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Can Book-to-Market and Size be Risk Factors that Predict Economic Growth in Asia's Emerging Economies?

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Abstract

We investigate whether the two zero cost portfolios, SMB and HML, have the ability to predict economic growth for markets investigated in this paper. Our findings show that there are only a limited number of cases when the coefficients are positive and significance is achieved in an even more limited number of cases. Our results are in stark contrast to Liew and Vassalou (2000) who find coefficients to be generally positive and of a similar magnitude. We go a step further and also employ the methodology of Lakonishok, Shleifer and Vishny (1994) and once again fail to support the risk-based hypothesis of Liew and Vassalou (2000). In sum, we argue that search for a robust economic explanation for firm size and book-to-market equity effects needs sustained effort as these two zero cost portfolios do not represent economically relevant aggregate risk.

I. Introduction

THE DEVELOPMENT AND testing of asset pricing models remains at the heart of the financial economics discipline. Like all scientific models, asset pricing techniques are an abstraction from reality, and are the focus of continued empirical scrutiny to gauge their validity. At the heart of the asset pricing debate remains the vexed question of the ongoing acceptance of the Sharpe (1964) and Lintner (1965) Capital Asset Pricing Model (CAPM) in light of the challenge of multiple factor asset pricing models.

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The CAPM is an intuitive and simple tool for pricing assets. MacKinlay (1995) neatly summarises the seminal role that the CAPM plays in financial economics, stating that "although common sense suggests that investments free of risk will generally yield lower returns than riskier investments such as the stock market, it was only with the development of the capital asset pricing model that economists were able to quantify these differences in returns". Although simplicity is the hallmark of the CAPM (resulting in the model being at the fore of empirical asset pricing), it is also this feature that provides the basis for ongoing criticism by empiricists.

In short, controversies in asset pricing centre on the numerous anomalous findings that have been (and continue to be) discovered in the testing of the CAPM. Decades of testing have documented other factors (apart from the market factor) that capture the cross section of returns in an economically meaningful way, namely, Banz's (1981) 'size' anomaly and Rosenberg, Reid and Lanstein's (1985) 'value' effect. Such variables however, are the result of empirical analysis, and thus are not borne of economic theory. As such, whether such variables are indeed proxy for risk, or are the result of chance and irrationality, impacts upon the validity and interpretation of the results from multi-factor models. This study is motivated by such controversies, and builds on the work of Fama and French (hereafter, FF) (1995, 1996) in attempting to determine whether there is a link between the variables - size and value - and economic intuition. Using an approach building on the work of Liew and Vassalou (2000), we examine the relationship between the variables (size and value) on gross domestic product growth in Asia's emerging economies. Further empirical analysis is also conducted, based on the work of Lakonishok, Shileifer and Vishny (1994), by sorting the variables into varying periods of overall market returns to gauge whether the variables do indeed proxy for risk.

The study digresses from the majority of empirical work, in that the sample chosen is not from the major industrial markets. The markets examined in this study are China, Hong Kong, Malaysia, the Philippines, and, South Korea. The selection of this sample permits the paper to shed some light on two important issues. First, the selection of countries is relatively free of prior empirical work in regard to such tests, permitting a true 'out-of-sample' investigation; and, second, the observation period, over the decade of the 1990s, has seen these emerging economies progress though a period of high economic growth, recession, and a period of reform following the economic downturn.

II. Asset Pricing in Asia's Emerging Economies

There has been an increased interest in the asset pricing literature on using samples of data from stocks listed on emerging stock markets. For instance, an important study by Groot and Verschoor (2002) considers the relationship between expected returns, size and the market-to-book ratio (ME/BE) in five emerging markets: India, Korea, Malaysia, Taiwan and Thailand. The period chosen for the study is from 1984 through 2000, again

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providing an observation window covering varied economic conditions. The motivation for the work of Groot and Verschoor (2002) is reflected in the statement, "whether or not return factors in a group of relatively isolated markets are the same as those found in developed markets provides a unique opportunity to examine which factors are fundamentally related to the way investors set prices in financial markets around the world". Using the methodology of Fama and MacBeth (1973), this is, a focus on individual securities rather than adopting the grouping portfolio method, the results indicate that size is significant for all five countries while value (the ratio of market equity to book equity or ME/BE) is significant for only Korea, Malaysia and Thailand. With regard to the bi-variate regression, the size variable declines in significance and, when controlling for ME/BE, it seems to absorb the role of size in capturing the cross section of returns.

Another study considering the emerging stock markets is conducted by Drew and Veeraraghavan (2001). This study examines the cross-section of stock returns based on an overall market factor, size and book-to-market equity in the Asian region (Hong Kong, Korea, Malaysia, and the Philippines) for the period 1992 through 1999. Following the work of Fama and French (1993), they employ the model:

$$R_{pt} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + siSMB + hiHML + \varepsilon_{it} \qquad (1)$$

Again, two independent sorts are formed with the stock split into two groups based on size and tri-tiles based on BE/ME. Similar results for all four countries are obtained with the summary statistics for the mean monthly returns indicating that small and high BE/ME stocks generate higher returns. Thus, based on such results they conclude that the premium is compensation for risk missed by the CAPM and deduce that such firms carry a risk premia. Furthermore, results based on the regressions indicate that the intercept term (or alpha) is statistically indistinguishable from zero. Such is the case for all six portfolios for all four countries.

