

Drivers of Expected Returns in International Markets

CAMPBELL R. HARVEY

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is the J. Paul Sticht professor of international business at Duke University, and a research associate with the National Bureau of Economic Research in Cambridge, Massachusetts.

What are the drivers of average returns in international markets? Are the sources of risk that impact developed market returns the same as the risk factors that affect emerging market returns? These are the questions explored in this study.

The work is closely related to Harvey [1995a, 1995b] and to Estrada [2000], who examines a number of risk measures and relates these measures to emerging market returns. The difference is that we expand the list of risk metrics, and examine both developed and emerging market returns.

There are many reasons to believe that the sources of risk in emerging and developed markets may differ. Harvey [1995a] demonstrates that the pricing relationships that show some positive success in developed markets fail in emerging markets. Bekaert and Harvey [1995] argue that emerging and developed markets cannot be treated similarly. They propose an asset pricing framework that allows for time-varying integration. Indeed, the presence of barriers to international investment as documented in Bekaert [1995] immediately suggests that risk factors will differ across developed and emerging markets.

I examine a comprehensive list of 18 risk factors, and analyze whether these risk factors explain expected returns in 47 different markets. In much of the analysis, I present three sets of results: developed markets, emerging mar-

kets, and all markets. The idea is to determine if the same risk factors explain expected returns in developed and emerging markets.

I. DATA AND RISK METRICS SUMMARY ANALYSIS

Sample

I examine average returns and risk in a sample of 47 countries using data from Morgan Stanley Capital International (MSCI). The sample consists of 28 emerging markets and 19 developed markets. Emerging market data are also available from the International Finance Corporation (IFC). When I replicate a number of the emerging markets analyses with the IFC data, I find little difference between the IFC and MSCI samples.

The data are sampled between January 1988 and December 1999. There are a number of emerging markets whose data do not begin until later, but I include only markets that have a history at least from January 1995.

Risk Metrics

A variety of risk metrics are used to explain the average returns. The notation is detailed here. For example, the raw materials I am working with are the average total returns in U.S. dollars for country i , which I express as $E[R_i]$.

One-Factor Market Model. Using a world version of a single-factor model, where R_{mt} denotes the return on the MSCI world index, I estimate the regression:

$$R_{it} - r_{ft} = \alpha_i + \beta_i [R_{mt} - r_{ft}] + e_{it} \quad (1)$$

where r_{ft} is the U.S. 30-day Treasury bill rate, and e_{it} is the residual. Also, note that $e_{mt} = R_{mt} - \text{Avg}(R_{mt})$ is used later.

SR (systematic risk) is the beta, β_i in equation (1). TR (total risk) is the standard deviation of country return σ_i . IR (idiosyncratic risk) is the standard deviation of the residual e_{it} . The one-factor model is studied in Harvey [1995a, 1995b] and Bekaert and Harvey [1995].

Size. For size (market capitalization), we take the natural log of average market capitalization over the relevant period for each country. This variable is studied in Bekaert, Erb, Harvey, and Viskanta [1997] and Estrada [2000].

Semistandard Deviations. The formula for semistandard deviation is:

$$\text{Semi} - B = \sqrt{(1/T) \sum_{t=1}^T (R_t - B)^2} \quad \text{for all } R_t < B \quad (2)$$

Semimean is the semistandard deviation with $B =$ average returns for the market. Semi- r_f is the semistandard deviation with $B =$ U.S. risk-free rate. Semi-0 is the semistandard deviation with $B = 0$.

These variables are studied in Estrada [2000].

Downside Beta Measures. Down- β_{iw} is the β coefficient from the market model using observations when country returns and world returns are simultaneously negative. Down- β_w is the β coefficient from the market model using observations when world returns are negative. The first variable is studied in Estrada [2000]. The second beta has not been studied before.

Value at risk. VaR is a value at risk measure. It is the simple average of returns below the 5th percentile level. This variable is examined in Estrada [2000].

Skewness. Skew is the unconditional skewness of returns. It is calculated by taking the $\text{Mean}(e_i^3)$ divided by the $[\text{Standard Deviation of } (e_i)]^3$. Skew 5%: $[(\text{Return at the 95th Percentile level} - \text{mean return}) - (\text{Return at 5th Percentile Level} - \text{Mean Return})] - 1$.

Coskew1 represents coskewness definition 1. It is calculated by $(\text{sum up } e_i \times e_m^2)/T$ and divide by $[\text{square root of } (\text{sum of } (e_i^2)/T)] \times [(\text{sum of } (e_m^2)/T)]$. Coskew2 represents coskewness definition 2. It is calculated by

$(\text{Sum up } e_i \times e_m^2)/T$ and divide by $[\text{standard deviation of } (e_m)]^3$.

These variables are examined in Harvey and Siddique [1999, 2000a, 2000b].

Spread. Kurt is the kurtosis of the return distribution. Kurtosis is documented in Bekaert and Harvey [1997] as well as Bekaert, Erb, Harvey, and Viskanta [1998].

Political and Country Risk. ICRGC is the log of the average monthly International Country Risk Guide's (ICRG) country risk composite. CCR is the log of the average semiannual country risk rating published by *Institutional Investor*. ICRGP is the log of the average monthly ICRG political risk ratings.

These variables are studied in Erb, Harvey, and Viskanta [1996a, 1996b] as well as Bekaert, Erb, Harvey, and Viskanta [1997].

II. SUMMARY STATISTICS

Exhibit 1A (emerging markets) and Exhibit 1B (developed markets) present some summary statistics for the risk measures over the complete sample for each country. We report the mean monthly U.S. dollar returns as well as the geometric mean return and the unconditional correlation with the MSCI world in addition to the average values of the risk measures.

The last row of each exhibit reports the average across all markets. We see the usual characteristics. Emerging markets are more volatile and generally have more risk on the downside (as measured by the semivariance, VaR, downside betas). In addition, the coskewness measures for emerging markets are more negative, suggesting that these markets are contributing to the negative skewness of a diversified portfolio.

Exhibits 2A-2C present the correlation matrices of the risk measures in developed countries, emerging markets, and all countries. There are some interesting findings.

Total risk and idiosyncratic risk are 99% correlated across emerging markets and 93% correlated in developed markets. The three semivariance measures all have more than 90% correlation with total risk in both emerging and developed markets. VaR is at least -86% correlated with total risk in emerging and developed markets. The skewness measures are relatively little correlated with the other risk measures.

III. REGRESSION ANALYSIS

Bivariate Regressions

The main regression results are presented in Exhibit 3. The regressions are illustrated 18 sets of graphs in Exhibit 4. These regressions examine the bivariate relation between the average returns and the average risk measures.

I should emphasize that we are comparing averages to averages over the same time period. This is consistent with some of the early tests of asset pricing models, such as Black, Jensen, and Scholes [1972]. There is a substantial literature, beginning with Harvey [1991], however, that suggests that in an international context time variation in the risk and returns measures is very important. Nevertheless, this unconditional analysis should prove interesting.

The first set of regressions is the classic world CAPM. The analysis shows a significant relation when all 47 countries are included with an R^2 of 27%. Interestingly, the intercept is not significantly different from zero. This evidence would seem to support the CAPM.

A closer inspection reveals that all of the explanatory power is coming from emerging markets. The regression suggests that there is a 0% R^2 for developed markets.

But here is where the graphic analysis is especially insightful. The poor fit for developed markets is driven by one point; Japan has a beta of 1.41 and an average return close to zero. If this single observation is excluded, the fit of the developed countries dramatically improves and shows an R^2 of 27%. Hence, the CAPM fares reasonably well in this analysis.

The fit for the emerging markets might seem surprising, given the results in Bekaert and Harvey [1995] and Harvey [1995a], but remember that the sample is for 1988-1999. During the early part of this period, many of the emerging markets liberalized, and the evidence in Bekaert and Harvey [2000] would suggest that these markets have become more correlated with the world.

The second risk measure is total risk. Asset pricing theory says that only systematic risk, or the part of variance that contributes to a well-diversified portfolio's variance, should be important. The regressions suggest that total variance can account for 52% of the variation in the emerging market returns. Variance explains practically none of the developed market returns. A combined analysis is heavily influenced by emerging markets returns.

The results for the third risk measure, idiosyncratic risk, are similar to total risk.

