2008) report that New Zealand has the smallest sum-of-SMADs among their 10 countries and hence conclude that it has the most integrated stock market in the Asia-Pacific region. A summary of their results appears in Table 8. Note that the sum of SMADs for New Zealand is only 72% of that of Australia (0.703 versus 0.976), suggesting that New Zealand is considerably more integrated with the Asia-Pacific region than is Australia — consistent with the correlations evidence in Table 7. On an individual country basis, New Zealand is estimated to be less integrated than Australia with Singapore and Malaysia, but more so with the other six markets. One surprising aspect of these calculations is the implied relatively low level of integration between Australia and New Zealand — their SMAD of 0.098 is only the 6th lowest (out of 9) for New Zealand and 4th lowest for Australia.<sup>12</sup>

<sup>12</sup>However, only Japan has a lower SMAD with both countries than they do with each other. This reinforces the point that New Zealand and Australian capital markets tend to be most highly integrated with different sets of countries.

## 2.5 Valuation ratios

All of the above methods for measuring integration require statistical estimation. However, Bekaert et al. (2008) point out that a characteristic of an integrated market is a convergence of valuation ratios – which are observable at each point in time and hence do not need to be estimated. More precisely, they show that full integration implies that industry earnings-yield differentials should be small and explained fully by differences in leverage and earnings volatility. As a result, they propose that a country’s effective segmentation can be measured by a weighted sum of industry earnings-yield absolute differentials:

$$SEG_{it} = \sum_j \alpha_{ji,t} |EP_{ji,t} - EP_{jw,t}|.$$

where  $\alpha_{ji,t}$  is the weight of industry  $j$  in country  $i$  at time  $t$ ,  $EP_{ji,t}$  is industry  $j$ ’s earnings yield in country  $i$ , and  $EP_{jw,t}$  is the the world earnings yield for industry  $j$ . In an integrated market, SEG should be close to zero, similar to the factor price equalisation result from classic trade theory.

Bekaert et al. (2008) calculate SEG for a sample of 50 countries between 1980 and 2005. Table 9 summarises these results for the most recent 5-year period, and also reports the average annual change in SEG over the entire 26-year period. According to this measure, New Zealand is one of the most segmented developed countries, is twice as segmented as Australia, and is on a par with Malaysia, Indonesia and the Phillippines. The second column reveals the source of this assessment: the average change in SEG for New Zealand over the full sample period has been less than 1/5 that of Australia, with similar or greater shortfalls relative to Canada, Finland, France, Ireland, Singapore and the United Kingdom. In short, the integration of New Zealand into world capital markets has, according to this measure, stalled over the last two decades. What would be interesting to know – but which is unreported by Bekaert et al. – is whether or not this phenomenon is evenly spread over the entire 1980-2005 period, or is concentrated in, for example, a more recent sub-period.

Another valuation ratio that may shed some light on capital market integration is Tobin’s  $Q$  – the ratio of market value to replacement cost. As Hietala (1989) and others show, stocks that are only able to be held by do-

Table 9: Earnings-yield segmentation measure (SEG) for selected countries

Estimates of segmentation for selected countries. Based on SEG measure of Bekaert et al. (2008).

	Average Segmentation 2001-2005	Average Annual Change in Segmentation 1980-2005
Australia	1.2%	-2.74%
Canada	1.7%	-2.18%
Finland	2.2%	-4.60%
France	2.0%	-2.08%
Indonesia	2.7%	-0.81%
Ireland	1.7%	-2.71%
Korea	3.6%	-0.65%
Malaysia	2.4%	-0.24%
New Zealand	2.5%	-0.47%
Phillippines	2.5%	-1.73%
Singapore	2.3%	-2.87%
Thailand	3.8%	2.35%
United Kingdom	1.2%	-2.91%
United States	0.8%	0.94%

mestic citizens typically trade at a lower price (and hence  $Q$ ) than stocks open to all investors. Since these two situations correspond to segmentation and integration respectively, country  $Q$  values that markedly differ from those prevailing in similar countries may indicate the presence of significant segmentation.

