Country Risk and Macroeconomic Factors: Evidence from Asian Markets

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Using international version of capital asset pricing model (ICAPM), we analyze the response of country risk in Asia to a set of domestic and global macroeconomic factors. Specifically in a two-step process, we first estimate country beta models for Hong Kong, Indonesia, Malaysia, Philippines and Singapore and generate separate series of country risk variables for each market. In the second step we analyze the response of these country risks to five local factors and seven global factors. The local factors are: money supply, inflation, economic growth, interest rate and exchange rate while the international factors are: value of U.S. dollar against currencies of 15 industrialized countries, spread between 90-day Euro dollar deposit rate and 90 day U.S. Treasury Bill yield, weighted average inflation of G-7 countries, weighted average short term interest rates of G-7 countries, U.S. dollar price per barrel of crude oil, U.S. interest rate and U.S. inflation. The results indicate strong and significant effects of the global risk factors on country risk of all these Asian markets. The price of dollar has significant positive effects in all except in the case of Malaysia's country risk. In addition, the dollar euro spread, real interest rates and inflation of G-7 countries have a significant negative impact on country beta in all the cases. On the other hand, exchange rate (in case of Malaysia and Singapore) and to some extent money supply (only in case of Hong Kong) are the only local factors, which have a significant effect on country risk of these markets. Our results are consistent with previous findings that sensitivity to global risk factors increases as the markets become more integrated.

INTRODUCTION

International investors invest in emerging markets quite differently than they do in developed markets. The international investors perspective on country risk which is often used in conjunction with cross border investments is therefore quite different in developed versus emerging markets. International investors react to both global and local economic conditions while infusing capital in emerging markets when it is hot and offload local currency based holdings when the global and/or local economy slows down. The central banks of these countries get hard-pressed to prop up a large amount of devalued local currency based securities which such outflows leaves behind. This phenomenon is in contrast to the developed markets (like the U.S., United Kingdom, Japan), where investors react mainly to the local economic conditions and are more willing to hold on to the local currency denominated securities even in case of global slowdown.

The country risk for a given economy is the unique risk faced by foreign investors when investing in that country. For developed countries it is convenient to measure country risk by credit ratings. However, more refined measures are needed for emerging markets which are structurally different and where international investors respond dramatically to both local and global factors (Gangemi et al., 2000; Verma and Soydemir, 2006). For example, in case of emerging markets, during slowdown, an increase in the local interest rate which is supposed to entice investors and therefore reduce country risk (commonly seen in developed markets) becomes a double edged sword as it can also take a toll on the economic growth. Such simultaneous positive and negative effects can lead to increase or decrease in country risk.

Harvey (1991) suggested the country beta approach to model country risk. Under this approach the country risk is measured as the conditional sensitivity (or covariance) of country returns to the world stock returns. Accordingly, Harvey and Zhou (1993) estimate country betas for seventeen developed countries conditional on the effect of a weighted world market portfolio. Similarly, Erb at al. (1996b) estimate country betas for twenty-one developed and twenty-six emerging equity markets as a function of country credit risk. Gangemi et al. (2000) estimate Australia's country beta conditional on Australian macroeconomic variables by using a country beta approach. On similar lines Verma and Soydemir (2006) examined country risk of four Latin American countries.

In the light of these theoretical, empirical findings and recent global developments it can be postulated that the modeling of country risk in Asian emerging markets is quite different from those used in developed countries. However, it is important to realize that it would be unfair to lump all emerging markets into one basket. Findings for Latin American may or may not corroborate for Asian markets. Even there exist differences among countries of the same region. Many of the emerging markets have sound macroeconomic, financial, and policy fundamentals; some of the medium-term fundamentals for most emerging markets, including the fragile ones, remain strong: urbanization, industrialization, catch-up growth from low per capita income, a demographic dividend, the emergence of a more stable middle class, the rise of a consumer society, and the opportunities for faster output gains once structural reforms are implemented. Therefore, a differentiation is needed while investigating the determinants of country risk in Asian markets.