EXHIBIT 2 A Cross-Section Analysis Correlation Matrix—Developed Countries

	E[R]	SR	TR	IR	Size	Semimean	Semi - r_f	Semi-0	Down- β_w	Down- β_w	VarR	skew	skew5%	coskew1	coskew2	kurt	ICRGC	CCR	ICRGP
E[R]	1.000																		
SR	0.060	1.000																	
TR	-0.025	0.691	1.000																
IR	-0.023	0.389	0.933	1.000															
Size	-0.093	0.082	-0.442	-0.607	1.000														
Semimean	-0.023	0.685	0.987	0.919	-0.447	1.000													
Semi - r_f	-0.266	0.651	0.954	0.885	-0.402	0.969	1.000												
Semi-0	-0.262	0.648	0.953	0.885	-0.405	0.970	1.000	1.000											
Down- β_w	0.044	0.451	0.625	0.567	-0.264	0.687	0.668	0.678	1.000										
Down- β_w	0.190	0.584	0.745	0.656	-0.318	0.787	0.722	0.729	0.929	1.000									
VarR	0.136	-0.624	-0.919	-0.859	0.440	-0.946	-0.952	-0.956	-0.801	-0.823	1.000								
skew	-0.221	-0.128	0.151	0.243	-0.218	0.040	0.083	0.074	-0.064	-0.061	-0.061	1.000							
skew5%	-0.047	0.584	0.673	0.580	-0.220	0.594	0.570	0.562	0.215	0.372	-0.458	0.184	1.000						
coskew1	-0.275	0.224	-0.063	-0.204	0.273	-0.166	-0.102	-0.115	-0.523	-0.438	0.218	0.330	0.123	1.000					
coskew2	-0.264	0.179	-0.218	-0.376	0.418	-0.312	-0.242	-0.254	-0.614	-0.549	0.358	0.209	0.069	0.956	1.000				
kurt	-0.101	-0.214	-0.221	-0.166	-0.113	-0.223	-0.178	-0.172	0.193	-0.004	0.066	0.264	-0.258	-0.209	-0.209	1.000			
ICRGC	-0.050	-0.048	-0.038	-0.036	-0.010	0.009	0.034	0.038	0.167	0.169	-0.078	-0.210	-0.289	-0.052	-0.075	0.039	1.000		
CCR	-0.134	-0.069	-0.313	-0.392	0.652	-0.282	-0.224	-0.221	0.140	0.021	0.180	-0.126	-0.397	0.112	0.155	0.096	0.566	1.000	
ICRGP	0.223	-0.149	-0.061	-0.011	-0.108	-0.027	-0.076	-0.074	0.018	0.127	0.036	-0.273	-0.252	-0.119	-0.174	-0.131	0.876	0.350	1.000

EXHIBIT 2B

Cross-Section Analysis Correlation Matrix—Emerging Market Countries

	E[R]	SR	TR	IR	Size	Semimean	Semi- r_f	Semi-0	Down- β_w	Down- β_w	VaR	skew	skew5%	coskew1	coskew2	kurt	ICRGC	CCR	ICRGP	
E[R]	1.000																			
SR	0.562	1.000																		
TR	0.716	0.660	1.000																	
IR	0.683	0.555	0.990	1.000																
Size	0.309	0.303	0.134	0.092	1.000															
Semimean	0.678	0.746	0.966	0.937	0.187	1.000														
Semi- r_f	0.530	0.724	0.932	0.906	0.145	0.982	1.000													
Semi-0	0.531	0.727	0.931	0.904	0.145	0.983	1.000	1.000												
Down- β_w	0.499	0.661	0.439	0.361	0.201	0.544	0.508	0.511	1.000											
Down- β_w	0.507	0.794	0.593	0.518	0.246	0.732	0.724	0.727	0.837	1.000										
VaR	-0.556	-0.761	-0.901	-0.865	-0.227	-0.965	-0.977	-0.978	-0.564	-0.775	1.000									
skew	0.469	0.126	0.480	0.509	-0.129	0.265	0.182	0.181	-0.024	-0.108	-0.153	1.000								
skew5%	0.092	-0.241	0.185	0.255	-0.168	0.062	0.042	0.038	-0.524	-0.307	0.034	0.337	1.000							
coskew1	-0.054	0.048	0.184	0.190	-0.020	0.114	0.136	0.132	-0.536	-0.354	-0.056	0.162	0.248	1.000						
coskew2	-0.286	0.008	-0.137	-0.159	-0.086	-0.166	-0.129	-0.132	-0.502	-0.434	0.197	-0.023	0.055	0.875	1.000					
kurt	0.401	0.194	0.414	0.429	0.031	0.221	0.155	0.155	0.009	-0.085	-0.197	0.858	0.179	0.155	-0.011	1.000				
ICRGC	-0.094	0.017	-0.265	-0.295	0.253	-0.281	-0.294	-0.294	-0.221	0.273	0.135	-0.074	-0.152	-0.020	0.161	1.000				
CCR	-0.132	0.022	-0.021	-0.029	0.471	-0.029	0.000	-0.002	-0.113	-0.169	0.042	0.050	-0.042	0.165	-0.001	0.651	1.000			
ICRGP	0.169	0.119	-0.081	-0.113	0.259	-0.093	-0.141	-0.139	0.124	-0.041	0.104	0.214	-0.024	-0.283	-0.244	0.259	0.902	0.499	1.000	

EXHIBIT 2C

Cross-Section Analysis Correlation Matrix—All Countries

	E[R]	SR	TR	IR	Size	Semimean	Semi- r_f	Semi-0	Down- β_w	Down- β_w	VaR	skew	skew5%	coskew1	coskew2	kurt	ICRGC	CCR	ICRGP	
E[R]	1.000																			
SR	0.519	1.000																		
TR	0.642	0.514	1.000																	
IR	0.595	0.395	0.990	1.000																
Size	0.018	0.171	-0.394	-0.467	1.000															
Semimean	0.616	0.582	0.980	0.960	-0.368	1.000														
Semi- r_f	0.488	0.549	0.959	0.945	-0.405	0.988	1.000													
Semi-0	0.489	0.551	0.959	0.944	-0.405	0.988	1.000	1.000												
Down- β_w	0.491	0.616	0.515	0.457	-0.127	0.593	0.566	0.569	1.000											
Down- β_w	0.515	0.751	0.624	0.557	-0.091	0.726	0.710	0.712	0.854	1.000										
VaR	-0.516	-0.586	-0.940	-0.920	0.362	-0.977	-0.985	-0.986	-0.616	-0.756	1.000									
skew	0.442	0.099	0.530	0.549	-0.305	0.376	0.326	0.325	0.067	-0.009	-0.302	1.000								
skew5%	0.117	-0.137	0.319	0.359	-0.284	0.234	0.229	0.225	-0.314	-0.143	-0.167	0.359	1.000							
coskew1	-0.149	0.067	-0.128	-0.168	0.308	-0.174	-0.168	-0.172	-0.540	-0.390	0.217	0.059	0.103	1.000						
coskew2	-0.339	0.019	-0.376	-0.417	0.310	-0.397	-0.380	-0.382	-0.568	-0.503	0.424	-0.135	-0.054	0.846	1.000					
kurt	0.406	0.157	0.488	0.501	-0.221	0.353	0.313	0.314	0.119	0.022	-0.342	0.822	0.218	-0.061	-0.173	1.000				
ICRGC	-0.213	0.009	-0.608	-0.660	0.392	-0.608	-0.628	-0.629	-0.333	0.604	-0.179	-0.243	-0.198	0.326	-0.170	1.000				
CCR	-0.240	0.010	-0.532	-0.586	0.728	-0.528	-0.536	-0.537	-0.315	0.537	-0.236	0.360	0.444	-0.276	0.867	1.000				
ICRGP	-0.039	0.067	-0.511	-0.567	0.573	-0.510	-0.551	-0.551	-0.142	-0.227	0.519	-0.129	-0.210	0.189	-0.111	0.957	0.800	0.499	1.000	

MSCI Data. E[R]: Mean returns; SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Semimean: Semideviation with respect to mean; Semi- r_f : Semideviation with respect to risk-free rate; Semi-0: Semideviation with respect to 0; Down- β_w : Downside beta calculated using observations when country index and world index fall simultaneously; Down- β_w : Downside beta calculated using observations when world index falls; VaR: Value at risk; skew: Skewness, skew5%: Skewness calculated using formula 1; Coskew1: Co-skewness with world index using formula 2; Coskew-2: Coskew with world index using formula 3; kurt: Kurtosis; ICRGC: Log of average composite country risk; CCR: Log of average CCR country risk, ICRGP: Log of ICRP political risk.

