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World, Regional and Political Risk Influences Upon Asia Pacific Equity Market Returns

by
Richard Heaney †
Vince Hooper §

Abstract:

This paper focuses on the explanatory power of world influences, regional effects and political risk indices on the equity market returns for a selection of Asia Pacific countries. The results support the notion that emerging equity market returns are driven by both regional and global factors. Political risk indices provide little explanatory power over returns. It is discovered that 'Regionalism' is a strong influence upon the markets located within ASEAN, and is priced accordingly. Countries whose equity markets are considered to be more open exhibit greater covariability with the world market portfolio. Financial risk indices provide some explanatory power over volatility for roughly half of the sample. The results suggest that emerging market returns may be captured more effectively by multi-index models that incorporate a regional factor and that political risk indices may help in explaining market volatility.

Keywords:

EMERGING EQUITY MARKETS; REGIONAL; ASEAN; APEC; POLITICAL RISK; VOLATILITY.

† Reader, Department of Commerce, Faculty of Economics and Commerce, The Australian National University, Canberra, ACT, 0200.
§ Lecturer, Department of Commerce, Faculty of Economics and Commerce, The Australian National University, Canberra, ACT, 0200.

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1. Introduction

This paper examines the impact that regional and world effects have upon selected equity market returns with a focus on the Asia Pacific region. The sample includes Australia, Hong Kong, Indonesia, Japan, South Korea, Malaysia, New Zealand, Philippines, Taiwan and Thailand. These countries are all members of the Asia Pacific Economic Co-operation (APEC) and around half are members of the Association of South East Asian Nations (ASEAN). Regional impacts are expected to be prevalent due to social, cultural, economic, political and geographical linkages. Political Risk Services Inc. (PRS) provide the political risk indices used to capture country specific variation in risk. These indices cover a broad range of factors including the impact of financial market liberalisation.

There has been a change in the world's political dynamics that has encouraged the rise of emerging equity markets in developing countries. The new 'emerging markets' compete for capital to finance the privatisation of former state-run enterprises and new ventures. Further, there has been a gradual decrease in barriers to investment in these markets which has been accompanied by a dramatic increase in portfolio equity flows to these markets[1]; though it is difficult to determine the impact on long-term portfolio equity flows which will accompany the recent 'Asian meltdown'. The key characteristic of these changes is the tendency for greater economic and political links between the countries in the Asia Pacific region, suggesting greater regional impacts on the economies of Asian Pacific countries and possibly on the equity markets as well.

Investment in emerging equity markets is often encouraged because of relatively low correlation with developed equity markets (Divecha, Drach & Stefek 1992; Errunza 1977). This low correlation may be due to market segmentation arising from factors such as market frictions which constrain cross country assets flows (Jorion & Schwartz 1986; Hietala 1989; Gultekin, Gultekin & Penati 1989; Campbell & Hamoa 1992; Mittoo 1992; Errunza, Losq & Padmanabhan 1992). Recent analysis of the level of segmentation across world markets suggests that rather than observe the extremes of full segmentation or full integration, an important dimension of emerging equity markets is the possibility of a market being both partially integrated and partially segmented (Choi & Rajan, 1997). Further, Bekaert and Harvey (1995) find that most emerging equity markets have exhibited time-varying integration during the 1970s and 1980s. In addition, there is evidence of a reduction in volatility as markets are liberalised (Bekaert & Harvey 1997).

