The Cost of Equity in Emerging Markets: A Downside Risk Approach

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Every company evaluating an investment project or an acquisition in an emerging market must estimate not only future cash flows but also an appropriate discount rate. Yet, there is no widely accepted definition of risk in emerging markets, and therefore no standard way to estimate discount rates. This issue is critical for companies investing in emerging markets.

The aim of this article is to estimate a capital asset pricing model (CAPM)-based cost of equity for a sample of 28 emerging markets, and compare it to two alternative estimates based on total risk and downside risk. The downside risk methodology has several attractive features. It is theoretically sound; it is very simple to implement; it can be applied both at the market level and at the company level; it is not based on subjective measures of risk; it can be tailored to any desired benchmark return; and it captures the downside risk that investors want to avoid (as opposed to the upside risk to which investors want to be exposed).

WHAT'S AT STAKE

Estimating the cost of equity is very different in developed markets and emerging markets. In developed markets, practitioners widely use a CAPM-based required return on equity. This method, of course, is not free from controversy; over 30 years of academic debate have not settled whether beta is the most appropriate measure of risk. Few, however, call for discarding the CAPM outright.[1]

The bulk of the evidence seems to indicate that, although additional factors such as size and book-to-market ratios may be necessary to properly explain stock returns, beta should not be discarded as a measure of risk. In other words, in developed markets, the debate is not so much about whether beta is an appropriate measure of risk as it is about determining what additional variables (if any) affect stock returns.

In emerging markets, the debate is quite different. The international version of the CAPM implicitly assumes fully integrated markets, thus implying that assets with the same risk must have the same expected return regardless of where they trade.[2] Most of the evidence on the integration of emerging markets is at odds with this assumption.[3]

The relevant question is, then, what model should be used to estimate the cost of equity in these markets?

Previous Approaches

Use of the CAPM to estimate the cost of equity in emerging markets has several problems. From an empirical point of view, these problems are compounded by the fact that, in emerging markets, betas and stock returns are largely uncorrelated. Furthermore, early studies on the cost of equity in emerging markets, such as Harvey [1995], find that these markets have very low betas that, when used as an input in the CAPM equation, generate required returns typically considered "too low." As a result, several alternative ways of estimating the cost of equity in emerging markets have been proposed.

Godfrey and Espinosa [1996] propose adjusting the CAPM in two ways. First, they add to the risk-free rate the spread between the yield of an emerging market sovereign bond denominated in dollars and the yield of a comparable U.S. bond. Second, they are an "adjusted beta," defined as 60% of the ratio between an emerging market's standard deviation of returns and the standard deviation of returns in the U.S. market.

There are at least two problems with this approach. First and foremost, not all countries issue dollar-denominated debt. And second, it is difficult to assess how much risk is double-counted by the joint adjustment of the risk-free rate and the beta. Godfrey and Espinosa's [1996] ad-hoc adjustment is based on empirical results reported in Erb, Harvey, and Viskanta [1995].

An alternative approach is based on credit ratings, such as those provided by Institutional Investor or Political Risk Services. Erb, Harvey, and Viskanta [1995, 1996a] report that country credit ratings are significantly related to stock returns, and they propose a model to estimate the cost of equity in emerging markets based on these indices. Diamonte, Liew, and Stevens [1996] also report that ratings of political risk are significantly related to stock returns.

The problem with this approach is twofold. First, this methodology is designed to estimate a countrywide cost of equity and cannot be applied at the company level. Second, the numerical value of the ratings, critical for quantitative analysis, is highly subjective. In many cases, the indices are based on qualitative variables and arbitrary weights. Erb, Harvey, and Viskanta [1996b] provide some details on the construction of these ratings.

Another approach, proposed by Bekaert and Harvey [1995], incorporates a time-varying measure of market integration. The cost of equity is plausibly allowed to change over time, depending on the degree of market integration, and required returns are determined by a time-varying weighted average of a global beta and a local standard deviation. The main problem with this approach lies in the difficulty of the estimation procedure; it is far more complicated than the more straightforward methods that companies typically seek to apply.