EXHIBIT 3 A

Bivariate Regressions—Developed Countries

Risk Variable	c0	p-value	c1	p-value	R2	Adj-R2
SR	0.7777	0.091	0.1126	0.807	0.004	-0.055
TR	0.9277	0.052	-0.0076	0.919	0.001	-0.058
IR	0.9155	0.019	-0.0071	0.925	0.001	-0.058
Size	1.0041	0.007	-0.0244	0.704	0.009	-0.050
Semimean	0.9274	0.070	-0.0107	0.925	0.001	-0.058
Semi - r_f	1.3345	0.004	-0.1220	0.271	0.071	0.016
Semi-0	1.3063	0.004	-0.1214	0.279	0.069	0.014
Down- β_{iw}	0.8317	0.012	0.0624	0.857	0.002	-0.057
Down- β_w	0.6351	0.066	0.2310	0.436	0.036	-0.021
VaR	1.0930	0.011	0.0182	0.580	0.018	-0.039
skew	0.9309	0.000	-0.2259	0.364	0.049	-0.007
skew5%	0.8909	0.000	-0.1423	0.850	0.002	-0.057
coskew1	0.8474	0.000	-0.6217	0.255	0.075	0.021
coskew2	0.8419	0.000	-0.5410	0.274	0.070	0.015
kurt	1.0414	0.016	-0.0387	0.681	0.010	-0.048
ICRGC	3.0763	0.777	-0.4956	0.840	0.003	-0.056
CCR	3.5383	0.469	-0.6027	0.586	0.018	-0.040
ICRGP	-7.2269	0.413	1.8384	0.359	0.050	-0.006

EXHIBIT 3 B

Bivariate Regressions—Emerging Countries

Risk Variable	c0	p-value	c1	p-value	R2	Adj-R2
SR	0.3699	0.272	1.0050	0.002	0.319	0.293
TR	-0.8754	0.059	0.1813	0.000	0.517	0.499
IR	-0.7778	0.107	0.1831	0.000	0.470	0.450
Size	0.6242	0.202	0.2704	0.118	0.092	0.057
Semimean	-0.8811	0.084	0.2792	0.000	0.464	0.444
Semi - r_f	-0.4945	0.412	0.2520	0.003	0.285	0.258
Semi-0	-0.4459	0.447	0.2526	0.003	0.286	0.259
Down- β_{iw}	0.2849	0.484	0.8893	0.007	0.250	0.221
Down- β_w	0.4131	0.258	0.5713	0.006	0.259	0.230
VaR	-0.4617	0.409	-0.0780	0.002	0.312	0.286
skew	0.8635	0.003	0.6561	0.012	0.220	0.190
skew5%	1.2288	0.000	0.5588	0.639	0.009	-0.030
coskew1	1.2324	0.002	-0.4184	0.781	0.003	-0.035
coskew2	0.9742	0.004	-0.7513	0.140	0.082	0.047
kurt	0.3654	0.447	0.1618	0.035	0.160	0.128
ICRGC	5.9795	0.532	-1.1071	0.625	0.009	-0.029
CCR	3.3286	0.249	-0.5460	0.478	0.020	-0.018
ICRGP	-5.2259	0.495	1.5644	0.395	0.028	-0.009

EXHIBIT 3C

Bivariate Regressions—All Countries

Risk Variable	c0	p-value	c1	p-value	R2	Adj-R2
SR	0.2480	0.325	0.9514	0.000	0.271	0.249
TR	-0.1256	0.612	0.1318	0.000	0.422	0.409
IR	0.0934	0.693	0.1207	0.000	0.365	0.351
Size	1.1247	0.001	0.0031	0.968	0.000	0.022
Semimean	-0.1784	0.512	0.2070	0.000	0.389	0.376
Semi - r_f	0.0813	0.789	0.1832	0.000	0.247	0.230
Semi-0	0.1170	0.691	0.1836	0.000	0.248	0.232
Down- β_{iw}	0.2769	0.289	0.8451	0.000	0.244	0.227
Down- β_w	0.3493	0.135	0.5758	0.000	0.269	0.253
VaR	0.0753	0.793	-0.0583	0.000	0.275	0.259
skew	0.8478	0.000	0.5886	0.002	0.198	0.180
skew5%	1.0650	0.000	0.6623	0.421	0.015	-0.007
coskew1	1.0229	0.000	-0.8703	0.300	0.024	0.002
coskew2	0.8964	0.000	-0.8121	0.018	0.118	0.098
kurt	0.3226	0.289	0.1586	0.004	0.167	0.149
ICRGC	8.2620	0.081	-1.6560	0.130	0.050	0.029
CCR	3.4683	0.012	-0.5851	0.084	0.065	0.044
ICRGP	2.4870	0.538	-0.3163	0.737	0.003	-0.020

$E[R_i]$: Mean return; $Risk_i$ = Risk Variable; SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Semimean: Semideviation with respect to mean; Semi- r_f : Semideviation with respect to risk-free rate; Semi-0: Semideviation with respect to 0; Down- β_{iw} : Downside beta calculated using observations when country index and world index fall simultaneously; Down- β_w : Downside beta calculated using observations when world index falls; VaR: Value at risk; skew: Skewness; skew5%: Skewness calculated using formula 1; Coskew1: Co-skewness with world index using formula 2; Coskew-2: Coskew with world index using formula 3; kurt: Kurtosis; ICRGC: Log of average ICRG composite country risk; CCR: Log of average CCR country risk, ICRGP: Log of ICRP political risk.

The fourth risk measure is size. Size could be related to liquidity and the amount of information available in the market, which are legitimate risk factors. We find that there is little relation between the average international returns and size.

The fifth through seventh measures are semivariance measures. All are similar, and from Exhibit 2 we know they are all highly correlated with total variance. We find that the semivariance measures account for a substantial part of the variation in the emerging market returns but not the developed market returns.

The eighth and ninth measures are downside betas. There is some relation between the downside betas and the emerging market returns—but little relation with the developed market returns.

The tenth measure is a value at risk measure. The VaR measures the mean return in the 5% tail of the distribution. If this type of risk is priced, one would expect a highly negative VaR (high risk) to command a high average return. This is exactly what we see for emerging markets—but not developed markets. Notice that the slope of the line in the Exhibit 4J Emerging Markets

graph is negative, implying that a more negative VaR implies a higher expected return in emerging markets.

Harvey and Siddique [2000a] posit that investors care about the skewness of their portfolio. Their model is based on the work of Rubinstein [1973] and Kraus and Litzenberger [1976]. In this world, investors value the contribution to the skewness of the portfolio, or the coskewness. That is, if an asset contributes positive skewness to a diversified portfolio (high coskewness), that asset will be valuable and will have a high price (low expected return). If the asset contributes negative skewness (negative coskewness), to get investors to purchase this asset the price must drop (higher expected return).

So, in the world of the augmented CAPM, coskewness should count, and skewness itself should not. This is analogous to beta and variance. In the CAPM, it is only the beta that is rewarded, not the total volatility. To be consistent, only the systematic part of skewness (the coskewness) should command a reward.

When we examine the two total skewness measures, we see a positive relation for emerging markets but not developed markets. This is similar to what we see for total volatil-

EXHIBIT 4A - Systematic Risk
All Countries

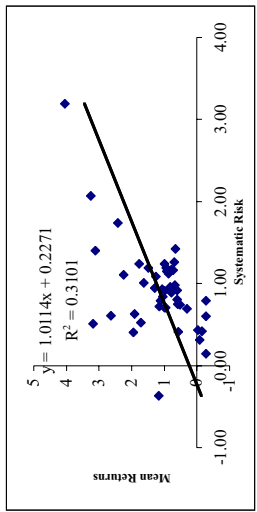


EXHIBIT 4B - Total Risk
All Countries

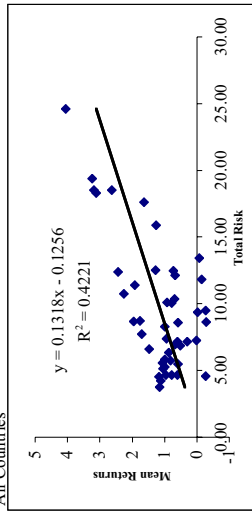
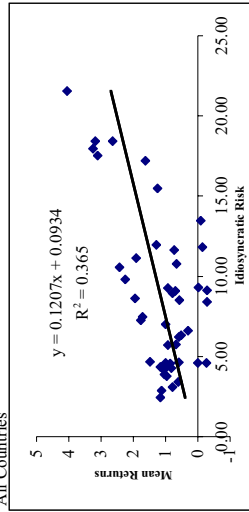
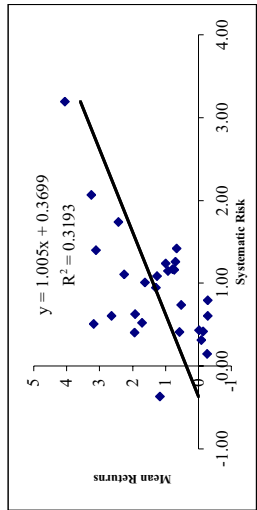