This study extends prior research by investigating whether global and local risk factors have any varying degrees of influence on country betas in five Asian markets: Hong Kong, Indonesia, Malaysia, Philippines and Singapore. This study contributes to the extant literature in the following distinct ways: first, unlike previous studies, which examine the effect of global and local factors on Asian stock returns, we investigate their effects on their time varying country risk. Second, we examine the determinants of time variations in country risk in Asia. Thirdly, we apply the country beta approach to a set of Asian countries, which have not been done in earlier studies.

We employ a two-step process to examine the postulated relationships: we first estimate country beta models for Hong Kong, Indonesia, Malaysia, Philippines and Singapore and generate separate series of country risk variables for each market; in the second step we analyze the response of these country risks to five local factors and seven global factors. The local factors are: money supply, inflation, economic growth, interest rate and exchange rate while the international factors are: value of U.S. dollar against currencies of 15 industrialized countries, spread between 90-day Euro dollar deposit rate and 90 day U.S. Treasury Bill yield, weighted average inflation of G-7 countries, weighted average short term interest rates of G-7 countries, U.S. dollar price per barrel of crude oil, U.S. interest rate and U.S. inflation.

The estimations results indicate strong and significant effects of the global risk factors on country risk of all these Asian markets. The price of dollar has significant positive effects in all except in the case of Malaysia's country risk. In addition, the dollar euro spread, real interest rates and inflation of G-7 countries have a significant negative impact on country beta in all the cases. On the other hand, exchange rate (in case of Malaysia and Singapore) and to some extent money supply (only in case of Hong Kong) are the only local factors, which have a significant effect on country risk of these markets. Our results are consistent with previous findings that sensitivity to global risk factors increases as the markets become more integrated.

The remainder of this paper is structured as follows: Section 2 reviews the previous literature while section 3 presents the model specification. Section 4 describes the data and the econometric methodology and section 5 reports empirical results. Section 6 concludes.

LITERATURE REVIEW

There are a variety of factors that potentially influence time varying country risk. Oetzel et al. (2000) suggest that several economic factors impact country risk and therefore, relate country risk to national macroeconomic policies. A sound monetary policy with low inflation and unemployment rates contribute to lowering country risk. When a country's economic conditions become unstable, country risk may increase. They find the currency risk as an important element associated with country risk.

Erb et al. (1996a) address the economic content of five different measures of country risk for 117 countries (political, financial, economic, composite risk indexes and country credit ratings) over the period 1984 – 1995. Their results suggest that the country risk measures are correlated with future equity returns. However, a major limitation of their study is the inability to capture the nature of country risk and its potential impact on global investment strategies in emerging markets where risk information may be limited (Gangemi et al. 2000).

Erb et al. (1996b) extend this previous analysis and model country risk as a function of country's credit rating over the period 1979 - 1995 for 21 developed and 26 emerging markets. They find those factors that simultaneously influence a country's credit rating are mainly political risk, inflation, exchange rate variability and control, industrial portfolio, economic viability, and sensitivity to global economic shocks.

Abell and Krueger (1989) examine the influence of the U.S. macroeconomic variables on the country beta by allowing it to vary with a set of macroeconomic variables. Specifically, their variable set includes budget deficit, six months commercial paper rate, consumer price index, AAA corporate bond yield, crude oil price index, exchange rate, federal funds rate, M1 money supply, merchandise trade balance, and unemployment rate. Their results show that beta estimates are sensitive to a number of macroeconomic variables.

In a similar analysis Gangemi et al. (2000) investigate a set of economic variables to examine the effect of foreign debt on Australia's country risk. The variable set includes Australia's government net overseas borrowing, 90-day bank accepted bill rate, ten year Treasury bill rate, wool price, trade weighted index, manufacturer's price index, retail trade, balance on current account and Australian money supply. They find that the exchange rates are the only macroeconomic factor that has a significant impact on Australia's country beta.

Following same approach Verma and Soydemir (2006) find that both local and global factors have relatively different impacts on the country risk of Mexico, Brazil, Argentina and Chile. The real interest rates and inflation rates of G-7 countries have a statistically significant negative impact on country beta (the highest effect is on Mexico followed by Brazil and Chile). Among the local factors, money supply and exchange rates have a statistically significant effect on country risk. The effect of money supply is most significant in the case of Mexico followed by Chile and Brazil.