A Simple Approach

The framework proposed in this article is very simple, and companies can apply it just as easily as the CAPM. Furthermore, it is grounded in modern portfolio theory; it can be applied both at the market level and at the company level; it is not based on subjective measures of risk; it can be fine-tuned to any desired benchmark return; and it captures the downside risk that investors want to avoid.

Any required return can be thought of as having two components: a risk-free rate, and a risk premium. The first component is compensation required for the expected loss of purchasing power, which is demanded even for a riskless asset. The second component is extra compensation for bearing risk, which depends on the asset considered.[4]

I take the perspective of a U.S.-based, internationally diversified investor. Thus, the risk-free rate should compensate this investor for the dollar's expected loss of purchasing power, and the risk premium should compensate the investor for the risk of investing in the world market portfolio. Mathematically:

$$RR_i = R_f + (RP_W)(RM_i) \tag{1}$$

where RR_i is the required return, R_f is the (U.S.) risk-free rate, RP_W is the world market risk premium, RM_i is a risk measure, and i indexes markets.

There are several alternative risk variables. I propose to estimate required returns in emerging markets using a measure of *downside* risk. More precisely, I propose to use an RM_i equal to the ratio between the semistandard deviation of returns with respect to the mean in market i and the semistandard deviation of returns with respect to the mean in the world market. The semistandard deviation of returns, or semideviation for short, with respect to any benchmark return B (Σ_B) is given by

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

where T is the number of observations in the sample, R denotes returns, and t indexes time.

Several reasons support the plausibility of a downside risk approach. First, Bawa and Lindenberg [1977] develop a model based on downside risk and show that, the CAPM being a special case of their model, the latter must explain the data at least as well as the former. Second, Harlow and Rao [1989] refine the Bawa-Lindenberg downside risk framework and find that the data support their model. Third, Sortino and van der Meer [1991] show that a mean-downside variance optimizer outperforms a mean-variance optimizer. Fourth, Markowitz [1959] does consider downside risk in his path-breaking analysis and states that "the semideviation produces efficient portfolios somewhat preferable to those of the standard deviation."[5] And finally, investors do not dislike volatility; they dislike *downside* volatility.

DATA AND RESULTS

The data used in this article consists of the entire database of Morgan Stanley Capital International (MSCI) of emerging markets, which covers 28 countries over different time periods. Summary statistics of the data in these markets, as well as for the Emerging Markets Free (EMF) index, a capitalization-weighted index of emerging markets, are provided in Exhibit A-1 in the appendix. Returns used throughout are monthly returns, measured in dollars, accounting for both capital gains and dividends, and through December 1998.

Exhibit A-1 confirms the results reported in several other studies showing that emerging markets exhibit high volatility and a low correlation with the world market.[6] Unlike results reported in other studies, the observed mean returns are in general not very high. The 1.29% mean monthly return of the EMF index for the 1988-1998 period implies a mean annual return of 16.63%. During the same period, the world market and the U.S. market delivered mean annual returns of 12.95% and 19.99%, respectively. This finding is not entirely surprising, given that the data include the years 1997 and 1998, when the EMF index fell by roughly 12% and 25%, respectively.

The low correlations shown in Exhibit A-1, on the other hand, suggest that emerging markets can still provide substantial diversification benefits. Furthermore, they may suggest that emerging markets are not completely integrated, thus strengthening the arguments against using the CAPM to estimate the cost of equity in these markets.

Contrary to results reported by Harvey [1995], most of the country betas reported in Exhibit A-1 are significant, and half of them are larger than 1.0, thus indicating that in many emerging markets the betas have increased substantially over the past few years. Finally, the coefficients of standardized skewness indicate significant departures from symmetry in most distributions of returns, thus justifying the downside risk approach proposed in this article.

Cross-Sectional Analysis

The first step of the analysis consists of computing, over the whole sample period available for each country, one statistic that summarizes the average (return) performance of each market, and another number that summarizes its risk under each of the definitions considered. Average returns over the whole sample period are summarized by mean monthly arithmetic returns.