Trade blocs like ASEAN[2] may provide a situation where emerging markets are partially segmented from the world economy but integrated into smaller regional groups. Further, 'Open Regionalism' provides an alternative model where countries form loose trading blocs which are open to the world economy. This

1. For example, the World Bank (1996) reported a ten-fold increase in portfolio equity flows over the period 1990-1993. Foreign equity flows to developing countries of $34.9 billion in 1994 and $22.0 billion in 1995 are recorded. As an indication of new capital raised in emerging equity markets, the World Bank (1996) estimates that international equity issues amounted to $10.3 billion in 1995. The majority of capital raised in IFC (International Finance Corporation) emerging equity markets were located in Asia Pacific countries. South Korean companies raised $1.3 billion, Malaysian and Philippines companies raised $1.2 billion. Chinese, Indonesian and Thai companies each raised around $620 million.
2. ASEAN includes Brunei, Malaysia, Singapore, Indonesia, Philippines, Thailand and Vietnam.

later form is evident in the Asia Pacific Economic Co-operation (APEC), which is composed of 18 member nations from the Asia Pacific.[3] Under the doctrine of 'Open Regionalism', regional trade is promoted, provided it is consistent with GATT (General Agreement on Trade and Tariffs) principles. Thus it is expected that future cash flows generated by companies within such regions will also be correlated. The regional effect may be even more apparent with more restrictive groupings such as ASEAN. Thus equity market returns may be explained both by world returns and regional returns.

Political risk indices are used in this paper to model country specific equity market impacts. Political risk can encompass many elements such as blocked funds; repatriation constraints, in the form of exchange controls; expropriation or nationalisation of property or resources; inconvertibility of currency; war damage; civil strife; actions against personnel, for example, kidnapping; limits on remittances; government interference with the terms of a contract; discriminatory taxation; politically based regulations on operations; and the loss of copyright protection (Howell & Chaddick 1994; Buckley 1992). The complexity of political risk measurement is discussed in Jodice (1985), Mohtadi (1992), Rice and Mahmoud (1990) and David (1985). Different types of firms will be affected in varying degrees by changes in a country's political risk that may generate opportunity as well as threat.[4] Prast and Lax (1982) argue that political risk is the probability that the goals of a project will be affected by changes in the political environment. It is this probability that commercial country risk consultancies attempt to capture with their published indices. Various risk measures exist for individual countries such as the ratings provided by Institutional Investor and Euromoney and the indices reported by PRS. This paper focuses on the indices provided by PRS to capture country specific risk characteristics. The results of Erb, Harvey and Viskanta (1996) suggest that the indices are highly correlated with returns. Further, they also find the indices are correlated with the more traditional financial measures used in analysis of emerging market returns and volatility.

This paper focuses on the impact that regional and world effects have upon equity market returns. PRS indices are used to model the country specific returns and, where required, volatility effects. The statistical method used in analysis is described in the following section while the data is described in section 3. Section 4 provides an analysis of the data and section 5 provides a summary of the results.

2. Model

Country-specific factors could also be important in explaining returns and to this end we employ political risk indices which have been shown to capture

3. Its members include Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, Malaysia, Mexico, New Zealand, Papua New Guinea, Philippines, Singapore, South Korea, Taiwan, Thailand and the USA. These economies account for more than half of world GDP and almost 40% of world trade. In addition, 65% of their exports are amongst each other (Elek 1992).
4. For example, supposing sanctions are imposed against a country, then foreign firms could well be adversely affected but local firms might benefit from such action.

idiosyncratic country effects[5] (Erb, Harvey & Viskanta, 1996) much like the instruments used in Berkaert and Harvey (1997). A linear model is chosen to give:

$$R_{it} = a + b\,R_{mt} + c\,R_{at} + d\,R(Pol)_t + e\,R(Eco)_t + f\,R(Fin)_t + e_{it} \quad (1)$$

where: R_{it} = total equity return for country *i*, at time *t*
R_{mt} = total return on a world equity portfolio, at time *t*
R_{at} = total return on a regional equity portfolio, at time *t*
$R(Pol)_t$ = proportional change in the political risk index, at time *t*
$R(Eco)_t$ = proportional change in the economic risk index, at time *t*
$R(Fin)_t$ = proportional change in the financial risk index, at time *t*
a, b, c, d, e, f = coefficients
e_{it} = residual country specific returns, at time *t*.