Using a semi–parametric approach, Jeon (2001) explores the influence of macroeconomic influences on country risks for 14 developed countries. The variable set includes the U.S. term premium, the U.S. default premium, trade weighted exchange rate, consumer price index, money market rate and industrial production index. The results suggest that for the majority of countries consumer price index, industrial production index, and exchange rates have a significant impact on country betas.

The previous literature has well documented the impact of macroeconomic variables on betas for developed countries. However, such causal relationships have been little questioned in Asian markets. The set of macroeconomic variables relevant in the context of developed countries might be different than those of emerging markets. This study is an extension of the current literature in that it investigates the postulated relationship between economic forces and country risk in the Asian markets by using the

country beta approach. Our choice of macroeconomic variables is based on the studies that deal exclusively with emerging markets equity returns.

MODEL SPECIFICATION

This study employs the approach suggested by Gangemi et al. (2000) which modeled Australia's country risk and Verma and Soydemir (2006) which performed similar analysis for Latin American countries. The country risk under this approach is modeled in four steps. In the first step the international version of the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965) is estimated. This model predicts that the expected return on any traded asset in excess of a risk free return is proportional to the systematic risk of the asset as measured by its covariance with the a market wide portfolio return. Accordingly, the following time varying standard country beta model for the purpose of measuring country risk is estimated:

$$R_{jt} - R_{ft} = \beta_{jt}(R_{wt} - R_{ft}) + \varepsilon_t \tag{1}$$

where R_{jt} is the return on j^{th} country's stock market index, R_{ft} is return on a risk free asset, β_{jt} is the parameter; R_{wt} is the return on global stock market index; ε_t is the random disturbance term. Specifically β_{jt} is a measure of relative risk, which is determined by a combination of j^{th} country's economic, financial, political factors, world market conditions and sensitivities of the country's market to the world market conditions at a particular time 't'[1].

In the second step, based on the arguments of Fama and French (1989), Mcqueen and Roley (1993), and Ferson and Harvey (1991) a time varying country beta model is estimated. Specifically, these studies suggest that equity returns are highly correlated with the business cycle through a variety of macroeconomic influences and that beta risk is time varying in nature as a result of business cycle. Accordingly, this study specified the following country risk model:

$$\beta_t = b_0 + \sum_{i=1}^{N} b_i E_{it} + u_t \tag{2}$$

where b_0 and b_i are the parameters; E_{it} is a set of local and global factors affecting beta at time 't'; u_t being the independent and identically distributed random disturbance.

In the third step, we specific the local and global factors that can affect country risk of the Asian markets. We identify a set of local and global factors based on the findings that domestic money supply, goods prices, real activity, production rates, productivity, gross national product growth rate, unemployment, yield spread, interest rates, inflation, dividend yields and other local factors and exchange rates are significant in their association with emerging equity returns (Fama, 1970; Chen et al. 1986; Jorian 1991; Groenewold and Fraser, 1997; Ely and Robinson 1997; Kwon and Shin 1999; Serra 2000Bilson et al., 2001; Ferson and Harvey, 1994).

Accordingly based on the previous studies, we select five local factors and seven global factors which can have significant effect on country beta of Asian markets. The local factors are: (i) money supply (M1), (ii) goods prices (CPI), (iii) real activity (IIP), (iv) interest rate (IR) and (v) exchange rates (XR). The global risk factors are: (i) foreign exchange value of the U.S. dollar against the price of the currencies of 15 industrialized countries (Dollar), (ii) Spread between 90-day Euro dollar deposit rate and 90 day U.S. Treasury Bill yield (Euro$) (iii) weighted average inflation of G-7 countries (G7_INF) (iv) weighted average short term interest rates of G-7 countries (G7_INT) (v) U.S. dollar price per barrel of crude oil (OIL) (vi) U.S. interest rate (US_INT) (vii) U.S. inflation (US_INF). When beta varies over time with a set of these factors, equation (2) can be specified as follows:

$$\begin{aligned}\beta_t &= b_0 + b_1 M1_t + b_2 CPI_t + b_3 IIP_t + b_4 IR_t + b_5 XR_t + b_6 dollar_t + b_7 Euro\$_t \\ &+ b_8 G7\_INF_t + b_9 G7\_INT_t + b_{10} OIL_t + b_{11} US\_INT_t + b_{12} US\_INF_t + \upsilon_t\end{aligned} \tag{3}$$