Several risk variables are considered. The first is *systematic* risk (SR) measured by beta. The second is *total* risk (TR) measured by the standard deviation of returns. The third is *idiosyncratic* risk (IR) measured by the variability of returns not explained by beta.[7] The fourth is size (Size) measured by the log of the average market capitalization over the sample period, and the fifth is *downside* risk measured by five different variables.

I consider three downside risk variables based on the semideviation of returns, one for each of three different benchmarks. The three benchmarks selected are the (arithmetic) mean of each distribution of returns (μ); the risk-free rate (R_f); and 0, which generate the semideviation with respect to the mean (Σ_μ); the semideviation with respect to the risk-free rate (Σ_f); and the semideviation with respect to 0 (Σ_0), respectively. The fact that managers or investors can set any other desired benchmark is, of course, one of the attractive features of this approach.

The other two downside risk variables considered are the downside beta (β^D), which is the sensitivity of each market's returns with respect to the world market returns when both markets simultaneously go down, and the value at risk (VaR), a well-known measure of expected losses in extreme downturns. The time interval and confidence level for this variable are set at one month and 95%, respectively.

Systematic risk is used because it is the most widely used measure of risk; total risk because it is the appropriate measure of risk in segmented markets; idiosyncratic risk in order to assess the impact of diversifiable risk on returns; size in order to test for the well-known size effect;[8] and downside risk for the several reasons discussed above. All nine risk variables considered for all 28 markets in the sample are reported in Exhibit A-2 in the appendix.

A correlation matrix of mean returns and the nine risk variables under consideration is reported in Exhibit 1. The first column of this matrix provides a preview of the results to be analyzed in more detail below. Note that total risk, idiosyncratic risk, and three downside risk variables are more correlated with mean returns than system-

EXHIBIT 1

Cross-Sectional Analysis—Correlation Matrix

	MR	SR	TR	IR	Size	Σ_μ	Σ_f	Σ_0	β^D	VaR
MR	1.00									
SR	0.32	1.00								
TR	0.56	0.69	1.00							
IR	0.49	0.63	0.98	1.00						
Size	0.13	0.19	0.14	0.15	1.00					
Σ_μ	0.48	0.78	0.96	0.97	0.18	1.00				
Σ_f	0.29	0.78	0.92	0.94	0.17	0.98	1.00			
Σ_0	0.30	0.78	0.92	0.94	0.17	0.98	1.00	1.00		
β^D	0.42	0.79	0.56	0.53	0.12	0.66	0.63	0.63	1.00	
VaR	–0.39	–0.75	–0.96	–0.98	–0.15	–0.99	–0.99	–0.99	–0.60	1.00

MR: Mean return; SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Sm: Semideviation with respect to m; Σ_μ: Semideviation with respect to μ; Σ_f; Semideviation with respect to R_f; Σ_0: Semideviation with respect to 0; β^D; Downside beta; VaR: Value at risk.

EXHIBIT 2

Cross-Sectional Analysis—Simple Regressions

			$MR_i = \gamma_0 + \gamma^1 RV_i + u_i$			
RV	γ_0	p-value	γ_1	p-value	R^2	Adj-R^2
SR	0.86	0.03	0.53	0.09	0.11	0.07
TR	–0.29	0.59	0.14	0.00	0.32	0.29
IR	–0.12	0.83	0.14	0.01	0.24	0.21
Size	0.19	0.91	0.13	0.50	0.02	–0.02
Σ_μ	–0.15	0.81	0.20	0.01	0.23	0.20
Σ_f	0.44	0.50	0.13	0.13	0.09	0.05
Σ_0	0.46	0.48	.13	0.12	0.09	0.05
β^D	0.68	0.08	0.51	0.03	0.17	0.14
VaR	0.27	0.64	–0.06	0.04	0.15	0.12

MR: Mean return; RV: Risk variable; SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Σ_μ: Semideviation with respect to μ; Σ_f : Semideviation with respect to R_f; Σ_0: Semideviation with respect to 0; β^D: Downside beta; VaR: Value at risk.

atic risk (measured by beta). Size, on the other hand, exhibits the lowest correlation with stock returns.[9]

It is interesting to note in Exhibit 1 the very high correlations between total risk and idiosyncratic risk (0.98), and between idiosyncratic risk and the semideviation with respect to the mean (0.97). These two correlations together suggest that the close relationship between mean returns and total risk goes largely through downside risk (measured by the semideviation with respect to the mean).