The work of Drew and Veeraraghavan (2001) suggests that the size and value premium is real. For Hong Kong and Korea the small (S)/high (H) intersection portfolio generates the highest size and value premium. Similar results are obtained for Malaysia with the S/H portfolio generating the highest premium for size and the second highest for value. In the case of the Philippines the three small stock portfolios outperform the three big stock portfolios. Furthermore, in relation to value S/H and big (B)/H have a positive value premium while the medium and low portfolios are negative. Thus, the results imply that small firms and high BE/ME firms outperform big firms and low BE/ME firms implying that such firms carry a risk premium. The study provides a rebuttal to the arguments of survivorship bias and data snooping. For, instance Kothari, Shanken and Sloan (1995) state that the data source used in Fama and French (1992) contains survivorship bias. However, the data set used in the study by Drew and

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Veeraraghavan (2001) was largely free from such a predicament. In short, Drew and Veeraraghavan conclude that, "in our view, the CAPM is simply misspecified as the risk factors investigated in this paper are not captured by the CAPM". Furthermore, they highlight the importance of future research in this area to attempt to provide an economic story for size and book-to-market equity effects, rather than choosing arbitrary risk variables and relating them to stock returns.

The leading paper that takes up this challenge, contributed by Liew and Vassalou (2000), attempts to relate various asset pricing anomalies to macroeconomic factors, such as Gross Domestic Product (GDP). For the sample period 1978 through 1996, Liew and Vassalou (2000) examine the relationship between asset pricing factors, such as size and value, and GDP using regression analysis on ten industrialized countries. Interestingly, they report that the value portfolio generates statistically positive returns in nine out of ten countries while SMB is statistically significant in four.

Liew and Vassalou (2000) also run univariate and multivariate regressions on the variable GDP growth and find that the results are statistically significant and positive in a number of countries. They claim that such a result is expected and investors would prefer to hold stocks whose returns are relatively high when the economy is in a bad state. During such periods, investors would therefore hold low BE/ME stocks and large size stocks with good growth opportunities. To test whether the presence of business cycle variables subsume the presence of size and value they include such variables as treasury bill yields and past one-year growth in a country's industrial production. Nevertheless, the variables SMB and HML continue to exhibit a positive relationship although significant in only a limited number of countries.

There is some evidence that, in the industrialized economies, size and BE/ME are two variables that appear to have some power in explaining the cross-section of average returns in both developed and emerging markets. These two variables however, are not derived from asset pricing theory but rather are a result of empirical research. Thus, the importance of defining the theoretical underpinning of the various explanatory variables lies in the fact that without, one will always be able to explain the returns with the inclusion of extra variables when the real explanation may be non risk-based, as MacKinlay (1995) notes, "without a theory that specifies the exact form of the state variables or common factors in returns, the choice of any particular version of the factors is arbitrary".

This study takes up MacKinlay's (1995) challenge, addressing the issue in a new context. It extends on the analysis of Liew and Vassalou (2000) (and the foundations of this paper, specifically, the work of (Chan and Chen, 1991; Lakonishok, Shileifer and Vishny, 1994; Fama and French, 1995 and Chen and Zhang, 1998) by attempting to examine the relationship between size and value and the business cycle of emerging economies.

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Specifically, the economic explanation of the SMB and HML variables are analysed from a sample which has received very little attention in the past thus providing an out of sample test which presents for a rebuttal to the argument of Black (1993). In addition, the method used is novel in that it does not look at the specific characteristics of the value of firms, but rather aims to gauge the responsiveness of the returns of such trading strategies to the overall economy. In addition to this regression analysis a further approach is applied using a data sort methodology utilised by Lakonishok, Shileifer and Vishny (1994) to add a further element of robustness. The period which the analysis examines provides an extra element of differentiation, in that the markets are all closely geographically located and were all exposed to an economic and financial crisis following years of high economic growth over the decade of the 1990s.

III. Data and Methodology

To determine whether the portfolios SMB and HML are related to future economic growth, regression analysis will be utilised. In addition to the variables HML and SMB a market factor and various other business cycle variables are included to observe whether the predictive power of HML and SMB are subsumed by their inclusion. Further analysis is undertaken using a data sort by calculating the returns of the trading strategies during both high and low states of the market in each country. Monthly portfolio returns are summed to obtain the return to each portfolio for the quarter as GDP data is quarterly. Thus, the datasets vary in length depending on availability of data.