However, since beta is not directly observable, one cannot estimate the time varying equation of beta in its present form. Therefore, equation (3) is substituted in time varying international CAPM model

presented in equation (1) and in order to estimate the parameters of the model. Accordingly, in step 4, we generate the following specific time varying country beta model for each Asian country in the sample:

$$\begin{aligned} R_{jt} - R_{ft} &= a + b_1(R_{wt} - R_{ft})M1_t + b_2(R_{wt} - R_{ft})CPI_t + b_3(R_{wt} - R_{ft})IIP_t \\ &+ b_4(R_{wt} - R_{ft})IR_t + b_5(R_{wt} - R_{ft})XR_t + b_6(R_{wt} - R_{ft})dollar_t + b_7(R_{wt} - R_{ft})Euro\$_t \\ &+ b_8(R_{wt} - R_{ft})G7\_INF_t + b_9(R_{wt} - R_{ft})G7\_INT_t + b_{10}(R_{wt} - R_{ft})OIL_t \\ &+ b_{11}(R_{wt} - R_{ft})US\_INT_t + b_{12}(R_{wt} - R_{ft})US\_INF_t + \upsilon_t \end{aligned} \quad (4)$$

The step 4, allows us to indirectly estimate the values of parameters for equation (3) in terms of observable variables. A significant (insignificant) parameter b_1 through b_{12} of this estimated equation would suggest a significant (insignificant) relationship between the local and global risk factors with country risk.

DATA AND ECONOMETRIC METHODOLOGY

This study employs country beta model to analyze the country risk of the following five Asian countries: Hong Kong, Indonesia, Malaysia, Philippines and Singapore. The sample period spans from January 1989 to January 2012 and data is obtained in monthly intervals from Datastream and *Federal Reserve Bank of St. Louis*.

The stock market data is the local currency denominated stock indexes for each of the Asian countries in the sample. The exchange rates are the nominal values expressed as local currency per U.S. dollar. The proxy for interest rate (IR) is the individual middle rates for 30 days certificate of deposits for all these countries while money supply (M1) is measured as the narrow stock of money (M1). The goods prices (CPI) series are the domestic consumer price indexes for these countries and the real activity (IIP) series are the index for industrial production.

The world market index is the MSCI World Index which is composed of stocks that broadly represents stock composition in the different countries. The premium on euro dollar deposit rates relative to the U.S. treasury rate (EURO$) is the spread between the 90-day Eurodollar deposit rate and the 90 day U.S. Treasury bill yield. The U.S. inflation (US_INF) is the percentage change in the CPI of the U.S. and the proxy for the U.S. interest rate (US_INT) is the 90 day U.S. Treasury Bill yield.

The G-7 interest rate (G7_INT) is the weighted average of the short term real interest rate in G-7 countries using the shares of G-7 GDP as the weights less the G-7 inflation rates. Similarly, the G-7 inflation rate (G_7INF) is the weighted average of the percentage change in the CPI in the G-7 countries using the relative shares of the gross domestic product (GDP) as the weights. The proxy chosen for fluctuation in the U.S. dollar (DOLLAR) is the trade weighted foreign exchange value of the U.S. dollar against the price of the currencies of 15 industrialized countries. Lastly, the oil price variable (OIL) is the U.S. dollar price per barrel of crude oil and the data.

Table 1 reports the descriptive statistics for most of the variables employed in this study[2]. The mean returns for all five Asian markets are higher than those of the world market return. Moreover, the standard deviations of stock returns for these Asian markets are higher than those of the world market suggesting that these emerging markets are highly volatile and investors are compensated for bearing risk. In comparison, all these markets have similar volatility but Hong Kong seems to have the highest mean return followed by Philippines while Indonesia and Singapore have similar returns and Malaysia being the lowest.