More detailed results about the relationship between risk and return in emerging markets can be obtained from regression analysis. I start by running a cross-sectional simple linear regression model relating mean returns to each of the nine risk variables considered. More precisely:

$$MR_i = \gamma_0 + \gamma_1 RV_i + u_i \tag{3}$$

where MR_i and RV_i stand for mean return and risk variable, respectively; γ_0 and γ_1 are coefficients to be estimated; u_i is an error term; and i indexes markets. The results of the nine regression models (one for each of the nine risk variables considered) are reported in Exhibit 2.

The figures in Exhibit 2 confirm a result that has been advanced, using IFC data, by Harvey [1995]; Erb, Harvey, and Viskanta [1996a]; and Bekaert, Erb, Harvey, and Viskanta [1997]. In emerging markets, systematic risk measured by beta is not significantly related to stock returns.[10] Furthermore, Exhibit A-3 in the appendix reports that when systematic risk is considered together with any of the other eight risk variables, it never comes out as significant. Conversely, total risk, idiosyncratic risk, and downside risk measured by the semideviation with respect to the mean are significant when jointly considered with systematic risk.

The lack of explanatory power of systematic risk can be explained in several ways. One is that emerging markets are not fully integrated with the world market, in which case beta is not an appropriate measure of risk. Bekaert [1995] argues that several barriers still prevent emerging markets from being fully integrated. Stulz [1995] argues that a local CAPM should be used in segmented markets and a global CAPM in integrated markets. Stulz [1999] further elaborates on the impact of globalization on the cost of capital.

Another is that the world market portfolio is not mean-variance efficient. As argued by Roll and Ross [1994], even slight deviations of the market portfolio used to estimate betas from the efficient frontier may imply almost no cross-sectional correlation between betas and stock returns. Kandel and Stambaugh [1995] make a similar point.

A third possibility is that the model is mispecified due to the omission of some relevant explanatory variables. Asness, Liew, and Stevens [1997] report that size, book-to-market ratios, and momentum are significantly related to stock returns in international (developed) markets. Rouwenhorst [1998], using data for individual companies, reports a similar result for emerging markets. Claessens, Dasgupta, and Glen [1998] provide further evidence on the cross-section of emerging market stock returns.

Finally, returns and betas may be uncorrelated if these two magnitudes are summarized by long-term averages but their true values change widely over time. Exhibit A-4 in the appendix reports means, standard deviations, correlation coefficients, and betas for two subsamples (January 1988-June 1993 and July 1993-December 1998) of the 13 markets that have data for the whole sample period. As the exhibit shows, in most cases these statistics change dramatically from one period to the next.

Note in Exhibit 2, that size, which as argued above has been reported to explain stock returns in many markets, fares even worse than beta. The regression between mean returns and size exhibits a negative adjusted R^2, and the coefficient of the size variable is clearly non-significant, thus eliminating a second variable as a relevant risk measure for emerging markets. Finally, two of the downside risk variables (the semideviation with respect to the risk-free rate and with respect to 0) are also non-significant.

Exhibit 2 does show that total risk is significantly related to stock returns and explains over 30% of their variability. This result, combined with the lack of explanatory power of systematic risk, implies that in emerging markets diversifiable risk is priced. This result is in fact confirmed in Exhibit 2, which shows that idiosyncratic risk is significantly related to stock returns and explains almost 25% of their variability. Finally, three downside risk variables (the semideviation with respect to the mean, the downside beta, and the VaR) are also significantly related to stock returns and explain between 15% and 23% of their variability.