Table I
Sample Periods

Country	Period
Malaysia	1992 - 1999
South Korea	1992 - 1999
Philippines	1992 - 1999
China	1994 - 2001
Hong Kong	1993 - 2000

3.1 *Portfolio Construction*

The tests are based on six portfolios formed on ranked values of size and BE/ME for individual stocks. Thus, the stocks for each of the markets are ranked on size (share price times no of shares outstanding) and are then split into two groups, small and big (S and B), based on the median. The stocks are then split into three book-to-market equity groups based on the breakpoints for the bottom 30% (low), middle 40% (medium) and top 30% (high). Book equity is defined as the book value of shareholders' equity in calendar year *t-1* divided by the market equity at the end of December of *t–1*. Fama and French (1993) explain that the reason BE/ME is divided into three groups and size only two groups follows the evidence found in FF 1992 that BE/ME has a stronger role in average stock returns. Thus, from the intersection of the two size and three BE/ME groups six portfolios are constructed (S/L, S/M, S/H, B/L, B/M, B/H). For example, the S/L portfolio

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contains the stocks in the small-market equity group that are also in the low-BE/ME group, and the B/H portfolio contains the big-market equity stocks that also have high BE/MEs.

Thus, the portfolio SMB is designed to represent the risk factor in returns related to size. It is the difference each month of the average returns between the three small size portfolios (S/L, S/M and S/H) and the three big size portfolios (B/L, B/M and B/H). The portfolio HML represents the risk factor in returns related to book-to-market equity. It is the difference each month of the average returns between the two high BE/ME portfolios (S/H and B/H) and the two low BE/ME portfolios (S/L and B/L).

3.2 *Modelling*

The variables SMB and HML have found extensive support not only in the industrialized markets, but also recently within developing markets. Yet, the issue that remains unresolved is finding an explanation for the performance of these variables. Is the explanation risk-based or is it non risk-based? If it is risk-based then the variables are a proxy for fundamental risk that is non-diversifiable and is appropriately earning abnormal returns. On the other hand, if it is non risk-based, it may be the result of investor over-reaction or some other form of market misspecification (for example, data snooping). In order to provide further evidence on the issue, this paper considers the relationship of the variables SMB and HML and the overall economy. Evidence already exists in the literature that there is co-variation in returns related to relative distress that is not captured by the market return and is compensated in average returns. Thus, SMB and HML (which proxy for relative distress) should find a statistically significant relationship with economic growth as the returns on such stocks should be more susceptible to fluctuations in the economy.

The following section outlines the various regression analysis models that attempt to link the variables SMB and HML to GDP growth. In addition to this method of providing evidence towards a risk-based explanation, the procedure utilised by Lakonishok, Shileifer and Vishny (1994) is also considered to provide a further test to ensure the robustness of results. This method however uses overall stock market returns and the variables size and value as opposed to GDP growth. Nevertheless, as was evidenced during the Asian Economic Crisis, all economies that experienced major declines in the stock market also experienced major declines in GDP growth. A priori, we expect that these two different approaches should yield similar results.

The regression analysis commences with the model

$$GDPgrowth = a + bFactor\,\mathrm{Re}t + e \qquad (2)$$

where, *GDPgrowth* is growth rate for a country's GDP; *FactorRet* is MKT, HML, or SMB; and, *e* is the residual term of the regression. The next regression

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involves adding the *MKT* term with *FactorRet*; thus the resultant model takes the form

$$GDPgrowth = a + bMKT + cFactor\,\mathrm{Re}t + k \tag{3}$$

where, *MKT* is quarterly excess market return over the risk-free rate; *FactorRet* stands for quarterly returns on HML and SMB and k are the residuals. This regression is aimed at determining the impact of the market variable on the SMB and HML variables. All three variables are then regressed together to see the relative strength of the variables of the form:

$$GDPgrowth = a + bMKT + cHML + dSMB + u \tag{4}$$

The final model includes various business cycle variables to see if their inclusion subsumes the information content contained in HML and SMB

$$GDPgrowth = a + bMKT + cFactor\,\mathrm{Re}t + dTB + fDY + gTERM + hIDP + q \tag{5}$$

$$GDPgrowth = a + bMKT + cHML + dSMB + fTB + gDY + hTERM + iIDP + v \tag{6}$$

where, *TB* represents the Treasury Bill yield and is the average of daily rates from the last month of the quarter. The variable *DY* represents dividend yield and is the quarterly dividend yield. *TERM* is the difference between the long term yield and the *TB* for each country thus measuring the slope of a country's yield curve. *IDP* represents industrial production and like GDP it is the seasonally adjusted quarterly growth rate. A complete list of the various instruments used for each of the variables and the data source for each of the countries is provided in Appendix I.

A second approach used to analyse whether the variables expose investors to greater systematic risk is based on sorting the returns of the strategies relative to the performance of the market overall. The technique of Lakonishok, Shileifer and Vishny, (1994) is utilised is to compare the performance of value and glamour portfolios; high BE/ME, small SIZE, and low BE/ME and large SIZE respectively. Thus, for each country the returns on the market are sorted from lowest to highest along with the corresponding returns for each of the intercept portfolios. The market returns are then split up into four states of the world; the ten worst stock return months in the sample, the remaining negative returns, the ten best months in the sample, and the remaining positive months.

IV. Empirical Results

The coefficients for SMB and HML will be positive if their high returns are associated with good states of GDP growth. Such a relationship is expected because it is expected that high BE/ME and small size stocks are better able to prosper than low BE/ME and large size stocks in periods of

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high economic growth. Thus, when the economy is contracting, investors should prefer to hold stocks with good growth opportunities (glamour stocks) and whose returns are relatively high.