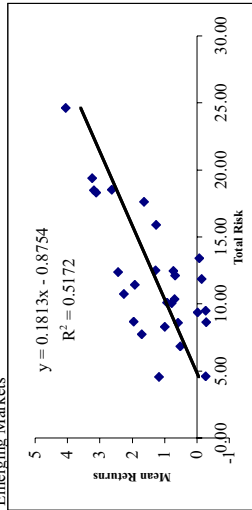
EXHIBIT 4C - Idiosyncratic Risk
All Countries



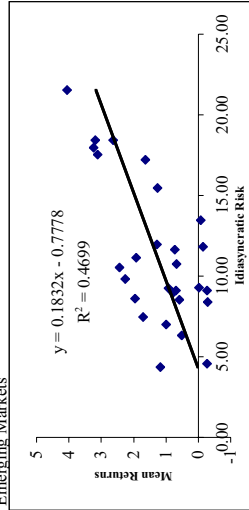
Emerging Markets



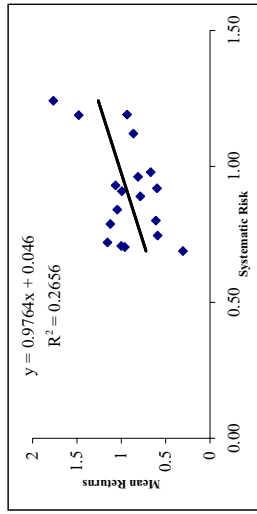
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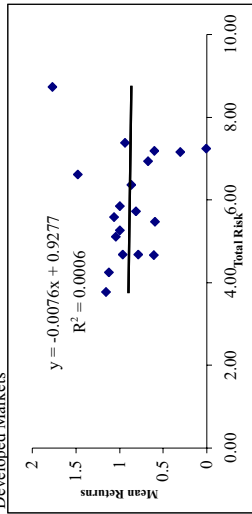
Emerging Markets



Developed Markets



Developed Markets



Developed Markets

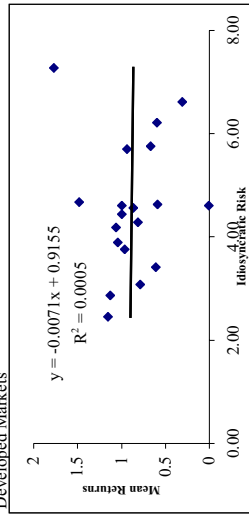
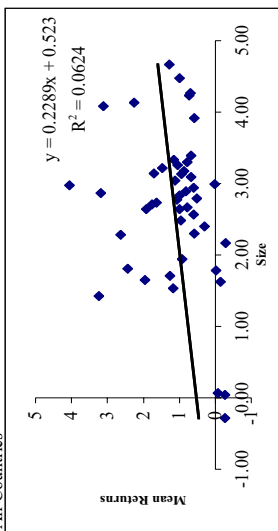
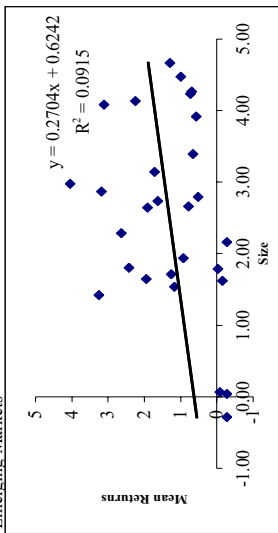


EXHIBIT 4D - Size
All Countries



Emerging Markets



Developed Markets

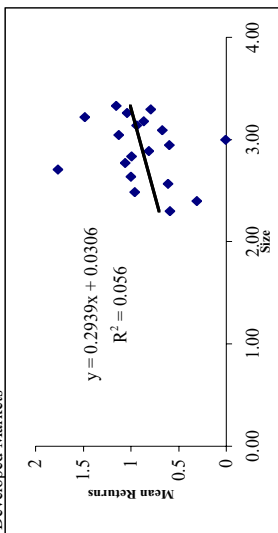
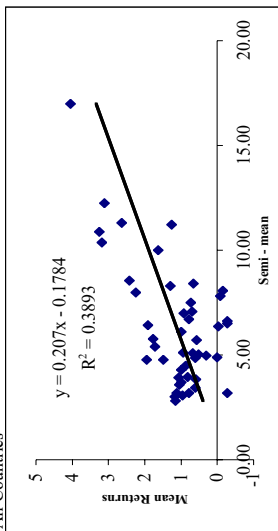
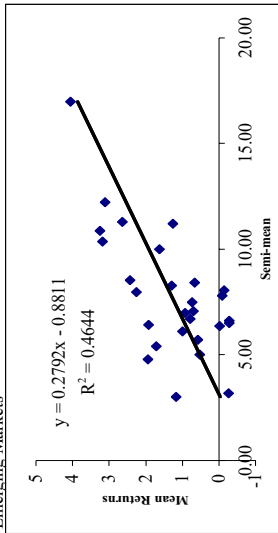


EXHIBIT 4E - Semivariance to Mean
All Countries



Emerging Markets



Developed Markets

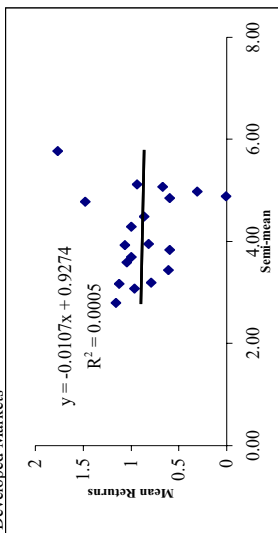
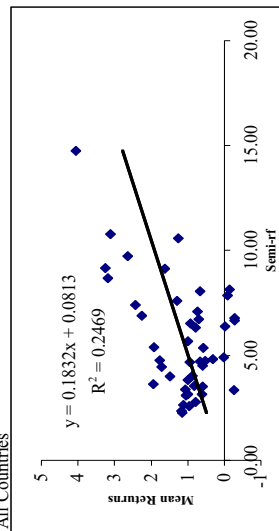
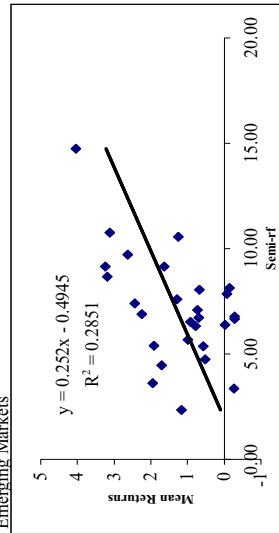


EXHIBIT 4F - Semivariance to Risk-Free Interest Rate
All Countries



Emerging Markets



Developed Markets

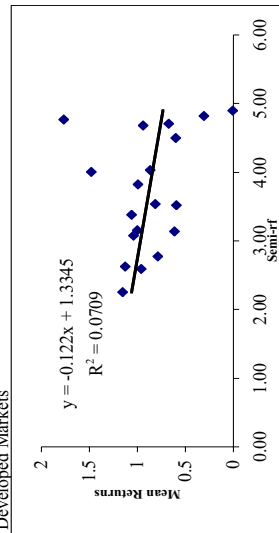
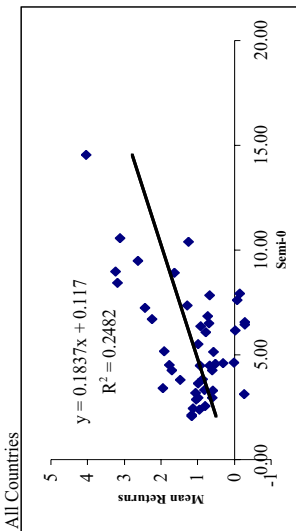
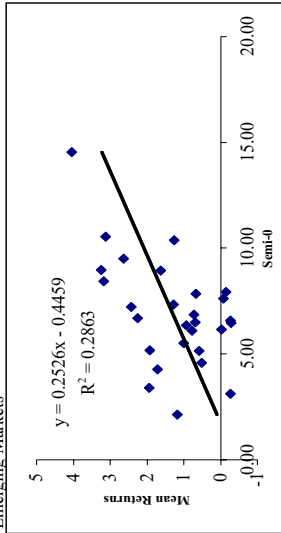