The exchange rate for Hong Kong has zero mean and median value with an extremely low standard deviation. Hong Kong is one of the few economies that have adopted a fixed exchange rate and it is also one of a few to have maintained exchange rate stability effectively over a long period. On the other hand, the exchange rate of Indonesia displays the highest mean appreciation of approximately 1% with an extremely high standard deviation. This is followed by the mean appreciations in exchange rates for Philippines and Malaysia. As expected these appreciations are higher than those of the price of dollars. A possible reason for this could be a massive increase in supply of dollars due to quantitative easing

program followed by the Federal Reserve. Similarly, the price of euro displays a negative mean growth during the sample period possibly due to recent crisis in the euro zone. The inflation and interest rates for both the U.S. and G7 countries display a small mean mainly due to the recent monetary policy measures taken by the developed countries.

TABLE 1
DESCRIPTIVE STATISTICS: MONTHLY CONTINUOUSLY COMPOUNDED RETURNS AND GROWTH RATES (IN DECIMALS)

The variables are stock market returns of Hong Kong, Indonesia, Malaysia, Philippines, Singapore, world (S_HK, S_IND, S_MAL, S_PHI, S_SING, W_EX), changes in exchange rates for Hong Kong, Indonesia, Malaysia, Philippines, Singapore (R_XRHK, R_XRIND, R_XRMAL, R_XRPHI, R_XR_SING), growth in price of dollar (R_DOLLAR), spread between euro dollar interest rate and U.S. interest rate (R_Euro$), weighted average inflation for G-7 countries (G7_INF), weighted average interest rate for G-7 countries (G7_INT), change in oil price (R_OIL), U.S. inflation (US_INF), and U.S. interest rate (US_INT).

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
S_HK	0.0088	0.0100	0.2645	-0.3482	0.0803	-0.1472	5.3482
S_IND	0.0044	0.0052	0.2502	-0.3786	0.0904	-0.6959	5.4215
S_MAL	0.0027	0.0031	0.2895	-0.2784	0.0892	0.0183	4.8655
S_PHI	0.0062	-0.0006	0.3317	-0.2989	0.0903	0.2764	4.9222
S_SING	0.0044	0.0057	0.2484	-0.2107	0.0712	-0.0497	4.7179
W_EX	-0.0339	-0.0299	0.0716	-0.1935	0.0432	-0.4540	3.5450
R_XRHK	0.0000	0.0000	0.0040	-0.0077	0.0012	-2.2013	19.4320
R_XRIND	0.0095	0.0022	0.8802	-0.3337	0.0942	4.6878	47.5589
R_XRMAL	0.0021	0.0000	0.1076	-0.1392	0.0236	0.1335	17.6480
R_XRPHI	0.0044	0.0012	0.1382	-0.0860	0.0299	1.1865	8.3927
R_XRSING	-0.0003	-0.0016	0.0561	-0.0598	0.0153	0.1561	5.8807
R_DOLLAR	0.0003	0.0005	0.0562	-0.0471	0.0150	-0.1658	4.1369
R_EURO$	-0.0007	-0.0025	0.1942	-0.1663	0.0481	0.6899	6.1423
R_G7INF	-0.0002	-0.0002	0.0035	-0.0040	0.0015	-0.0702	2.9018
R_G7INT	0.0004	0.0011	0.0546	-0.0459	0.0149	-0.1727	4.0060
R_OIL	-0.0007	-0.0007	0.1968	-0.2014	0.0718	-0.0488	2.8556
R_USINF	-0.0002	-0.0002	0.0047	-0.0071	0.0020	-0.0458	3.5998
R_USINT	0.0000	0.0000	0.0066	-0.0051	0.0015	-0.0608	5.3765

ESTIMATION RESULTS

Before proceeding with the main results, we check the presence of multicollinearity by examining the correlations among the local and global risk factors. The correlations among the exchange rates of the Asian countries seem to be high suggesting these economies to be highly integrated. As expected the correlation between the U.S. and G-7 countries' interest rates are high and so is the relationship between the oil prices with the U.S. inflation and price of dollars. The correlations between other variables are low suggesting that multicollinearity is not an issue. This suggests that each local and global macroeconomic factor chosen as a determinant of country risk represents the unique risk. Table 2 reports the correlation coefficients for Mexico, Brazil, Argentina and Chile under panels A through D respectively.