There has been some evidence of heteroscedasticity in emerging market returns and for this reason there is a need to model changes in volatility. A GARCH process is often used to model the volatility of returns (Bekaert & Harvey 1995, 1997; Giovannini & Jorion 1989). However, the assumption that non-constant volatility is best handled with a GARCH process is not clear especially given the use of monthly data and the availability of political risk indices. Risk index levels are used in this paper to model volatility as these indices are designed to capture changes in the level of country specific risk[6]. An exponential model is used to model time-changing variance. This simple approach allows variance to be modelled as a function of the political risk indices yet excludes the possibility of negative variance (Harvey 1990) which can occur with simple linear models of variance. The resulting variance model takes the form:

$$\sigma_{it}^2 = exp(g + h\,Pol_t + i\,Eco_t + j\,Fin_t) \quad (2)$$

where: σ_{it}^2 = time changing variance for country *i*, at time *t*
Pol_t = political risk index, at time *t*
Eco_t = economic risk index, at time *t*
Fin_t = financial risk index, at time *t*
g, h, i, j = coefficients
$exp(.)$ = exponential function.

Equations (1) and (2) give rise to a simple model designed to capture the explanatory power of regional and world effects on emerging nation equity market returns while controlling for idiosyncratic country effects through the introduction of three indices, the political risk, economic risk, and financial risk index. Some evidence exists for heteroscedasticity in the returns and so variance is modelled as an exponential function of the three political risk indices.

5. The authors much appreciate the suggestion of reviewers to include the risk indices in the mean equation. This avoids confusion in the final analysis and provides a more general model for testing purposes.
6. If we choose variance as a measure of risk then it is expected that variance would be a function of the index level rather than the proportional change in the index over time.

3. Data

3.1 Equity Returns

Total US dollar (USD) returns are obtained for Australia, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Taiwan and Thailand. These returns are based on end-of-month index values. The majority of the time series cover the period January 1985 to August 1997. Exceptions include Indonesia (January 1990 to August 1997), South Korea (March 1985 to August 1997) and New Zealand (January 1988 to August 1997).

The indices are obtained from Datastream and include both Morgan Stanley Capital International (MSCI) indices and the International Finance Corporation (IFC) indices. The MSCI total return indices are used for Australia, Hong Kong, Japan, New Zealand, Singapore, the USA and the world index. The IFC indices provide time series for Indonesia, South Korea, Malaysia, Philippines, Taiwan and Thailand. World impacts on return are captured using both the MSCI world index and the USA index, although only the world index results are reported[7]. One problem with the use of indices in equation (1) is the possibility of spurious regression where a large proportion of the chosen regional and world indices consists of the country that is the subject of the regression. For this reason a unique regional index is constructed for each country that consists of an equally weighted index of sample countries excluding the country subject to analysis. This minimises the impact of spurious regression in equation (1) with respect to the regional index.

All returns are monthly US dollar (USD) total returns converted to continuously compounded rates of return per month. Serial correlation in the country returns is generally low, with Chi-square tests not identifying statistically significant serial correlation for any of the countries[8].

3.2 Risk Indices

Risk indicators are obtained from PRS Inc. These indices attempt to measure the risks relating to regime stability, turmoil, financial transfer, direct investment and export markets with the critical factors in Political Risk Services' International Country Risk Guide (ICRG) Rating system described in Table 1.

The indices are designed such that the higher the index number, the lower the risk assessed for the country. If the index increases over a period, this indicates that the level of risk has fallen over that same period. With the ICRG rating system, Political Risk Services Inc. classifies countries into the following broad categories according to percentage: very high risk is 0% to 49.5%; high risk is 50.0% to 59.5%; moderate risk 60.0% to 69.5%; low risk is 70.0% to 84.5%; very low risk is 85.0% to 100.0%.

7. Results of analysis using the MSCI USA index are available from the authors on request. There is some variation in results for individual countries, especially Japan, though the general results are similar for both the MSCI USA index and the MSCI World index.
8. Although descriptive statistics are not reported here, they are available from the authors on request.