The initial regression analysis found evidence of autocorrelation and heteroskedasticity. Thus, the results reported throughout the paper are corrected estimates made utilising White's (1980) heteroskedasticiy consistent covariances for heteroskedasticity, and the Newey and West (1987) correction for both serial correlation and heteroskedasticity. By way of synopsis, the estimates suggest that the variables contain some limited information about GDP growth in emerging economies. Specifically, the coefficients are positive in four out of six cases, however, significance is only achieved in three cases.[1]

Table II
Results of the Model
(GDPgrowth = a+bFactor Ret+e)

Country	Slope Coefficients			T-Stat			Adj R^2		
	MKT	HML	SMB	MKT	HML	SMB	MKT	HML	SMB
Philippines	0.014	-0.014	0.955	1.3234	-0.450	1.0121	6.03%	1.11%	4.9%
Hong Kong	-0.009	-0.051	0.022	-0.4141	-0.955	0.8027	0.68%	6.19%	2.3%
China	0.114	-0.430	0.478	0.8246	-1.036	0.9939	3.71%	4.47%	3.8%
Malaysia	0.007	-0.080	-0.03	0.3219	-2.215*	-0.4939	0.36%	11.50%	1.4%
South Korea	0.036	0.008	0.049	1.9844*	0.3101	2.1727*	15.20%	0.14%	17.0%

Note : * 5% significance level.

Thus, this first univariate regression produces results that contrast the results of Fama (1981) and Liew and Vassalov (2000). In particular, Fama (1981) reports the presence of a positive and statistically significant relation between the market factor and economic growth in the United States. In their paper, Liew and Vassalov (2000), find a positive and statistically significant relationship in five out of ten countries for the market factor. In the results in Table II, however, find the market factor is statistically significant only for South Korea. HML is statistically significant only in the case of Malaysia and this is for a negative coefficient as well. The SMB variable also only achieves significance once again for the country of South Korea. These results imply that some similarity may exist between the variables, in that the two of the three times that significance is reported it is for South Korea. Such a result poses the question of whether the variables are dependant on the market factor?

In the second test, bi-variate regressions are used to analyse the influence of the market factor on the SMB and HML variables. The results presented in Table III indicate that the bi-variate regressions produce relatively the same results for the variables SMB and HML even in the presence of the market factor. Thus, even in the presence of the market factor the results remain qualitatively the same providing evidence against the hypothesis that the results might be induced by dependence on the market factor.

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Table III
Results of Model
(GDP Growth = a + b MKT + c Factor Ret + k)

Country	MKT		HML		ADJ R^2
	SLOPE	TSTAT	SLOPE	TSTAT	
Philippines	0.0136	0.9847	-0.0092	-0.2749	4.56%
Hong Kong	-0.0056	-0.2170	-0.0503	-0.9256	2.92%
China	0.1364	1.2120	-0.5000	-1.2342	3.16%
Malaysia	0.0302	1.0463	-0.1057	-2.742*	9.32%
South Korea	0.0399	1.9945*	-0.0217	-0.4649	8.05%

Note : * 5% significance level.

Table IV
Results of Model
(GDP Growth = a + b MKT + c Factor Ret + k)

Country	MKT		SMB		ADJ R^2
	SLOPE	TSTAT	SLOPE	TSTAT	
Philippines	0.0170	1.3220	0.0234	1.2969	3.12%
Hong Kong	-0.0103	-0.4672	0.0236	0.7550	6.40%
China	0.1181	1.0053	0.4926	1.0867	1.23%
Malaysia	0.0264	0.8440	-0.0674	-0.8227	3.99%
South Korea	0.0313	1.7691*	0.0431	1.9641*	21.50%

Note : * 5% significance level.

The next regression includes all three variables to test the impact that the variables will have upon one another and produces the following results (Table IV). The results for the HML variable have remained the same although the significance of the market factor has dropped in South Korea and increased in Malaysia. In addition the SMB factor has increased in significance for the market of the Philippines while remaining relatively the same for South Korea. Thus, there were slight changes in which variables were significant thus implying that the variables SMB and HML impact upon one another. The changes however are very limited and overall there appears to have been no real changes from the prior regressions. It would be expected that the variables might have a greater impact upon one another in differing markets given the differing characteristics of the markets.

Table V
Results of the Model
(GDP Growth = a + b MKT + c HML+ dSMB + u)

Country	MKT		HML		SMB		ADJ R^2
	SLOPE	TSTAT	SLOPE	TSTAT	SLOPE	TSTAT	
Philippines	0.0159	1.3739	-0.0268	-0.6448	0.0294	1.8464*	0.69%
Hong Kong	-0.0067	-0.2581	-0.0498	-0.8332	0.0230	0.7070	5.52%
China	0.1333	1.2053	-0.3881	-1.1143	0.2523	0.6480	0.44%
Malaysia	0.0601	1.8758*	-0.1191	-2.4041*	-0.0952	-1.4914	13.90%
South Korea	0.0281	1.4171	0.0192	0.3927	0.0474	1.9009*	18.20%

Note : * 5% significance level.