Some information on country  $Q$  values appears in the first two columns of Table 10. New Zealand  $Q$  values are slightly below those of Australia, but essentially comparable. Most other countries also report  $Q$ s in the same general area; only Korea has a significantly lower value, suggesting that its capital markets may be more segmented than most – consistent with the evidence contained in earlier tables.

One problem with attempting to infer capital market integration from absolute  $Q$  values is that several other factors are also likely to influence  $Q$ , e.g., future investment opportunities, which affect  $Q$ , are likely to differ across countries at any particular point in time. A potentially more fruitful approach involves comparing the  $Q$  of a country's international firms – those that list on major exchanges such as the LSE, NYSE or NASDAQ, or have otherwise raised equity capital in international markets – with that of



Table 10: Tobin's  $Q$  in selected countries

Estimates of Tobin's  $Q$  – the ratio of equity market value to replacement cost – based on (i) those reported in Table 1 of Gozzi et al. (2008) and (ii) the reciprocal of the Book-to-Market ratios reported in Table 1 of Bekaert et al. (2008). Lower  $Q$  may be associated with greater segmentation, as is a greater difference between the  $Q$  values of a country's international firms and its domestic firms. International firms are those that list on the LSE, NYSE or NASDAQ or have otherwise raised equity capital in international markets.

	<i>Total Q</i> Bekaert et al. 1980-2005	<i>Total Q</i> Gozzi et al. 1989-2000	<i>Intl Q/Dom Q</i> Gozzi et al. 1989-2000
Australia	1.15	1.51	1.04
Canada	1.11	1.57	1.36
Finland	1.04	1.30	0.91
France	0.95	1.39	1.18
Germany	1.25	1.55	1.03
Indonesia	<i>NA</i>	1.34	1.08
Ireland	0.83	1.55	1.08
Japan	1.41	1.34	1.06
Korea	<i>NA</i>	1.04	1.07
Malaysia	<i>NA</i>	1.70	1.09
New Zealand	1.10	1.46	1.26
Phillippines	<i>NA</i>	1.40	1.10
Singapore	1.10	1.45	1.26
Taiwan	<i>NA</i>	1.65	1.29
Thailand	<i>NA</i>	1.28	1.51
United Kingdom	1.14	<i>NA</i>	<i>NA</i>
United States	1.23	<i>NA</i>	<i>NA</i>

its purely domestic firms. The idea here is that international firms are by definition integrated into world capital markets, so a significant difference between their  $Q$  values and those of their domestic counterparts would suggest that the domestic capital markets are segmented. By contrast, similar  $Q$ s would indicate that the same SDF is being used to price both groups, and hence integration.

The ratio of international firm  $Q$ s to those of their domestic counterparts is reported in the third column of Table 10. The New Zealand ratio of 1.26 is considerably higher than both Australia's 1.04 and the sample average of 1.15. This may indicate that the pricing process being applied to stocks listed solely on New Zealand capital markets differs from that applied to international firms, consistent with local capital markets being at least

somewhat segmented from foreign markets. Of course, the definition of an international firm here is one that participates in United States or European capital markets, so this result may only confirm above findings that New Zealand appears to be more integrated with Asia-Pacific markets than with developed western markets. It would be interesting to see if similar results continue to hold when the definition of an international firm is broadened to include, for example, New Zealand firms listed in Australia.

## 2.6 Participation in foreign markets

All the methods for measuring integration that have been employed thus far focus on price behaviour. Pungulescu (2008) argues that a useful complementary approach is to look at *participation*, i.e., quantity behaviour. The idea here is that investor under-weighting – relative to the theoretical benchmark of fully integrated markets – of foreign assets is indicative of market segmentation.<sup>13</sup>

The extent of foreign stock under-weighting by residents of country  $i$  is defined as the actual country  $i$  investment in these stocks relative to the optimal level of investment specified by standard portfolio choice models:

$$UW_{it} = \frac{actual_{it}}{optimal_{it}}.$$

where  $optimal_{it}$  is calculated as the proportion of foreign stocks in the world market portfolio. So for example, a country that makes up 10% of the world market portfolio should hold 90% of its equity investments in foreign securities and  $UW = 0.2$  would indicate that it actually only holds 18%, i.e., 1/5 of the optimum quantity, or 80% underweight.