Table 1

Critical Factors in the ICRG Rating System

Factor	Points Index	% of Individual
Political		
Economic expectations versus reality	12	12
Economic planning failures	12	12
Political leadership	12	12
External conflict	10	10
Corruption in government	6	6
Military in politics	6	6
Organised religion in politics	6	6
Law and order tradition	6	6
Racial and national tensions	6	6
Political terrorism	6	6
Civil war	6	6
Political party development	6	6
Quality of bureaucracy	6	6
Total Political Points	**100**	**100**
Financial		
Loan default or unfavourable loan restructuring	10	20
Delayed payments of suppliers; credits	10	20
Repudiation of contracts by governments	10	20
Losses from exchange controls	10	20
Expropriation of private investments	10	20
Total Financial Points	**50**	**100**
Economic		
Inflation	10	20
Debt service as a percentage of exports of goods and services	10	20
International liquidity ratios	5	10
Foreign trade collection experience	5	10
Current account balance as a percentage of goods and services	15	30
Parallel foreign exchange market indicators	5	10
Total Economic Points	**50**	**100**
Overall Points	**200**	

Note: Rounding errors could lead to some variation between individual percentage entries and the total percentages.

4. Analysis

The analysis of country specific returns is reported in Table 2, with diagnostics reported in Table 3. There is evidence to suggest that returns in emerging equity markets are driven by both regional and world factors. Regional factors exhibit a greater impact than world factors in a number of the countries consistent with the arguments of Divecha, Drach and Stefek (1992). Table 2 reports the results of maximum likelihood estimation of equations (1) and (2), while Table 3 reports separate tests of the impact of political risk indices and stability of the mean equation over the period. The estimation approach is described in the appendix.

Table 2

Test of the Explanatory Power of Regional Returns, World Returns Political Risk Indices Over Country Index Returns

The model consists of mean equation and variance equation estimated using maximum likelihood. The mean equation captures regional as well as world effects while the variance equation models the ability of PRS risk indices to explain changes in the variance of country specific returns (mean equation residuals).

$$R_{it} = a + b\,R_{at} + c\,R_{mt} + d\,R_{Polr,t} + e\,R_{Ecor,t} + f\,R_{Finr,t} + e_{it}$$

where: R_{it} = total equity return for country i, R_{at} = total return on an equally weighted Regional Index, R_{mt} = total return on the MSCI world Index, $R_{Polr,t}$ = natural log of the political risk index relative, $R_{Ecor,t}$ = natural log of the economic risk index relative, $R_{Finr,t}$ = natural log of the financial risk index relative, e_{it} = residual or country specific returns, a = constant term, b = regional effects beta, c = world effects beta, d, e, f = betas for proportional changes in political risk indices.

$$\sigma_{it}^2 = exp(g + hPol_t + i\,Eco_t + j\,Fin_t)$$

where: σ_{it} = standard deviation in residuals, e_{it}, for country i, Pol_t, Eco_t, Fin_t = risk indices for Political risk, Economic risk and Financial risk, f = constant term, g, h, i = risk index betas.