The final regression analysis included various business variables to examine how much of the information contained in HML and SMB regarding economic growth is also present in popular business cycle variables (Table VI).

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Thus, whereas in the above regressions the SMB variable was positive and statistically significant for South Korea the inclusion of the business cycle variables has subsumed the explanatory power of the variable. In addition, the market variable has dropped from a level of statistical significance for Malaysia but increased to significance in Hong Kong. A further adjustment occurs for Hong Kong with the variable for HML now also achieving statistical significance.

Table VI
Results of the Model
(GDP Growth= a + b MKT + c Factor Ret + dTB + fDY + gTERM+hIDP+q)

	MKT		HML		SHORT						
Country	Slope	T-value	Slope	T-value	Slope	T-value					
Philippines	0.0086	0.5035	-0.0376	-0.5927	-0.1187	-0.4368					
Hong Kong	-0.0802	-2.8329*	-0.1282	-5.4353*	-0.5514	-1.2812					
China	0.0903	0.6410	-0.7711	-1.3394	-16.019	-1.5128					
Malaysia	0.0334	1.6782*	-0.1238	-3.1121*	-0.2890	-0.5314					
South Korea	0.0165	0.9527	-0.0042	-0.1183	-0.3180	-2.0466					
DY		TERM		IDP		ADJ R^2					
Slope	T-value	Slope	T-value	Slope	T-value						
-0.9412	-0.6538	-0.1060	-0.4004	0.0044	0.4284	27.2%					
0.8783	1.3954	-0.6123	-1.5144	0.6530	6.6192	53.4%					
-1.6527	-0.1199	6.1180	1.8663	-0.1534	-0.3925	6.7%					
-0.0589	-0.0771	0.2011	1.0702	-0.0877	-0.6862	22.2%					
-1.5937	-1.9282	4.0505	3.6984	0.2149	1.2912	45.9%					
0.7062	0.9874	-0.5713	-3.6272	0.1571	1.5691	52.7%					

Note : * 5% significance level.

Table VII
Results of the Model
(GDP Growth= a + b MKT + c Factor Ret + dTB + fDY + gTERM+hIDP+q)

	MKT		SMB		SHORT						
Country	Slope	T-value	Slope	T-value	Slope	T-value					
Philippines	0.0220	1.4169	0.0295	1.5948	0.0944	0.5477					
Hong Kong	-0.0837	-2.3561*	0.0261	0.6850	-0.9788	-2.3399					
China	0.0541	0.4720	0.7904	1.4005	-6.7144	-0.4928					
Malaysia	0.0199	0.8154	-0.0144	-0.3577	-0.0924	-0.1177					
South Korea	0.0167	1.3855	0.0230	1.3902	-0.3483	-2.4743					
DY		TERM		IDP		ADJ R^2					
Slope	T-value	Slope	T-value	Slope	T-value						
-0.0943	-0.0673	0.1034	0.6090	0.0012	0.1452	18.6%					
-0.3303	-0.7083	-0.1193	-0.1782	0.3913	2.1964	16.0%					
2.9366	0.2505	3.0137	0.9444	0.2998	0.8758	7.4 %					
-2.0796	-1.7571	3.3713	2.3747	0.1574	0.7654	17.0%					
0.5549	0.7873	-0.5071	-2.6726	0.1143	1.2261	56.7%					

Note : * 5% significance level.

The final regression is an extension of the above model the only difference being that now both variable SMB and HML are included along side the MKT factor and the business cycle variables. The results indicate that the slope coefficients and significance for the MKT and HML factors are relatively the same (Table VIII). However, the result for the SMB variable

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is most interesting with the significance for the Philippines and Hong Kong increasing significantly. Such a result implies that there is some similar information content between the variables SMB and HML for some of the countries. This of course would be expected since the variables proxy for the same firm characteristics.

Table VIII
Results of Model
(GDPgrowth= a + bMKT + cHML +dSMD + fTB + gDY+hTERM+ iIDP+v)

	MKT		HML		SMB		SHORT		DY		TERM		IDP		ADJ R^2
Country	Slope	T-value	Slope	T-value	Slope	T-value	Slope	T-value	Slope	T-value	Slope	T-value	Slope	T-value	
Philippines	0.0110	0.6060	-0.0560	-0.8286	0.0358	2.4079*	-0.0777	-0.3080	-0.6564	-0.4783	-0.0625	-0.2549	0.0075	0.8039	18.3 %
Hong Kong	-0.0918	-3.6800*	-0.1243	-5.8806*	0.0425	2.0553*	-0.7795	-1.6081	0.7703	1.3294	-0.5096	-1.4978	0.6510	7.0873	60.7 %
China	0.0743	0.5758	-0.4822	-0.8190	0.4379	0.8396	-12.2718	-1.1624	0.0315	0.0022	4.6570	1.6883	0.0543	0.1214	9.4 %
Malaysia	0.0469	1.7304*	-0.1285	-3.1518*	-0.0428	-0.7438	-0.3143	-0.5697	-1.6977	-2.0006	3.7617	3.2014	0.2308	1.3582	44.5 %
South Korea	0.0147	0.9740	0.0128	0.3633	0.0255	1.3303	-0.3383	-2.1387	0.5336	0.7174	-0.5123	-2.7588	0.1178	1.1747	54.3 %

Note : * 5% significance level.