EXHIBIT 4G - Semivariance to Zero



Emerging Markets



Developed Markets

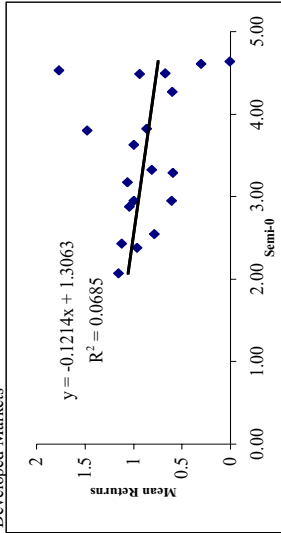
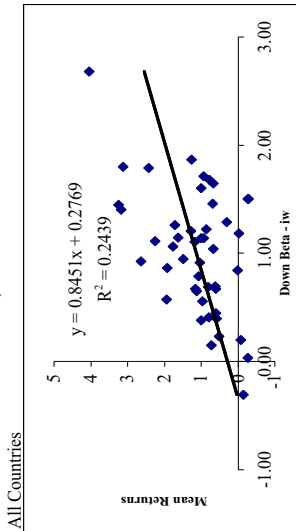
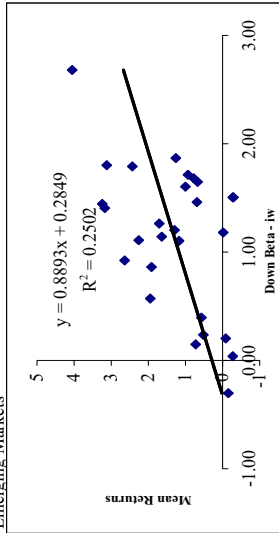


EXHIBIT 4H - Downside Beta, World and Local Market Down



Emerging Markets



Developed Markets

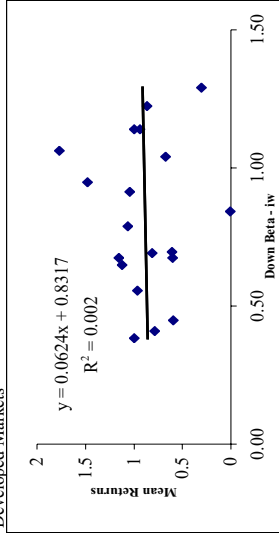
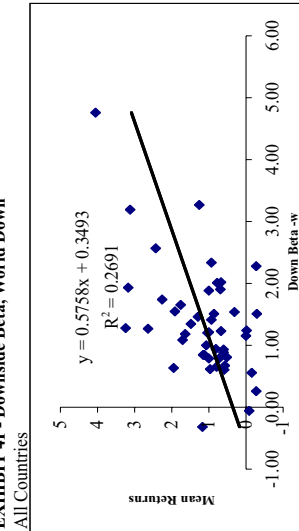
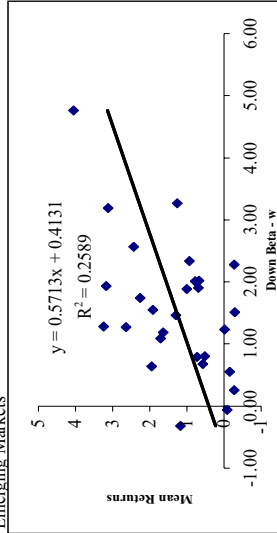


EXHIBIT 4I - Downside Beta, World Down



Emerging Markets



Developed Markets

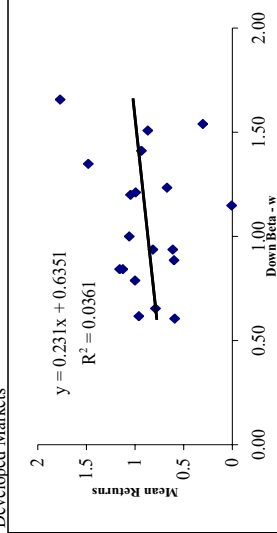
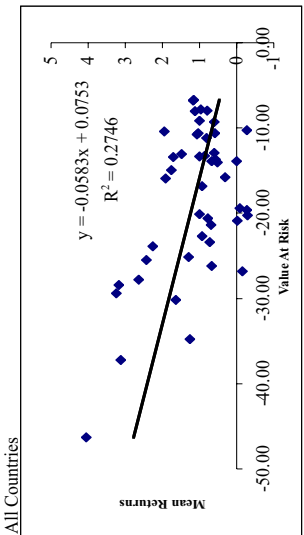
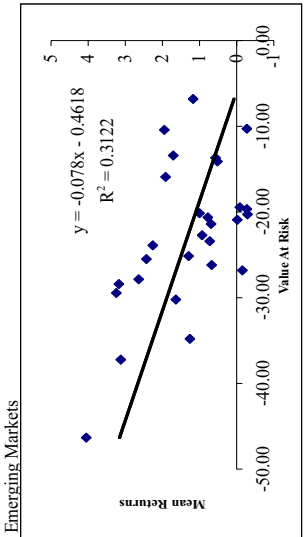


EXHIBIT 4J - Value at Risk



Emerging Markets



Developed Markets

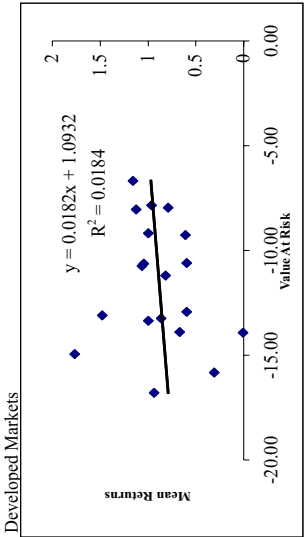
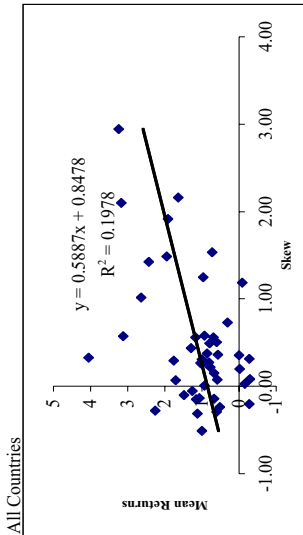
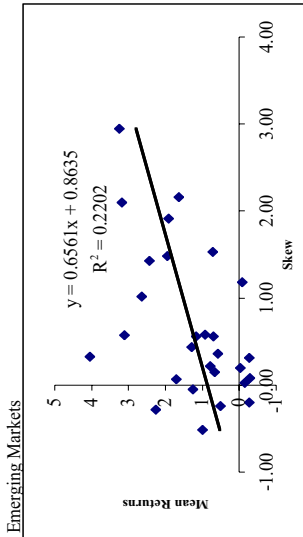


EXHIBIT 4K - Unconditional Skewness



Emerging Markets



Developed Markets

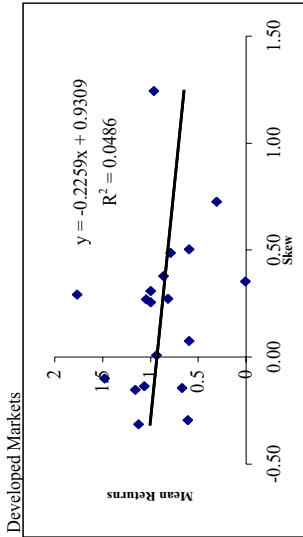
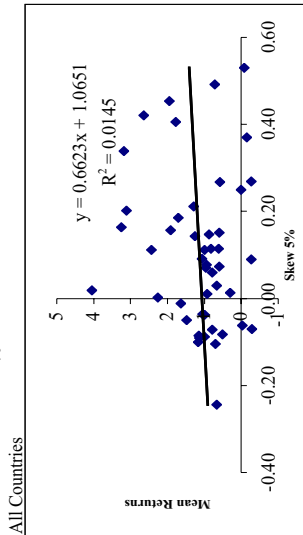
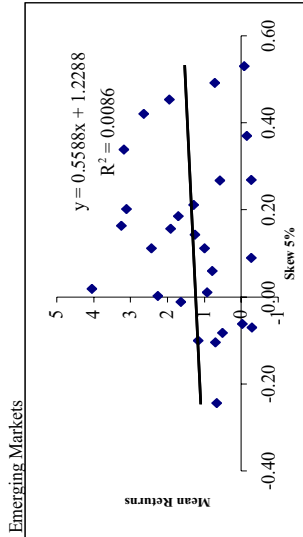