TABLE 2
CROSS CORRELATIONS

The variables are changes in exchange rates for Hong Kong, Indonesia, Malaysia, Philippines, Singapore (R_XRHK, R_XRIND, R_XRMAL, R_XRPHI, R_XR_SING), growth in price of dollar (R_DOLLAR), spread between euro dollar interest rate and U.S. interest rate (R_Euro$), weighted average inflation for G-7 countries (G7_INF), weighted average interest rate for G-7 countries (G7_INT), change in oil price (R_OIL), U.S. inflation (US_INF), and U.S. interest rate (US_INT).

	R_XRHK	R_XRIND	R_XRMAL	R_XRPHI	R_XRSING	R_DOLLAR	R_EURO$	R_G7INF	R_G7INT	R_OIL	R_USINF	R_USINT
R_XRHK	1.00											
R_XRIND	-0.03	1.00										
R_XRMAL	0.00	0.48	1.00									
R_XRPHI	0.06	0.39	0.47	1.00								
R_XRSING	0.12	0.45	0.55	0.35	1.00							
R_DOLLAR	0.07	0.14	0.25	0.19	0.52	1.00						
R_EURO$	-0.07	-0.09	-0.01	0.01	-0.09	-0.05	1.00					
R_G7INF	0.06	-0.01	-0.06	0.01	-0.02	0.10	-0.12	1.00				
R_G7INT	0.07	0.14	0.26	0.19	0.53	1.00	-0.04	0.00	1.00			
R_OIL	0.04	-0.04	-0.16	0.02	-0.13	-0.13	0.04	0.11	-0.15	1.00		
R_USINF	-0.14	0.04	-0.04	-0.05	-0.05	0.02	0.08	-0.04	0.01	0.34	1.00	
R_USINT	0.05	-0.01	-0.01	-0.06	0.11	0.23	-0.09	0.04	0.24	0.04	-0.13	1.00

In accordance with equation (1) we first estimate the international version of the CAPM in which the excess return of Hong Kong, Indonesia, Malaysia, Philippines and Singapore are regressed against the excess return of the world market. We estimate this international CAPM five times for each of these markets. The coefficients (betas) for all these markets are positive and statistically significant suggesting that Asian markets are highly integrated with the world equity prices. In comparison, the betas for Hong Kong and Singapore are highest followed by Indonesia while Malaysia and Philippines have lower coefficients. The Durbin-Watson statistics is close to 2 in all the regressions suggesting that the equations are correctly specified. The R squares for all the equations suggest a strong role of the world market in Asian market movements.

TABLE 3
INTERNATIONAL CAPM ESTIMATES

	Excess returns for Asian stock markets				
	Hong Kong	Indonesia	Malaysia	Philippines	Singapore
Excess returns of the MSCI world market	1.0690***	1.0371***	1.0102***	1.0152***	1.0651***
S.E	0.0911	0.1168	0.1154	0.1143	0.0800
t- statistics	11.7267	8.788	8.7487	8.8820	13.3081
R^2	0.3773	0.2350	0.2090	0.2384	0.4097
LL	223.70	181.79	183.75	185.49	245.71
Durbin-Watson	1.9265	1.7823	1.8405	1.8212	1.8335

In the next step, following Fama and French (1989), Mcqueen and Roley (1993), and Ferson and Harvey (1991) we specify a time varying country beta model for each Asian markets based on equation (2). However, since beta is not directly observable, one cannot estimate the time varying equation of beta in its present form. Therefore, in accordance with equation (3) and (4) we estimate a set of time varying country beta model for each Asian country in the sample. This step allows us to indirectly estimate the values of parameters for equation (3) in terms of observable variables. A significant (insignificant) parameter b_1 through b_{12} of this estimated equation would suggest a significant (insignificant) relationship between the local and global risk factors with country risk.

Table 4 (column 2) reports the estimation results for Hong Kong's time varying country beta. Consistent with Ferson and Harvey (1994), we find positive effects of the price of dollar while negative effects of the spread between the euro and the dollar, the U.S. interest rates, inflation for G-7 countries, interest rate for the G-7 countries, the U.S. interest rate and the U.S. inflation. Among the local factors, we find significant negative effect of money supply on country risk. This result is consistent with Bilson et al. (2001) who find that money supply is an important variable in emerging markets. These findings are also consistent with Verma and Soydemir (2006) which find similar results for Latin American countries. Overall, the result for Hong Kong suggests that the domestic money supply is an important source of local macroeconomic risk. Also, the world market, world inflation and interest rates are significant global factors affecting Hong Kong's time varying country beta.