Table 11 reports  $UW$  for both investor countries and destination countries. The first of these calculates  $UW$  from the perspective of local investor holdings of foreign equities, i.e., the Australian value of 0.24 indicates that Australians underweight foreign equities in their investment portfolios by  $(1 - 0.24) = 76\%$  on average. The second reports  $UW$  from the perspective of foreign investor holdings of local equities, i.e., the Australian value of 0.22 indicates that non-Australian investors underweight Australian equities in their investment portfolios by  $(1 - 0.22) = 78\%$  on average. The

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<sup>13</sup>The so-called ‘home bias’ has long been noted in the international finance literature. For an in-depth discussion and analysis, see Frogley (2005).

Table 11: Equity home bias: investor and destination countries

For each country in the table, the first column shows local investor holdings of foreign equities *relative to* the theoretical optimum (the weight of foreign equities in the world market portfolio) as of 2000; numbers greater (less) than 1.0 denote over-(under-)weighting by local investors in foreign equities. The second column shows foreign investor holdings of local equities *relative to* the theoretical optimum (the weight of local equities in the world market portfolio) as of 1997; numbers greater (less) than 1.0 denote over-(under-)weighting by foreigners in local equities.

	Investor country bias Bertaut and Kole (2004)	Destination country bias Faruquee et al. (2004)
Australia	0.24	0.22
Canada	0.26	0.30
Finland	0.25	0.12
France	0.24	0.20
Germany	0.26	NA
Ireland	NA	0.86
Japan	0.11	0.13
Korea	0.01	NA
Malaysia	0.01	0.03
New Zealand	0.36	0.31
Singapore	0.27	0.28

results reveal substantial home bias: all countries in the table significantly underweight foreign equities in their investment portfolios, while all countries except Ireland are significantly underweighted as an investment destination. This suggests at least some degree of market segmentation, since all ratios should be equal to 1.0 in a perfectly integrated market.<sup>14</sup> Overall, New Zealand scores relatively well, having the least amount of under-weighting as an investor country and the second-least as a destination country; under-participation levels are approximately 10-15% lower than those of Australia. Although not shown in the table, the Australian market is highly attractive to New Zealand investors: New Zealand's UW score for investment in Australia is a massive 4.2. However, a cautionary note is in order here: both investor and destination country calculations are based on relatively old data (2000 and 1997 respectively) that may not be representative of the more recent past.

What about participation in non-equity markets? Here, much less is

<sup>14</sup>Of course, this assumes that the optimal benchmark is correctly specified. However, the deviation from this benchmark is so systematic and so pronounced that misspecification is unlikely to be a large part of the puzzle.

Table 12: Lender home bias: participation by Australian banks in syndicated loans to Asia-Pacific countries

Various measures of Australian bank participation in 4661 syndicated loans to borrowing firms from 12 Asia-Pacific countries during 1999–2006, based on the data in Table 2 of Boyle and Stover (2008). The first numerical column gives the number of loans (by country) in which Australian banks participate. Proportion of loans expresses this number as a proportion of the total number of loans made to that country in the Boyle and Stover sample. Total contribution is the total investment (\$mill) in these loans. Contribution per loan equals Total contribution divided by Number of loans. Loan share equals Total contribution divided by the total value of country-loans. Banks per loan is the average number of participating Australian banks in each loan. Source: Boyle and Stover (2008).