The second approach that was used to determine whether SMB and HML are fundamentally riskier is based on the technique of sorting the returns for the market, SMB, and HML into differing periods of market returns. Thus, the analysis is based on the idea that value stocks would be fundamentally riskier than glamour stocks if first they under-perform glamour stocks and second those are on average bad states, in which the marginal utility of wealth is high making value stocks unattractive to risk averse investors. This analysis is conducted on a country-by-country basis, commencing with the results for Hong Kong (Table IX). The results for Hong Kong suggest that, over the observation period, value stocks outperformed in all market states except for the best 10 providing evidence against a risk-based explanation.

Table IX
Results for Hong Kong

Hong Kong	BIG		SMALL	
BE/ME	HIGH VALUE	LOW GLAM	HIGH VALUE	LOW GLAM
WORST 10	-100.12	-108.53	-73.26	-74.61
NEGATIVE	-83.27	-90.81	-28.63	-66.72
POSITIVE	91.97	83.19	109.98	72.17
BEST 10	100.94	136.06	64.82	87.57

Size	BIG GLAM	SMALL VALUE
WORST 10	-312.02	-208.56
NEGATIVE	-261.65	-91.19
POSITIVE	262.60	296.71

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The data for Malaysia is presented in Table X. Interestingly, in the case of Malaysia, the results are not as consistent as is that for Hong Kong, with value stocks under-performing in the worst 10 period for B/H; the worst 10 period for S/H, and in all the negative states within the size classification. Therefore, unlike Hong Kong, the results for Malaysia are more supportive of a risk-based explanation.

Table X
Results for Malaysia

Malaysia	BIG		SMALL	
BE/ME	HIGH VALUE	LOW GLAM	HIGH VALUE	LOW GLAM
WORST 10	-193.93	-169.85	-197.52	-203.49
NEGATIVE	-133.79	-144.74	-154.06	-130.18
POSITIVE	233.65	163.04	295.84	269.29
BEST 10	278.63	173.78	286.92	227.20
SIZE	BIG GLAM		SMALL VALUE	
WORST 10	-544.44		-590.88	
NEGATIVE	-426.84		-432.55	
POSITIVE	615.85		850.20	
BEST 10	697.87		743.63	

In the case of China (Table XI) the classification scheme based on size provides clear support for a non risk-based explanation. However, under BE/ME the evidence is not as direct with value stocks under-performing in all negative months in the small category and in all positive months within the big category. However, overall the evidence for China seems to support a non risk-based explanation.

Table XI
Results for China

China	BIG		SMALL	
BE/ME	HIGH VALUE	LOW GLAM	HIGH VALUE	LOW GLAM
WORST 10	-160.89	-166.02	-160.57	-150.52
NEGATIVE	-167.63	-172.07	-149.02	-143.65
POSITIVE	149.73	189.39	197.05	209.72
BEST 10	292.35	303.17	325.53	305.03
SIZE	BIG GLAM		SMALL VALUE	
WORST 10	-486.47		-453.38	
NEGATIVE	-506.19		-441.90	
POSITIVE	516.08		617.42	
BEST 10	884.29		952.61	

In the case of South Korea the data is again mixed (Table XII). That is, the value strategy under-performed under the worst ten for all BE/ME classifications and further for the SMALL/HIGH negative and positive months. In the size category on the other hand the data supports a non risk-based explanation with the value strategy outperforming in almost all months.

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Table XII
Results for South Korea

South Korea	BIG		SMALL	
BE/ME	HIGH VALUE	LOW GLAM	HIGH VALUE	LOW GLAM
WORST 10	-175.39	-163.33	-162.11	-159.32
NEGATIVE	-150.56	-161.14	-55.81	-54.92
POSITIVE	156.65	129.98	149.33	136.87
BEST 10	225.25	172.07	163.87	169.35

SIZE	BIG GLAM	SMALL VALUE
WORST 10	-503.78	-489.14
NEGATIVE	-485.60	-190.59
POSITIVE	410.06	429.29
BEST 10	643.40	509.27

In the case of the Philippines however, the results strongly reject a non risk-based explanation with the only deviations in the BIG/LOW best 10, SMALL/LOW negative and the size classification in best 10 (Table XIII).

Table XIII
Results for the Philippines

Philippines	BIG		SMALL	
BE/ME	HIGH VALUE	LOW GLAM	HIGH VALUE	LOW GLAM
WORST 10	-104.70	-123.80	-61.04	-87.43
NEGATIVE	-22.92	-74.96	29.74	36.52
POSITIVE	44.83	27.04	67.69	26.47
BEST 10	146.90	173.47	128.97	75.98

SIZE	BIG GLAM	SMALL VALUE
WORST 10	-321.16	-208.27
NEGATIVE	-144.97	102.24
POSITIVE	104.02	166.48
BEST 10	471.13	346.86

Overall the results of the data sort, whilst not as strong as that derived from the regression analysis, tend to corroborate the non-risk based story.