	Mean Equation						Variance			
Nation	Const	Reg	Wld	Polr	Ecor	Finr	Const	Pol	Eco	Fin
AUS	0.00	0.29	0.51	–0.12	–0.06	0.10	20.89	–5.01	–33.85	–23.66
	(0.0)	(2.6*)	(3.6*)	(–0.3)	(–0.1)	(0.5)	(5.2*)	(–1.4)	(–3.3*)	(–3.4*)
HKG	0.0	0.93	0.20	0.54	0.20	–0.27	–5.16	–1.73	9.77	–7.71
	(1.5)	(7.6*)	(1.3)	(2.1*)	(0.4)	(–2.3)	(–2.7*)	(–0.7)	(1.8)	(–2.5*)
IDO	0.0	0.25	–0.04	–0.60	0.01	–0.17	–1.61	–7.14	1.16	0.96
	(0.7)	(1.0)	(–0.1)	(–1.1)	(0.0)	(–0.7)	(–0.3)	(–2.5*)	(0.0)	(0.1)
JAP	–0.0	–0.34	1.71	0.20	–0.13	–0.32	2.86	–0.66	–2.29	–15.61
	(–1.8)	(–4.2*)	(16.0*)	(0.7)	(–0.3)	(–1.0)	(0.4)	(–0.2)	(–0.4)	(–1.7)
KOR	–0.0	0.05	0.56	–0.25	0.10	0.32	–0.66	–0.57	–10.29	–0.45
	(–0.1)	(0.4)	(2.8*)	(–0.7)	(0.2)	(0.9)	(–0.3)	(–0.3)	(–1.2)	(–0.2)
MAL	–0.0	1.04	–0.07	0.58	0.13	–0.51	–8.48	5.00	4.72	–6.99
	(–0.2)	(8.7*)	(–0.5)	(1.4)	(0.4)	(–1.8)	(–3.5*)	(1.9)	(0.7)	(–3.0*)
NZD	0.0	0.17	0.75	0.06	–0.28	0.24	71.96	–9.55	–8.24	–145.98
	(0.0)	(1.3)	(4.4*)	(0.1)	(–0.3)	(1.0)	(3.6*)	(–1.9)	(–1.0)	(3.7*)
PHI	0.0	1.24	–0.23	0.08	0.31	–0.08	–4.23	2.49	5.74	–13.81
	(0.7)	(6.8*)	(–1.0)	(0.4)	(1.3)	(–0.3)	(–3.3*)	(0.8)	(0.8)	(–3.3*)
SNG	–0.0	0.89	0.20	0.34	0.75	–0.01	3.88	–11.53	24.35	–25.18
	(–0.2)	(11.9*)	(2.4*)	(1.2)	(1.9)	(–0.1)	(1.3)	(–2.5*)	(3.9*)	(–7.5*)
TAI	0.0	0.85	0.23	0.48	0.74	0.42	–5.08	–24.58	53.86	–7.73
	(0.4)	(3.5*)	(0.8)	(0.9)	(0.4)	(1.6)	(–1.1)	(–5.7*)	(4.8*)	(–1.4)
THA	0.0	1.24	–0.35	0.79	0.17	–0.01	–6.98	3.08	–1.09	0.37
	(0.1)	(8.4*)	(–1.9)	(2.4*)	(0.4)	(–0.0)	(–3.8*)	(0.9)	(–0.1)	(0.1)

Note: * (+) statistically significant at the 5% (10%) level of significance.

AUS = Australia, HKG = Hong Kong, IDO = Indonesia, JAP = Japan, KOR = South Korea, MAL = Malaysia, NZD = New Zealand, PHI = Philippines, SNG = Singapore, TAI = Taiwan, THA = Thailand, const = constant term, Reg = Equally weighted regional index (excludes the country returns), Wld = MSCI Wld equity market index, Polr. = proportional change in PRS Political Risk Index, Finr. = proportional change in PRS Financial Risk Index, Ecor. = proportional change in PRS Economic Risk Index, Pol. = PRS Political Risk Index, Fin. = PRS Financial Risk Index, Eco. = PRS Economic Risk Index.

Table 3
Diagnostic Tests and Tests of Model Restrictions

	Diagnostics					
Nation	Corr. Obs. vs. pred.	Serial Corr. (12 lags)	ARCH(1)	Test $d=e=f=0$	Test $h=i=j=0$	Test b, c stable
AUS	0.32	12.60	0.66	0.36	55.15*	9.97
HKG	0.49	9.67	0.28	10.56*	10.18*	17.44*
IDO	0.05	7.19	2.00	1.65	6.88	8.49
JAP	0.65	18.37	0.06	1.91	3.40	4.97
KOR	0.10	10.67	0.34	1.48	5.28	6.89
MAL	0.47	9.94	3.27	5.14	8.83*	11.49
NZD	0.18	10.51	0.00	1.28	19.41*	9.72*
PHI	0.21	7.09	1.15	3.02	27.01*	32.98*
SNG	0.63	9.45	0.39	6.78	60.82*	7.99
TAI	0.14	7.99	0.00	4.13	46.03*	0.11
THA	0.41	12.80	0.54	6.09	2.35	10.09