EXHIBIT 4L - Skew 5% Tail



Emerging Markets



Developed Markets

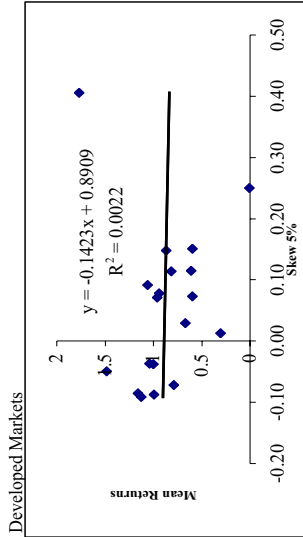
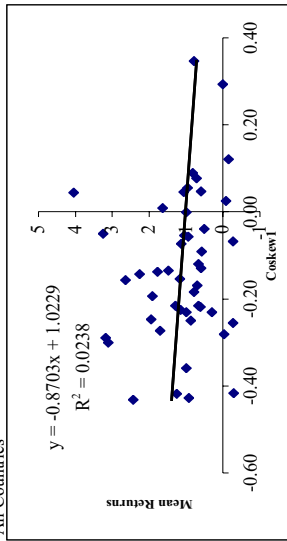
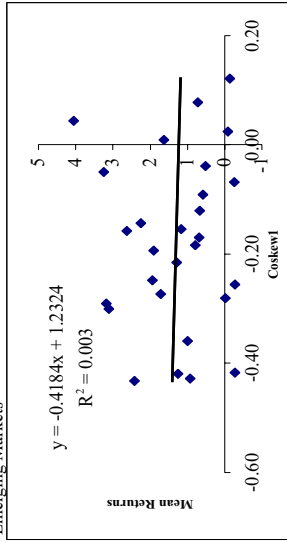


EXHIBIT 4M - Coskewness Measure 1
All Countries



Emerging Markets



Developed Markets

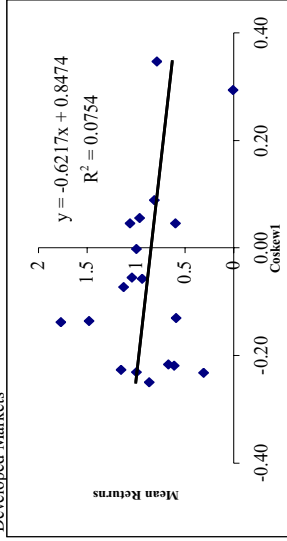
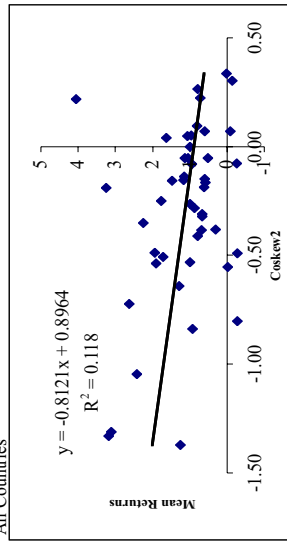
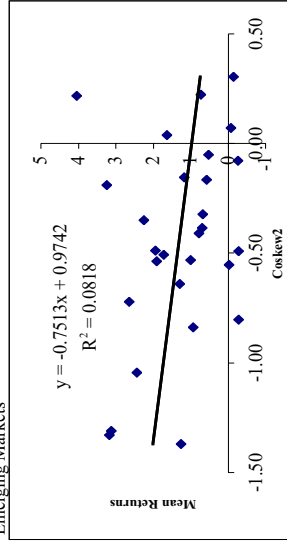


EXHIBIT 4N - Coskewness Measure 2
All Countries



Emerging Markets



Developed Markets

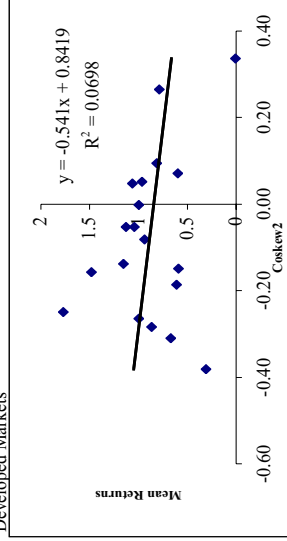
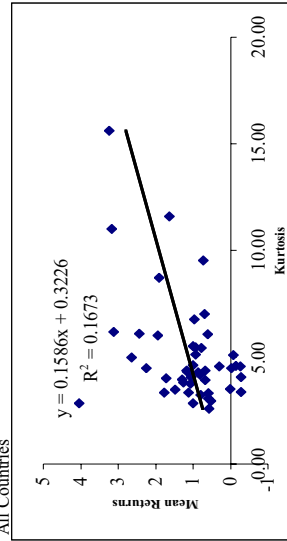
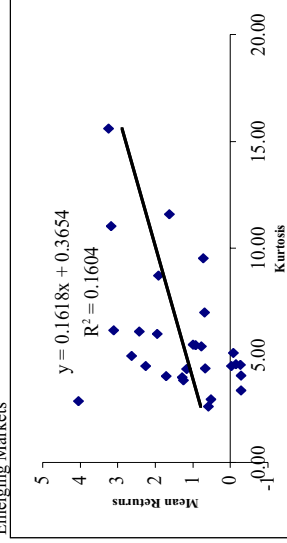


EXHIBIT 4O - Kurtosis
All Countries



Emerging Markets



Developed Markets

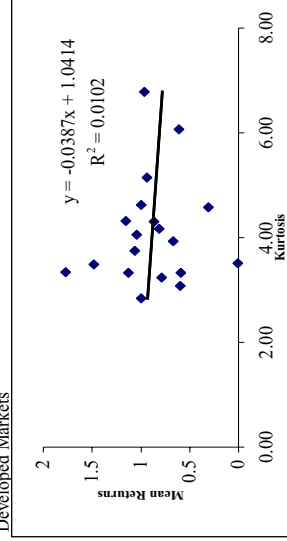
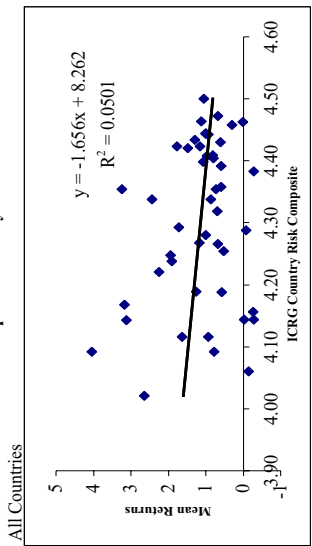
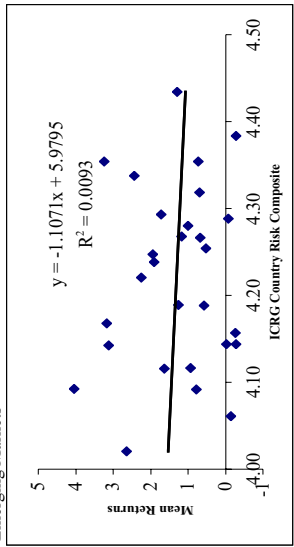


EXHIBIT 4P - ICRGC Composite Country Risk



Emerging Markets



Developed Markets

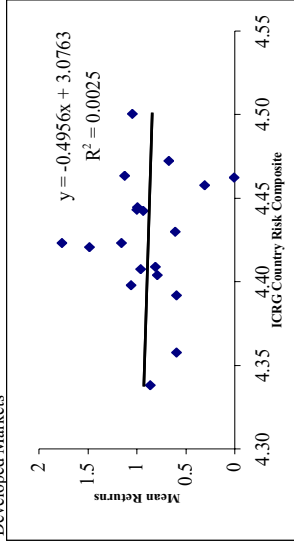
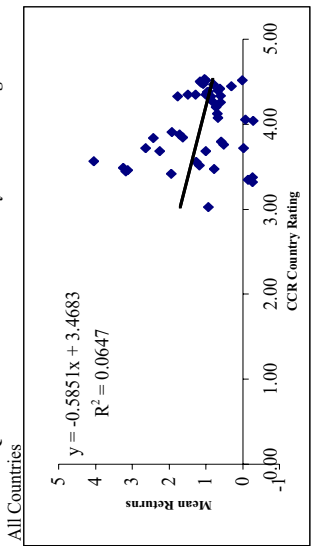
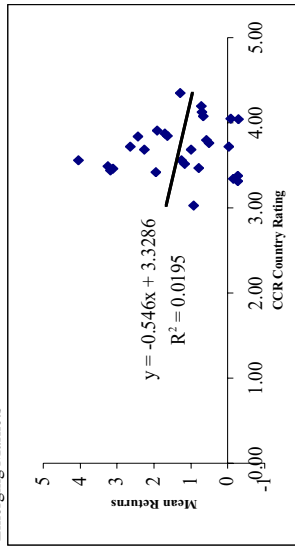