V. Discussion

The aim of this paper is to provide support for either a risk- or non-risk based explanation to the variables SMB and HML. Two differing methodologies were utilised with the majority of the results supporting a non risk-based explanation.

Under the regression analysis a risk-based explanation would be supported if a positive relationship was observed between HML, SMB, and GDP growth. That is, in negative states of GDP growth when the marginal utility of wealth is high, investors would prefer to hold low BE/ME and large size stocks with good growth opportunities. The results of the regression analysis however, indicate that there are only a limited number of cases when the coefficients are positive and significance is achieved in

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an even more limited number of cases. These results are in contrast to those found by Liew and Vassalou (2000) who find their coefficients to be generally positive and of a similar magnitude, stating that, "using data from developed markets, we found that at least HML and SMB contain significant information about future GDP growth, ... the predictive ability of these return factors is to a large degree independent of any information contained in the market factor" Liew and Vassalou (2000) make this argument because of the results obtained by Fama (1981) that suggest there is a positive and statistically significant relationship between the market factor and future GDP growth.

The conclusions drawn by Liew and Vassalou (2000) contrast to those of Fama and French (1996) who also attempt to provide a risk-based explanation to the size and value variables. That is, they state that they do not expect the two variables to be related to a common macro-variable. That is, based on their Fama and French (1994) work, industries fluctuate between strength and distress. They suspect that this fluctuation has a much greater importance than that in the general economy. They also use this argument to refute the evidence provided by Lakonishok, Shileifer and Vishny's (1994) data sort stating that 'although two unidentified state variables lead to common risk factors in returns, they are not the market factor and we should not expect to find their tracks in variables that are important in generating the market factor' (Fama and French, 1996). However, intuitively this argument does not seem valid. That is, there appears to be evidence in prior research that there is covariation in returns related to relative distress that is not captured by the return on the market portfolio. Thus, given this evidence, it is plausible to justify the hypothesis that firms in relative distress will be more susceptible to fluctuations in the economy.

On a practical level, a further regression was run of HML and SMB on the market factor. The results from the regressions show that the beta coefficients are generally small and always statistically insignificant (except for Malaysia). Therefore, any positive relation that is observed between HML, SMB and GDP growth is not induced by the relation between the market factor and GDP growth

Table XIV
Summary Results of the Model
(MKT=Factor Ret + e)

Country	HML		R2	SMB		ADJ R^2
	Slope	T-value		Slope	T-value	
Philippines	-0.4157	-0.5436	2.92%	-0.2646	-0.7281	3.21%
Hong Kong	0.2496	0.4362	1.55%	-0.1178	-0.2832	0.48%
China	0.5112	0.8134	2.23%	-0.1206	-0.1589	0.09%
Malaysia	0.8237	2.0381*	17.08%	1.3475	4.9726*	38.02%
South Korea	0.7552	1.1865	10.03%	-0.0479	-0.1105	0.05%

Note : * 5% significance level.

Nevertheless, the relation between the countries observed in this analysis provides weak evidence between the market factor and GDP growth. The results of this regression analysis contrast significantly with those of Liew

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and Vassalou (2000); for this reason a further regression was included on a developed market to provide some insight into the results. The reasoning behind this further regression is based on the evidence of Chen and Zhang (1998) that the value effect in their analysis obtained weak evidence for the markets of Taiwan and Thailand. Thus, they hypothesized that this might be the resultant feature of the characteristics of their economies. That is, in such emerging markets that are experiencing high growth marginal firms may enjoy the benefit of a rapidly expanding economy and the risk will not be higher in some absolute sense. This also seems plausible since the most number of variables to achieve significance in this study were from the market of South Korea. For this reason the market of Australia was chosen and the sample period commence in 1993 through 2000, with the results of the various regression given in Table XV. Again, the reported results have been corrected for heteroskedasticity and serial correlation, with the individual data sets also tested for stationarity.

Table XV
Results for Australia

	MKT		HML		SMB		ADJ R^2
Country	Slope	T-value	Slope	T-value	Slope	T-value	
Australia	0.0021	0.2388					0.21%
Univariate			0.0135	1.4244			6.99%
					-0.0286	-2.4156	17.02%
Multivariate	-0.0015	-0.1736	0.0139	1.3120			0.07%
	0.0007	0.1057			-0.0285	-2.3141	10.88%
	-0.0012	-0.1362	0.0079	0.7889	-0.0253	-1.9416	9.57%
	-0.0078	-0.8060	0.0180	1.9722			
	-0.0038	-0.4902			-0.0273	-2.3048	
	-0.0068	-0.8206	0.0111	1.1368	-0.0222	-1.4724	

SHORT		DY		TERM		IDP		ADJ R^2
Slope	T-value	Slope	T-value	Slope	T-value	Slope	T-value	
-0.0658	-0.4509	0.1322	0.2784	-0.1966	-1.9683	0.1219	1.0445	1.62%
-0.1040	-0.9133	0.2776	0.6524	-0.1028	-1.3703	0.1344	1.1518	8.75%
-0.0827	-0.7698	0.2127	0.5203	-0.1514	-2.0747	0.1253	1.0139	8.65%

Nevertheless, the results for this regression however also do not provide any support for a risk-based explanation. They are relatively the same as for those of the South East Asian Economies and are similar to those obtained by Liew and Vassalou (2000) for Australia under their analysis.