Alternative Risk Measures

Having established that in emerging markets total risk, idiosyncratic risk, and three downside risk variables are significantly related to stock returns, we have five candidates to use in the estimation of required returns. Of the three statistically significant downside risk variables, however, I will estimate only costs of equity based on the semideviation with respect to the mean. This is due not only to the fact that it is the most significant of the three, but also to the fact that it is the only of the them that was both considered and viewed favorably by Markowitz [1959].[11]

I thus consider three risk measures: one based on total risk (RM_{TR}) measured by the standard deviation, and the other based on downside risk (RM_{DR}) measured by the semideviation with respect to the mean, both to be compared with the standard risk measure based on systematic risk (RM_{SR}) measured by beta.[12] In all three cases, I consider risk measures based on the *ratio* between each of these three risk variables for a given market and the same variable for the world market.

The three risk measures and the implied costs of equity for each market in the sample are:

$$RM_{SR} = \beta_i | \beta_w = \beta_i \Rightarrow CE_{SR,i} = R_f + (RP_w)\beta_i \tag{4}$$

$$RM_{TR} = \sigma_i \sigma_w \Rightarrow CE_{TR,i} = RR_{TR,i} = R_f + (RP_w)(\sigma_i | \sigma_w) \tag{5}$$

$$RM_{DR} = \Sigma_{\mu.i} | \Sigma_{\mu,W} \Rightarrow CE_{DR,i} = RR_{DR,i} = R_f + (RP_w)(\Sigma_{\mu,i} | \Sigma_{\mu,W}) \tag{6}$$

where CE denotes the cost of equity; β, σ, and Σ_μ denote beta, the standard deviation of returns, and the semideviation of returns with respect to the mean, respectively; and the subscripts i and W denote the i-th market and the world market, respectively.[13]

These risk measures, as well as their implied costs of equity are reported for all 28 markets in Exhibit 3.

The first three columns of Exhibit 3 show the estimates of beta, the standard deviation of returns, and the semideviation of returns with respect to the mean for each market, and the next three columns the risk measures based on these risk variables. As can be seen, in all markets the risk measures based on total risk and downside risk are substantially higher than those based on systematic risk.

The last three columns show the cost of equity (or required return) based on each of the three risk measures considered, as well as on a risk-free rate of 5% and a world market risk premium of 5.5%.[14] Not surprisingly, the cost of equity based on systematic risk is the lowest of the three, which illustrates one of the problems of using this measure.

Hardly any company would invest its capital in Morocco, Egypt, or Turkey if the expected annual returns were 3%, 6%, and 8%, respectively. Even if Cooper and