EXHIBIT 4Q - Institutional Investor Country Credit Rating



Emerging Markets



Developed Markets

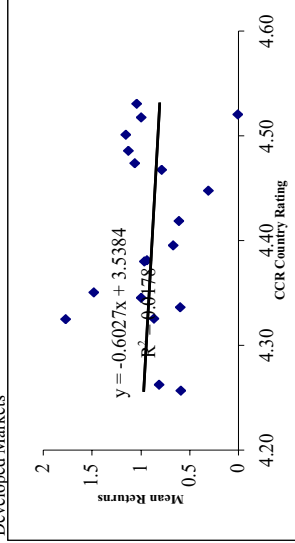
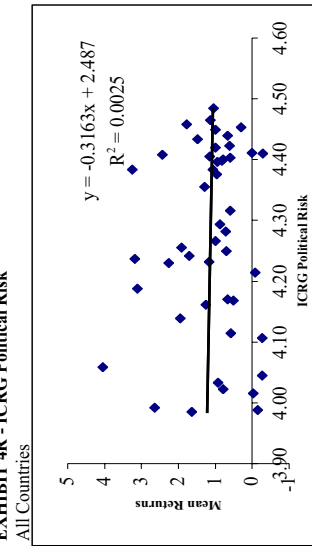
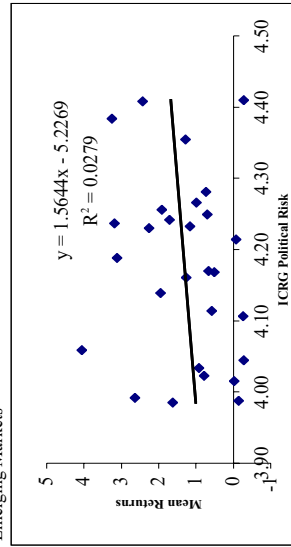


EXHIBIT 4R - ICRGC Political Risk



Emerging Markets



Developed Markets

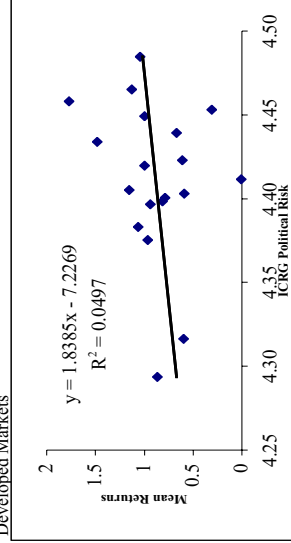


EXHIBIT 5A

Multiple Regressions—Developed Markets

Risk1 / Risk2	c ₀	p-value	c ₁	p-value	c ₂	p-value	R ²
SR / TR	0.8522	0.1000	0.2774	0.6730	-0.0385	0.7160	0.012
SR / IR	0.8177	0.1130	0.1526	0.7670	-0.0169	0.8420	0.006
SR / Size	0.8946	0.1150	0.1220	0.7970	-0.0253	0.7020	0.013
SR / Semimean	0.8671	0.1100	0.2681	0.6810	-0.0565	0.7280	0.011
SR / Semi - r _f	1.0727	0.0270	0.7604	0.1970	-0.2431	0.0970	0.166
SR / Semi-0	1.0284	0.0310	0.7421	0.2070	-0.2403	0.1040	0.159
SR / Down-β _w	0.7699	0.1130	0.0943	0.8600	0.0304	0.9390	0.004
SR / Down-β _w	0.7115	0.1310	-0.1446	0.8010	0.2857	0.4470	0.040
SR / VaR	0.9074	0.0650	0.4448	0.4570	0.0380	0.3760	0.053
SR / skew	0.8732	0.0700	0.0607	0.8970	-0.2217	0.3920	0.050
SR / skew5%	0.6725	0.2100	0.2483	0.6710	-0.3788	0.6910	0.014
SR / coskew1	0.6200	0.1830	0.2397	0.6080	-0.6864	0.2330	0.091
SR / coskew2	0.6446	0.1660	0.2081	0.6550	-0.5818	0.2610	0.082
SR / kurt	0.9574	0.1700	0.0755	0.8760	-0.0354	0.7220	0.012
SR / ICRGC	2.8540	0.7990	0.1084	0.2000	-0.4683	0.8530	0.006
SR / CCR	3.3791	0.5070	0.0959	0.8390	-0.5868	0.6070	0.020
SR / ICRGP	-7.9100	0.3930	0.1787	0.7030	1.9555	0.3480	0.059
TR / IR	0.9280	0.0790	-0.0079	0.9700	0.0003	0.9990	0.001
TR / Size	1.1992	0.1230	-0.0249	0.7700	-0.0339	0.6450	0.014
TR / Semimean	0.9171	0.1000	-0.0264	0.9560	0.0295	0.9680	0.001
TR / Semi - r _f *	0.8827	0.0050	0.7752	0.0000	-1.2421	0.0000	0.658
TR / Semi-0*	0.6921	0.0300	0.7319	0.0000	-0.1819	0.0000	0.611
TR / Down-β _w	0.9245	0.0600	-0.0262	0.7900	0.1385	0.7620	0.007
TR / Down-β _w	0.9436	0.0460	-0.1133	0.3080	0.5699	0.2060	0.099
TR / VaR	0.8558	0.0720	0.1935	0.3080	0.0967	0.2510	0.082
TR / skew	0.9160	0.0580	0.0026	0.9730	-0.2272	0.3820	0.049
TR / skew5%	0.8716	0.1500	0.0035	0.9730	-0.1659	0.8740	0.002
TR / coskew1	0.9235	0.0520	-0.0129	0.8620	-0.6278	0.2660	0.072
TR / coskew2	0.9947	0.0400	-0.0263	0.7290	-0.5798	0.2670	0.077
TR / kurt	1.1478	0.1100	-0.0150	0.8480	-0.0429	0.6660	0.013
TR / ICRGC	3.1693	0.7780	-0.0081	0.9160	-0.5057	0.8450	0.003
TR / CCR	4.1312	0.4510	-0.0224	0.7800	-0.7070	0.5560	0.023
TR / ICRGP	-7.1810	0.4330	-0.0035	0.0498	1.8327	0.3760	0.050

*Extreme multicollinearity.

ity, and is consistent with the notion that the emerging markets are not fully integrated into world capital markets.

For the coskewness measures, the results are similar across the two methods. In both developed and emerging markets, there is a negative relation, suggesting that more negative coskewness gets a higher expected return—which is what the theory would suggest.

From an asset pricing perspective again, it is the contribution to kurtosis of a well-diversified portfolio (the cokurtosis) that should be priced. We do not attempt to measure the cokurtosis. We find a positive relation between kurtosis and returns in emerging markets but not in developed markets.

The last measures are country risk ratings. Erb, Harvey, and Viskanta [1996a, 1996b] show that there is a relation between country risk ratings and subsequent returns. The analysis in Exhibit 3 is different. We are comparing average country risk to average returns during the same period. Nevertheless, most of the results are consistent with those of Erb, Harvey, and Viskanta.

We find for the ICRG Composite and the Institutional Investor Country Credit Rating that there is a negative relation in both developed and emerging markets. The relation is weak, however. The political risk measure in exhibit 4R has a positive slope, suggesting that higher political risk is associated with lower expected returns—which is counter-intuitive.