Table 4 (column 3) reports the estimation results for Indonesia. Similar to Hong Kong, among the global factors, there is a significant positive effect of the price of dollar while negative effects of the spread between the euro and the dollar, G-7 inflation, G-7 real interest rate and the U.S. inflation on country risk. However, we do not find any significant results for the U.S. interest rate and the spread between the euro dollar and the U.S. interest rates. Moreover, unlike the case of Hong Kong, there is no effect of any domestic money supply on the time varying country risk.

TABLE 4
REGRESSION RESULTS OF EXCESS RETURNS WITH INTERACTIVE FACTORS

The variables are excess return on the world market (W_EX), unanticipated inflation (R_CPI), unanticipated domestic interest rate (R_IR), unanticipated inflation for G-7 countries (R_G7INF), unanticipated real interest rate for G-7 countries (R_G7INT), unanticipated U.S. interest rate (R_USINT), U.S. inflation (R_USINF), unanticipated component of spread between Euro dollar interest rate and U.S. interest rate (R_Euro$), unanticipated growth rates in industrial production (R_IIP), unanticipated movement in exchange rate (R_XR), unanticipated changes in money supply (R_M1), unanticipated changes in oil price (R_OIL) and unanticipated movements in price of dollar (R_DOLLAR).

	Excess returns for Asian stock markets				
	Hong Kong	Indonesia	Malaysia	Philippines	Singapore
C	-0.0264***	-0.0319***	-0.0310***	-0.0278***	-0.0284***
W_EX*R_CPI	27.5770	0.0875	18.9923	10.9821	3.3145
W_EX*R_DOLLAR	681.6290**	677.3998**	320.3003	778.6439**	497.4569**
W_EX*R_EURO$	-5.4704**	-6.1407**	-5.0237**	-8.3762***	-3.8394**
W_EX*R_G7INF	-952.3195***	-574.0967*	-540.5000*	-931.1365***	-663.6727***
W_EX*R_G7INT	-674.5046**	-671.3668**	-315.7427	-769.1219**	-503.2011**
W_EX*R_IIP	7.5762	-3.0359	1.6885	3.1656	4.4068
W_EX*R_IR	-6.8333	-19.2463	14.1221	0.4191	-49.0300
W_EX*R_OIL	-0.4631	-2.3707	-3.7837*	-4.2279**	-1.3381
W_EX*R_USINT	-42.2457	13.8295	37.3101	88.6741	-38.2162
W_EX*R_USINF	-315.8445***	-71.7329	-106.4554	-186.7503**	-86.3472
W_EX*R_XR	273.0469	1.1178	22.1815***	5.2991	27.3186***
W_EX*R_M1	-6.4211*	4.3029	1.1875	-2.8367	-3.6108
R-squared	0.1858	0.0966	0.2118	0.1609	0.2119
S.E. of regression	0.0771	0.0935	0.0854	0.0887	0.0685
Sum squared resid	0.9098	1.3375	1.1161	1.2031	0.7188
Log likelihood	196.5965	164.6162	179.6362	173.4019	216.1578
F-statistic	2.9102	1.3641	3.4269	2.4455	3.4285
Prob(F-statistic)	0.0012	0.1889	0.0002	0.0061	0.0002

Table 4 (column 4) reports the estimation results for Malaysia. Similar to the results from Hong Kong and Indonesia negative effects of the inflation rates from G-7 countries and the spread between the euro and the dollar. In addition, there is a negative relationship between oil prices and Malaysian country risk. However, we do not find the effects of other global factors including G-7 and the U.S. interest rates. Unlike Hong Kong and Indonesia we find a significant effect of the exchange rate on Malaysia's country risk.

Table 4 (column 5) reports the estimation results for Philippines' time varying country beta. Similar to Hong Kong, we find positive effects of the price of dollar while negative effects of the spread between the euro and the dollar, the U.S. interest rates, inflation for G-7 countries, interest rate for the G-7 countries, the U.S. interest rate and the U.S. inflation. In addition similar to Malaysia, there is a negative

effect of oil prices in this case. Similar to Indonesia, there is an insignificant effect of any local macroeconomic variable on the country risk.