Borrower Country	Number of loans	Proportion of loans	Total contribution (\$mill)	Contribution per loan (\$mill)	Loan share	Banks per loan
Australia	416	0.95	45024.69	108.23	0.49	2.06
New Zealand	103	0.96	11944.52	115.97	0.59	2.16
Hong Kong	44	0.12	1129.23	25.66	0.05	0.13
India	13	0.15	172.82	13.29	0.11	0.14
Indonesia	2	0.07	22.65	11.33	0.17	0.07
Japan	14	0.01	1093.05	78.07	0.16	0.01
South Korea	19	0.05	433.86	22.83	0.11	0.05
Malaysia	15	0.14	401.47	26.76	0.08	0.15
Philippines	9	0.13	124.27	13.81	0.05	0.14
Singapore	17	0.12	830.55	48.86	0.17	0.14
Taiwan	5	0.01	154.82	30.96	0.17	0.01
Thailand	0	0.00	0.00	0.00	0.00	0.00
Asia Region	13.60	0.034	435.13	31.99	0.088	0.084

currently known, but a recent paper by Boyle and Stover (2008) examines the lending decisions of Australian banks (as measured by their participation in syndicated loans) with respect to borrowers from 12 countries in the Asia-Pacific region between 1999 and 2006. A summary of their findings appears in Table 12 which, overall, indicates considerable regional segmentation. For one class of borrowers – firms from Australia *and* New Zealand – Australian banks as a group are active loan syndicate participants, providing an average contribution of over \$110 million to 95% of such loans. For another class of borrowers – firms from the wider Asian region – participation is much thinner: an average contribution of \$32 million to less than 4% of loans.<sup>15</sup> However,

<sup>15</sup>Boyle and Stover (2008) show that much of this apparent bias can be ‘explained’ by various important differences with Australia and New Zealand - geographical, cultural, legal and banking.

Table 13: Ratio of international to domestic firms by country

For each country in the table, the column numbers represent the ratio of (i) international firms to (ii) domestic firms in the samples of the respective authors. Both samples cover the period 1989–2000. International firms are those that list on the LSE, NYSE or NASDAQ or have otherwise raised equity capital in international markets.

	Gozzi et al. (2008) Sample size = 9096	Claessens and Schumukler (2007) Sample size = 39517
Australia	0.36	0.12
Canada	0.32	0.15
Finland	0.25	0.18
France	0.10	0.08
Germany	0.07	0.07
Indonesia	0.09	0.05
Ireland	1.15	0.75
Japan	0.05	0.07
Korea	0.08	0.03
Malaysia	0.04	0.02
New Zealand	0.20	0.12
Phillippines	0.20	0.08
Singapore	0.08	0.08
Taiwan	0.19	0.09
Thailand	0.07	0.05
Total	0.15	0.07

New Zealand firms would seem to be well integrated into the Australian bank lending market. Indeed, Australian participation in loans to New Zealand borrowers is, if anything, on a slightly greater scale than their involvement with Australian borrowers.

A final participation measure is the extent to which a country's firms actively engage with foreign capital markets, i.e., are 'internationalised'. As discussed above, an international firm is defined to be one that has listed on a major exchange such as the LSE, NYSE or NASDAQ, or has otherwise raised equity capital in international markets (without listing). Countries with high proportions of such firms would seem, *prima facie*, to be more integrated with world capital markets. Table 13 uses data from two studies by Gozzi et al. (2008) and Claessens and Schumukler (2007) to calculate the ratio of international to domestic firms across a range of countries. Perhaps surprisingly, New Zealand scores fairly highly according to this measure, ranking in the top 1/3 of countries in both samples. Compared to Australia, New Zealand's proportion of international firms is about half in the Gozzi

Table 14: New Zealand and Australia ‘rankings’ in the various integration measures

Summary of the New Zealand and Australia integration rankings in Tables 6–13. ‘x/y’ denotes a ranking of ‘x’ in a sample of ‘y’ countries. In the final column, terms in parentheses refer to the source column of the corresponding table.

	New Zealand	Australia	Data coverage	Table
<i>Return correlations</i>				
Short-term	10/17	5/17	Global; 1990–2007	Table 6(1)
Long-term	5/17	7/17	Global; 1800–2000	Table 6(2)
<i>Valuation measures</i>				
Earnings yield	9/15	2/15	Global: 1980–2005	Table 9(1)
Earnings yield change	9/15	2/15	Global: 1980–2005	Table 9(2)
Market-Book	7/12	4/12	Global: 1980–2005	Table 10(1)
Tobin’s $Q$	7/15	6/15	Global: 1989–2000	Table 10(2)
Intl–Domestic $Q$	11/15	2/15	Global: 1989–2000	Table 10(2)
Discount rate	1/10	6/10	Asia-Pacific: 2006	Table 8
<i>Equity home bias</i>				
Investor country	1/12	8/12	Global; 2000	Table 11(1)
Destination country	4/11	8/11	Global; 1997	Table 11(2)
<i>International firms</i>				
Small sample	5/15	2/15	Global: 1989–2000	Table 13(1)
Large sample	4/15	4/15	Global: 1989–2000	Table 13(2)

et al. sample, but identical in the much larger sample of Claessens and Schmukler.