Note: Corr. Obs vs. pred = squared correlation coefficient between observed and predicted values, Ser. Corr (12 lags) = Chi-square test (12 lags) for serial correlation based on standardised residuals with 5% critical value of 21.03, Arch (1) = test for first order ARCH effects using standardised residuals with 5% critical value of 3.84, Test $d=e=f=0$ = Wald test for statistical significance of the risk indices in the mean equation, Test b, c stable = dummy variable based Wald test for stability of the regional and world coefficients over the study period where the period is split in half, Test $h=i=j=0$ = Wald test for statistical significance of the risk indices in the variance equation. The Wald tests for parameter stability in the mean equation for Japan, South Korea, New Zealand and Taiwan were run on the restricted models as convergence difficulties arose where political risk indices, though not statistically significant, were included in the model.

The regional index beta and the MSCI world index beta estimates vary across countries. In eight of the eleven countries the regional index betas are statistically significant though there are only five statistically significant world index betas.[9]

Hong Kong exhibits a statistically significant regional index beta that is close to one and larger than the world index beta that highlights its Asian focus. In the case of ASEAN countries, the regional index betas are consistently greater than the world index betas. For example Indonesia, Malaysia, Philippines, Thailand all exhibit regional betas close to one while world index betas are considerably smaller in magnitude and negative. Singapore is the only ASEAN country that has positive world and regional betas. This reflects Singapore's greater openness to the world economy.

Taiwan has a high regional index beta and a low world index beta. Taiwan is similar to Hong Kong in this regard as it is likely to be heavily influenced by trade

9. This tendency is also apparent when the USA index is chosen as the proxy for the world index though the magnitude of the beta estimates tend to vary somewhat. It is only the Japanese regional beta that is particularly sensitive to world index choice taking a negative value where the MSCI world index is used and a positive value where the USA index is used. The most likely explanation for this result is the importance of Japan to the world index with consequent correlation effects.

with mainland China. Unfortunately, in this study, due to data restrictions, China's equity market returns could not be examined. However, the influence of China's possible impact upon equity market returns in the Asia Pacific region should not be ignored (Jia & Muraoka 1996).

The South Korean equity market has a world index beta that is statistically significant and a regional index beta that is smaller in magnitude and statistically insignificant.[10] This reflects South Korea's isolation from North Korea, as well as its reliance upon world markets for its trade. The world index betas for the countries Australia, Japan and New Zealand, are positive, statistically significant[11] and greater than the regional index betas which are also positive. Given the broad composition of the MSCI world index this result suggests that the equity market in Australia, Japan and New Zealand are more sensitive to world factors.[12] The economies of these countries are at a more mature stage of internationalisation and that helps explain this discovery.

These results suggest that a number of countries whose economies are integrated on a regional basis (e.g. ASEAN) tend to exhibit smaller world index betas than countries whose markets are likely to be integrated on a world basis. The notions of restrictive regionalism evident in ASEAN and 'open regionalism' of APEC (Elek 1995; Garnaut 1994; Ariff 1994; Arndt 1993) reinforces this finding under which, some Asian economies are more integrated on a regional basis than globally.

Statistical tests were conducted to ascertain the explanatory power of the political risk indices in the mean and variance equations. The statistics in Table 3 suggest that the political risk indices provide little additional explanatory power once the impact of regional and world returns are taken into account. Chow tests are used to test for the possibility of structural change in the mean equation over the sample period. There is little evidence (Table 3) of structural change except for three countries, Hong Kong, the Philippines and New Zealand. There is an increase in the Hong Kong and Philippines regional betas over the period, consistent with an 'opening' of the economy towards Asia Pacific countries. Further, the massive deregulation observed in New Zealand over the 1990s provides one explanation for the increase in the New Zealand world beta over the period.