Table 4 (column 6) reports the estimation results for Singapore. The findings are similar to those of Indonesia and Philippines in that there is a significant positive effect of the price of dollar while negative effects of the spread between the euro and the dollar, G-7 inflation and G-7 real interest rate. However, there is no effect of the U.S. inflation on Singaporean country risk. Moreover, similar to Malaysia there is a significant effect of exchange rate on time varying country risk while insignificant effects of other local macroeconomic variables.

Overall estimation results suggest that both local and global factors have relatively differing impacts on country risks of Asian markets. Among the global factors, the price of dollar has significant positive effects except in the case of Malaysia's country risk. In addition, the dollar euro spread, real interest rates and inflation of G-7 countries have a significant negative impact on country beta in all the cases. On the other hand, exchange rate (in case of Malaysia and Singapore) and to some extent money supply (only in case of Hong Kong) are the only local factors, which have a significant effect on country risk of these markets. The significant effects of exchange rate movements on country betas in case of Malaysia and Singapore supports the findings of Oetzel et al. (2000), Gangemi et al. (2000) and Verma and Soydemir (2006) that currency risk is an important determinant of country risk in some emerging markets.

Furthermore, the results indicate strong and significant effects of the global factors on country risk of all these Asian markets. This finding is in line with the arguments of Harvey (1995a, 1995b) and Bekaert and Harvey (1995) on market integration. The Asian markets are highly integrated with the world market as suggested by the international CAPM and our results are consistent with previous findings that sensitivity to global risk factors increases as the markets become more integrated.

Interestingly, the world interest rate has a significant effect while the domestic interest rates have an insignificant effect in all cases. Perhaps because studies incorporating interest rates have found that it is not the interest rate itself that is relevant but the yield and the default spread that are more likely to influence equity returns (Chen et al. 1986). Further, Bilson et al. (2001) argue that in many emerging markets including there is not an active secondary market for bond issues and government paper which makes interest rates as an insignificant factor in financial markets. Our results are consistent with Gangemi et al. (2000) and Verma and Soydemir (2006) which find insignificant effect of interest rate on Australian and Latin American country betas respectively.

CONCLUSIONS

In this study, we employ country beta approach to investigate the response of country risk to local and global risk factors in case of five Asian markets: Hong Kong, Indonesia, Malaysia, Philippines and Singapore. In a two-step process, we first estimate country beta models for these markets and generate separate series of country risk variables for each market. In the second step we analyze the response of these country risks to five local factors (money supply, inflation, economic growth, interest rate and exchange rate) and seven global factors (value of U.S. dollar against currencies of 15 industrialized countries, spread between 90-day Euro dollar deposit rate and 90 day U.S. Treasury Bill yield, weighted average inflation of G-7 countries, weighted average short term interest rates of G-7 countries, U.S. dollar price per barrel of crude oil, U.S. interest rate and U.S. inflation).

The estimations results indicate strong and significant effects of the global risk factors on country risk of all these Asian markets. The price of dollar has significant positive effects in all except in the case of Malaysia's country risk. In addition, the dollar euro spread, real interest rates and inflation of G-7 countries have a significant negative impact on country beta in all the cases. On the other hand, exchange rate (in case of Malaysia and Singapore) and to some extent money supply (only in case of Hong Kong) are the only local factors, which have a significant effect on country risk of these markets. Our results are consistent with previous findings that sensitivity to global risk factors increases as the markets become more integrated.

Our study has useful implications for both academicians and professionals. By identifying those variables affecting country betas and at varying degrees, international investors may be able to better hedge against the inherent risks stemming from a specific variable. From a policy perspective, a better understanding of such varying causal relationships can have important implications for correct monetary and fiscal policy designed to achieve stability in financial markets.

ENDNOTES

1. Harvey (1991) suggests this model be in the form of excess or unadjusted return over a risk free rate. Gangemi et al. (2000) confirms that the results are insensitive to the choice of the form of the model. However, to avoid the potential problem of misspecification, the model is expressed using excess returns.
2. Due to space constraint, some of the local variables' descriptive statistics are not reported. However, they are available from authors on request.

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