To conclude this section, a synthesis of New Zealand ‘rankings’ according to these various measures of integration is given by Table 14. The overall picture is one of a country that ‘participates’ extensively in international capital markets, attracts considerable investment from foreign investors, but whose domestic pricing and valuation processes differ somewhat from those operating in global markets. Interestingly however, the latter phenomenon seems to disappear when the foreign markets considered are restricted to be from the Asia-Pacific region.

### 3 Final comments

The relatively fragmented nature of the above evidence means that it is difficult to make definitive or precise statements about the extent of New Zealand's integration with world capital markets. Nevertheless, with some trepidation, three tentative conclusions may be in order.

1. The degree of integration between the New Zealand and Australian markets appears to be high. Equity returns are strongly correlated, each country participates heavily in the equity market of the other, and Australian-owned banks not only have a dominating presence in New Zealand, but also treat New Zealand borrowers as 'one of their own' when it comes to large lending positions. Although some barriers may remain – such as the non-recognition of New Zealand tax imputation credits – resolution of these seems more likely to determine the choice of firm location (both physically and in terms of exchange listing) than contribute materially to trans-Tasman integration per se.
2. Beyond Australia, New Zealand may be more integrated with countries in the Asia-Pacific region than it is with the older and more developed markets of Western Europe and North America. By contrast, there is some evidence to suggest the reverse is the case for Australia.
3. Overall, there is little evidence to suggest that New Zealand capital markets suffer from a significant segmentation problem. Its rankings across the various integration measures are generally in the top 2/3 of the countries reported.

However, one would be unwise to push any of this too far. Most of the studies cited and utilised in this paper either use relatively old data, or are in working paper (i.e., preliminary) form, and/or are unable to shed detailed light on New Zealand's situation. Clearly, there is a need for additional work using the most recent data available that focuses specifically on New Zealand. Such work might include:

- An application of the Costello et al. (2008) exercise to New Zealand, both with respect to the rest of the world and to individual countries, to determine the extent of any remaining diversification benefits that New Zealand is able to offer foreign investors.

- An update of the Chay et al. (2001)-type analysis to determine the relative importance of global versus industry versus country factors in the pricing of New Zealand securities.
- An extension of the International–Domestic firm  $Q$  ratio analysis to one that defines ‘International’ as including Australian-listed New Zealand firms (see p21).
- An updating of the various valuation ratio and equity participation analyses to more recent data.
- An extension of the Kim and Sheen (2007) study to risk-sharing arrangements with countries other than Australia and, possibly, to other welfare measures.

What if such additional analysis indicated that New Zealand could achieve, and benefit from, additional integration with world capital markets? What might facilitate such development? Most studies of the determinants and effects of integration stress factors that are largely beyond New Zealand’s control (e.g., size and distance from other markets), or on which New Zealand already scores highly (e.g., creditor and shareholder rights, efficiency of legal system). However, some hint might be given by Schularick and Steger’s (2006) demonstration of the importance of property rights for attaining the full benefits of integration. New Zealand government knee-capping of Telecom shareholders and interference in the affairs of Auckland Airport shareholders, and NZX’s short-lived intention to disenfranchise majority-block shareholders on matters relating to independent director appointments are recent examples of scant regard being paid to investor property rights, with potentially damaging implications for New Zealand capital markets. While foreign investors are generally prepared, in a rule-of-law country like New Zealand, to take a chance on capricious users of capital, they are likely to be far less inclined to risk exposure to the whims of governments and regulators.



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