Tuning to the issue of data sorting, again value stocks would be fundamentally riskier if they under-perform glamour stocks and those states in which they under-perform are on average 'bad' states in which the marginal utility of wealth is high. The results of this study converge with those of Lakonishok, Shileifer and Vishny (1994). That is, Lakonishok, Shileifer and Vishny (1994) claim that the variable BE/ME is not fundamentally riskier because value stocks do not under-preform glamour stocks in periods of low overall market returns. Such a conclusion can also generally be drawn for the variables size and value based on the results

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presented in this study. However, Fama and French (1996) claim that they "are not surprised by the Lakonishok, Shileifer and Vishny evidence that variation in a return spread like HML is not highly correlated with GNP, or with the market return itself". This argument is not supported in the analysis undertaken in this paper, based upon the justification of attempting to link the variables to the overall economy. Nevertheless, the overall evidence from the data sort seems to support a non risk-based explanation.

VI. Conclusion

Results of this study diverge to those obtained by Liew and Vassalou (2000). Overall, the regression analysis revealed that the variables contained limited information with regard to GDP growth while the data sort also tended to support a non risk-based explanation as well. One of the overriding limitations which may have caused such weak regression results is the decade long sample size and the, at times, extreme economic and financial market conditions faced by emerging economies in Asia over the observation period.

The paper by Liew and Vassalou (2000), dealing with ten major industrialized markets use samples of approximately twenty years for such countries as the United Kingdom and the United States. However, Liew and Vassalou (2000) also used sample periods of similar duration in their study, Australia for instance had a sample size that ranges from 1985 through 1996. For this reason, this study considered the issue of robustness of estimation as a priority. To deal directly with this issue, we regressed the independent variables directly on the dependant variables. This is in contrast to Liew and Vassalou (2000), that averaged the quarterly variables across the year and regressed the future economic growth against the past year returns for the variables SMB, HML and the market. While it may be argued that this is perhaps the cause behind the variables finding weak support, it is our conjecture that this does not seem likely, given that this study also conducted a regression analysis for Australia reporting very similar results as Liew and Vassalou (2000). As a further step in ensuring the robustness of the results presented in this paper, the data sort methodology of Lakonishok, Shileifer and Vishny (1994) was also employed, and again provided evidence broadly rejecting the risk-based hypothesis.

As far as the future direction for research is concerned we are of the view that additional empirical tests on the robustness of the models tested in this study is a worthwhile and potentially profitable pursuit. In short, the so far elusive search for a robust economic explanation for firm size and book-to-market equity effects needs sustained effort. Economic explanations of the premia associated with firm size and book-to-market equity is important since these factors do not represent economically relevant aggregate risk. This paper also raises issues of whether expected returns are related to risk or investor misvaluation, which warrants further investigation.

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Notes

1 The sample sizes average 32 quarterly periods. Throughout the tables presented in the paper, the t-critical value is set at a significance level of 5% and is indicated by (*).

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Appendix I

MALAYSIA

GDP	DATASTREAM GDP
IDP	DATASTREAM Industrial Production
DIV	DATASTREAM Total Return Index
LONG	MALAYSIA DEP 1 YEAR - MID RATE DATASTREAM
TB	MALAYSIA DEP 1 MONTH - MID RATE DATASTREAM
TERM	Difference between LONG & TB

HONG KONG

GDP	DATASTREAM GDP
IDP	BLOOMBERG Industrial Production
DIV	DATASTREAM Total Return Index
LONG	HONG KONG EXC NOTE 3 Y - RED. YIELD DATASTREAM
TB	HONG KONG 3 MTH RED YIELD
TERM	Difference between LONG & TB

PHILIPPINES

GDP	DATASTREAM GDP
IDP	DATASTREAM Industrial Production
DIV	DATASTREAM Total Return Index
LONG	PHILIPPINE T-BILL 364D - MID RATE DATASTREAM
TB	PHIL 91D - MIDDLE RATE DATASTREAM
TERM	Difference between LONG & TB

CHINA

GDP	DATASTREAM GDP
IDP	BLOOMBERG Industrial Production
DIV	DATASTREAM Total Return Index
LONG	LEND RATE 5Y AND ABOVE - MID RATE DATASTREAM
TB	DEMAND DEPOSIT RATE - MID RATE DATASTREAM
TERM	Difference between LONG & TB

KOREA

GDP	DATASTREAM GDP
IDP	DATASTREAM Industrial Production
DIV	DATASTREAM Total Return Index
LONG	KOREAN 5 YEAR - RED. YIELD DATASTREAM
TB	KOREA OVERNIGHT MID RA DATASTREAM
TERM	Difference between LONG & TB

AUSTRALIA

GDP	RBA GDP
IDP	RBA Industrial Production
DIV	DATASTREAM Total Return Index
LONG	AUST T - BOND 1 YEAR BLOOMBERG
TB	AUST T - BILL SECONDARY 90 DAY RBA
TERM	Difference between LONG & TB

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