The country risk indices used in this study increase as risk declines and decrease as risk increases. Thus the predicted sign of the relationship between country risk index and equity market volatility is negative. In cross-sectional analysis Erb, Harvey and Viskanta (1996) find a negative relationship between risk index and volatility consistent with this hypothesis but the contribution of this paper is in determining whether the negative relationship is also observed over time for individual countries.

To gain some understanding of the interaction between political risk indices and estimated variance model we take the estimated variance equation for Australia from Table 2 and select representative index values. The beta estimates

10. This strong world effect is sensitive to world return proxy choice, with a decrease in relative importance when the USA index is used.
11. When the USA index is used as the world index proxy, statistical significance is only observed for Australia, Hong Kong, Malaysia and Singapore.
12. The USA index betas highlight the fact that, except for the countries Australia, Singapore and Hong Kong, the USA equity market is not a dominant explanatory factor of the equity market returns of these countries.

for Australia include the variance equation constant, 20.89, the political risk beta, –5.01, the economic risk beta, –33.85 and the financial risk beta, –23.66. Say the actual risk index values are 81.04, 37.13 and 42.64 respectively then in this example the country specific variance for the month is 0.0029 or 0.29% [*exp(*20.89 – 5.01*0.8104 – 33.85*0.3713 – 23.66*0.4264)].

The relationship between individual risk indices and volatility varies across the countries with most consistency evident with the financial risk index. In this case the financial risk beta is statistically significant and negatively signed in six of the eleven cases reported in Table 2. Indonesia and Thailand provide a puzzle, with positive coefficients for the financial risk beta. The political risk and economic risk betas are less consistent across the countries with few statistically significant betas, although there is also a preponderance of negatively signed political and economic risk betas. The consistency in the sign of the financial risk index is an important finding because it highlights the possibility that greater financial risk, as measured by the financial risk index, is associated with greater volatility in country specific equity returns over time. The variation in results for the indices should also be noted.

5. Summary

The focus of this paper is upon the impact of world, regional and political effects on Asia Pacific country equity market returns. Regional returns are important explanatory variables for the emerging Asia Pacific nation equity markets selected for analysis, especially members of ASEAN. In general the world return is less important, with the exceptions being found with the more integrated equity markets. Country-specific political risk indices provide very little time-series explanatory power over equity market returns. There is some variation in these results with the choice of world returns proxy, though in general the choice of world return proxy is not critical. The key result observed in this paper with respect to volatility is the consistency of the relationship between the financial risk index and equity market volatility. Decreases in the financial risk index are generally associated with increases in equity market volatility.

One topic for further research is the analysis of the predictive ability of commercial risk indices with regard to future equity market volatility. Further, additional research may help identify the extent of China's influence upon equity market returns in the Asia Pacific region.

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Appendix: Estimation Method

Equations 1 and 2 are estimated using Maximum Likelihood estimation. The multiplicative heteroscedasticity form is chosen for estimation because of its simplicity and avoidance of negative variance estimates (Harvey 1990). There is little guidance to aid model choice (Judge et al. 1985) though ARCH tests reported in Table 3 suggest that the more complex ARCH and GARCH family of models are not necessary for this data. The maximum likelihood estimates are based on the assumption that the errors are conditionally Gaussian with a log-density of the form:

$$l_t = -\frac{1}{2}\log(2\pi) - \frac{1}{2}\log(h_t) - \frac{1}{2}\frac{\varepsilon_t^2}{h_t}$$

for $t = 1, \ldots N$

and the log-likelihood function is:

$$L = \sum_{t=1}^{N} l_t$$

and the conditional variance takes the exponential form:

$$h_t = \exp(Z_t \alpha)$$

where Z_t are exogenous variables and α is the vector of parameters. The software package SHAZAM is used to solve this non-linear estimation problem using a quasi-Newton method. The variance-covariance matrix of parameter estimates is the inverse of the information matrix.

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