EXHIBIT 5 B

Multiple Regressions—Emerging Markets

Risk1 / Risk2	c ₀	p-value	c ₁	p-value	c ₂	p-value	R ²
SR / TR	-0.8203	0.0800	0.2851	0.3870	0.1546	0.0020	0.532
SR / IR	-0.7703	0.1010	0.4749	0.1220	0.1436	0.0030	0.519
SR / Size	0.1156	0.7980	0.9271	0.0050	0.1295	0.4040	0.338
SR / Semimean	-0.7869	0.1450	0.2272	0.5640	0.2401	0.0130	0.472
SR / Semi - r _f	-0.2003	0.7430	0.6672	0.1210	0.1238	0.2720	0.352
SR / Semi-0	-0.1763	0.7660	0.6641	0.1240	0.1245	0.2710	0.352
SR / Down-β _w	0.1567	0.6890	0.7405	0.0640	0.4000	0.3060	0.348
SR / Down-β _w	0.2985	0.4070	0.7753	0.1190	0.1825	0.5520	0.329
SR / VaR	-0.2127	0.7130	0.5912	0.1900	-0.0427	0.2260	0.359
SR / skew	0.0722	0.8190	0.9142	0.0020	0.5653	0.0100	0.480
SR / skew5%	0.0677	0.8600	1.1087	0.0010	1.4635	0.1490	0.375
SR / coskew1	0.2511	0.5460	1.0120	0.0020	-0.6276	0.6200	0.326
SR / coskew2	0.0283	0.9390	1.0088	0.0010	-0.7625	0.0720	0.404
SR / kurt	-0.2439	0.5900	0.9008	0.0030	0.1222	0.0660	0.407
SR / ICRGC	5.5166	0.4930	1.0083	0.0020	-1.2202	0.5220	0.331
SR / CCR	2.5628	0.2890	1.0108	0.0020	-0.5938	0.3580	0.342
SR / ICRGP	-3.5800	0.5820	0.9835	0.0030	0.9505	0.5440	0.330
TR / IR	-0.8258	0.0700	0.5232	0.0400	-0.3656	0.1650	0.554
TR / Size	-1.2669	0.0180	0.1743	0.0000	0.1879	0.1290	0.561
TR / Semimean	-0.8183	0.0980	0.2314	0.1010	-0.0842	0.7060	0.520
TR / Semi - r _f	-0.3113	0.4650	0.4239	0.0000	-0.4872	0.0040	0.658
TR / Semi-0	-0.4206	0.3150	0.4182	0.0000	-0.4763	0.0040	0.653
TR / Down-β _w	-1.0380	0.0280	0.1560	0.0000	0.4062	0.1350	0.559
TR / Down-β _w	-0.8699	0.0630	0.1624	0.0010	0.1424	0.4640	0.528
TR / VaR	-0.6711	0.1500	0.2888	0.0010	0.0661	0.1350	0.559
TR / skew	-0.7931	0.0900	0.1618	0.0000	0.2254	0.3080	0.537
TR / skew5%	-0.8635	0.0690	0.1833	0.0000	-0.2512	0.7700	0.519
TR / coskew1	-1.2476	0.0210	0.1903	0.0000	-1.4755	0.1660	0.554
TR / coskew2	-1.0189	0.0310	0.1748	0.0000	-0.5026	0.1690	0.553
TR / kurt	-1.0111	0.0440	0.1684	0.0000	0.0501	0.4180	0.530
TR / ICRGC	-5.8392	0.4140	0.1881	0.0000	1.1570	0.4860	0.527
TR / CCR	0.9363	0.6500	0.1807	0.0000	-0.4873	0.3710	0.533
TR / ICRGP	-9.7990	0.0710	0.1860	0.0000	2.1230	0.0980	0.568

Multivariate Regressions

The multivariate regressions are presented in Exhibit 5. These regressions use two risk factors. We concentrate on regressions with beta and one other risk factor and regressions with total risk and one other risk factor.

If the world behaves according to the augmented CAPM with skewness, we should have both beta and coskewness in the regression. It turns out that this type of regression is reasonably successful. In developed markets, the market beta has a positive coefficient, and the coskewness has a negative coefficient. Neither coefficient is significant at conventional levels in the regression with only 19 observations.

In the emerging markets sample, this regression is more successful. The coefficient on the market beta is significant, and the coefficient on the coskewness measure is negative and significant, at the 10% level using the second definition of coskewness. This regression is able to explain 40% of the emerging market returns. There are 28 observations in the regression.

In the full sample, the regression with coskewness definition 2 is quite successful. Both coefficients are significantly different from zero and are the right sign. The regression explains 40% of the variation in the average returns.

The alternative model is one with total variance and total skewness. This model does not fare well in developed markets; it does much better in emerging markets. The

EXHIBIT 5C

Multiple Regressions—All Markets

Risk1 / Risk2	c_0	p-value	c_1	p-value	c_2	p-value	R^2
SR / TR	-0.3051	0.2370	0.4638	0.0540	0.1054	0.0000	0.470
SR / IR	-0.2491	0.3280	0.6110	0.0080	0.0944	0.0000	0.459
SR / Size	0.3817	0.2400	0.9780	0.0000	-0.0451	0.5150	0.278
SR / Semimean	-0.2923	0.2900	0.4350	0.0970	0.1610	0.0010	0.427
SR / Semi - r_f	-0.1101	0.7130	0.6483	0.0200	0.1114	0.0460	0.335
SR / Semi-0	-0.0878	0.7640	0.6460	0.0210	0.1119	0.0450	0.335
SR / Down- β_{iw}	0.0555	0.8360	0.6375	0.0320	0.4776	0.0840	0.320
SR / Down- β_w	0.1791	0.4770	0.5493	0.1210	0.3252	0.1300	0.309
SR / VaR	-0.0937	0.7440	0.5945	0.0360	-0.0371	0.0320	0.344
SR / skew	0.0580	0.8020	0.8795	0.0000	0.5256	0.0010	0.427
SR / skew5%	0.0881	0.7430	1.0000	0.0000	1.0737	0.1310	0.308
SR / coskew1	0.0873	0.7460	0.9747	0.0000	-1.0720	0.1380	0.307
SR / coskew2	-0.0099	0.9680	0.9638	0.0000	-0.8360	0.0040	0.396
SR / kurt	-0.3296	0.2950	0.8553	0.0000	0.1302	0.0080	0.381
SR / ICRGC	7.5150	0.0640	0.9550	0.0000	-1.6895	0.0720	0.323
SR / CCR	2.6242	0.0270	0.9561	0.0000	-0.5971	0.0400	0.339
SR / ICRGP	2.5330	0.4660	0.9618	0.0000	-0.5372	0.5100	0.278
TR / IR	-0.4942	0.0790	0.5095	0.0020	-0.3758	0.0150	0.495
TR / Size	-0.9385	0.0180	0.1566	0.0000	0.1638	0.0100	0.503
TR / Semimean	-0.0596	0.8290	0.1963	0.0990	-0.1075	0.5750	0.426
TR / Semi - r_f	0.2858	0.1970	0.4402	0.0000	-0.5842	0.0000	0.622
TR / Semi-0	0.1582	0.4580	0.4334	0.0000	-0.5715	0.0000	0.616
TR / Down- β_{iw}	-0.2859	0.2760	0.1092	0.0000	0.3710	0.1020	0.457
TR / Down- β_w	-0.1824	0.4660	0.1083	0.0010	0.2064	0.2030	0.443
TR / VAR	0.0218	0.9290	0.2729	0.0000	0.0823	0.0240	0.486
TR / skew	-0.0723	0.7740	0.1168	0.0000	0.1853	0.3000	0.436
TR / skew5%	-0.1286	0.6050	0.1381	0.0000	-0.5315	0.4260	0.431
TR / coskew1	-0.1604	0.5300	0.1299	0.0000	-0.4071	0.5340	0.427
TR / coskew2	0.1218	0.6230	0.1230	0.0000	-0.2730	0.3510	0.434
TR / kurt	-0.2510	0.3760	0.1199	0.0000	0.0467	0.3590	0.433
TR / ICRGC	-9.1055	0.0530	0.1654	0.0000	2.0120	0.0560	0.469
TR / CCR	-1.4252	0.3100	0.1456	0.0000	0.2930	0.3470	0.434
TR / ICRGP	-10.7762	0.0030	0.1714	0.0000	2.4047	0.0030	0.530

loading on total variance is positive, and the loading on skewness is negative which is what one would expect if the markets are completely segmented. The two factors can explain about 52% of the variation in the average returns. In the model with all countries, the total variance remains important but the skewness measures are no longer significant.

Judging by R^2 , the best-fitting regression is the one with total risk and a measure of semivariance, although this is misleading because of the extreme collinearity between the semivariance measures and the total risk.

The message of this analysis is as follows. A world CAPM with coskewness appears to have some ability to explain average returns in both developed and emerging

markets. In emerging markets, the systematic risks (beta and coskewness) are not complete measures of risk. That is, extra variation can be explained by adding total risks to the regression. Even so, the results of Bekaert and Harvey [2000] suggest that these total risks may be becoming less important with capital market liberalizations.

IV. SUMMARY

I have examined 18 measures of risk in 47 international markets. Particular attention is paid to a measure of downside implied by asset pricing theory: coskewness. This risk measure captures the contribution that an asset makes to a well-diversified portfolio's total skewness. A

negative coskewness would imply that adding an asset to the portfolio will decrease the skewness of the portfolio. Given that investors like positive not negative skewness, this asset would have to have a high expected return to get investors to purchase it.

Risk measures implied by asset pricing theory, in particular world beta and coskewness, work reasonably well in capturing the cross-section of average returns in world markets. Yet, consistent with the evidence in Bekaert and Harvey [1995], many emerging markets appear to be impacted by total risk measures like variance and skewness. This is consistent with their less-than-complete integration with world capital markets.

ENDNOTES

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