EXHIBIT 3
Risk Measures and Costs of Equity

Market	β	σ	Σμ	RM_{SR}	RM_{TR}	RM_{DR}	CE_{SR}	CE_{TR}	CE_{DR}
Argentina	0.64	66.26	37.26	0.64	4.79	3.60	8.52	31.33	24.80
Brazil	1.59	62.93	41.92	1.59	4.55	4.05	13.73	30.01	27.28
Chile	0.53	27.30	19.05	0.53	1.97	1.84	7.94	15.85	15.12
China	1.17	43.40	27.48	1.17	3.14	2.66	11.44	22.25	19.60
Colombia	0.47	28.96	19.22	0.47	2.09	1.86	7.58	16.51	15.22
Czech Republic	0.84	27.37	21.75	0.84	1.98	2.10	9.62	15.87	16.56
Egypt	0.20	27.26	15.44	0.20	1.97	1.49	6.10	15.83	13.21
Greece	0.76	40.72	22.77	0.76	2.94	2.20	9.17	21.18	17.10
Hungary	2.14	45.45	31.21	2.14	3.28	3.02	16.78	23.06	21.59
India	0.46	28.31	18.57	0.46	2.05	1.79	7.51	16.25	14.87
Indonesia	0.93	60.08	34.04	0.93	4.34	3.29	10.13	28.87	23.09
Israel	0.84	22.98	17.08	0.84	1.66	1.65	9.61	14.13	14.07
Jordan	0.14	16.03	11.17	0.14	1.16	1.08	5.75	11.37	10.94
Korea	1.05	42.36	25.43	1.05	3.06	2.46	10.80	21.83	18.51
Malaysia	1.30	34.50	24.10	1.30	2.49	2.33	12.14	18.71	17.81
Mexico	1.13	37.45	27.77	1.13	2.71	2.68	11.20	19.88	19.76
Morocco	–0.40	15.48	10.13	–0.40	1.12	0.98	2.81	11.15	10.38
Pakistan	0.34	41.03	28.00	0.34	2.96	2.71	6.89	21.30	19.88
Peru	1.40	37.29	25.73	1.40	2.69	2.49	12.72	19.82	18.67
Philippines	1.16	36.46	24.60	1.16	2.63	2.38	11.35	19.49	18.07
Poland	2.01	70.39	38.30	2.01	5.09	3.70	16.04	32.97	25.36
Russia	3.64	85.15	59.27	3.64	6.15	5.73	25.01	38.84	36.50
South Africa	1.21	29.04	21.49	1.21	2.10	2.08	11.65	16.54	16.42
Sri Lanka	1.02	33.07	23.69	1.02	2.39	2.29	10.59	18.14	17.59
Taiwan	0.93	44.13	29.10	0.93	3.19	2.81	10.13	22.54	20.47
Thailand	1.39	41.88	29.43	1.39	3.03	2.84	12.63	21.64	20.64
Turkey	0.55	61.45	38.12	0.55	4.44	3.68	8.05	29.42	25.26
Venezuela	1.29	54.29	39.88	1.29	3.92	3.85	12.08	26.57	26.19
Average	1.03	41.47	27.21	1.03	3.00	2.63	10.64	21.48	19.46
World	1.00	13.84	10.35						

β: Beta; σ: Standard deviation; Σ_μ: Semideviation with respect to μ; RM: Risk measure; CE: Cost of equity. SR, TR, and DR indicate systematic risk, total risk, and downside risk, respectively. RMs and CEs follow from equations (4)-(6). Costs of equity based on a risk-free rate of 5% and a world market risk premium of 5.5%. All numbers other than beta and RMs expressed in %. Annual figures.

Kaplanis [1995] are right by arguing that a project in a segmented market should be discounted at a *lower* rate than the same project in the home market (thus implying that if barriers prevent shareholders from investing in emerging markets then corporate diversification into these markets is desirable), most managers would consider these expected returns "too low."

The costs of equity based on total risk (next-to-last column), in contrast, are much higher than those based on systematic risk. The problem with a cost of equity based on total risk, however, is that although volatility is only costly on the downside, the standard deviation gives the same weight to upward swings as to downward swings. Argentina and Poland, for example, are very volatile markets (66.26% and 70.39% a year, respectively), and therefore would have a very high cost of equity based on total risk (31.33% and 32.97%, respectively). Yet as Exhibit A-1 shows, the distribution of returns of both markets is significantly skewed *to the right*; hence, the standard deviation overestimates risk in these two countries.[15]

Costs of equity based on downside risk, which take into account only the volatility that investors seek to avoid, are reported in the last column of Exhibit 3. On average, these annual required returns annual are roughly nine percentage points higher than those based on systematic risk, and two percentage points lower than those based on total risk. For Argentina and Poland, note that the costs of equity based on downside risk (24.80% and 25.36%, respectively) are much lower than those based on total risk.

Interestingly, in all but one market (the Czech Republic), the costs of equity based on downside risk fall between those based on systematic risk and those based on total risk. Recall that in fully integrated markets the cost of equity is properly measured by beta, and in fully segmented markets by the standard deviation. Most emerging markets are partially integrated, though thus implying that their cost of equity should be between CE_{SR} and CE_{TR}. This is precisely the case with the estimates based on downside risk. In other words, costs of equity based on downside risk are consistent with partially integrated emerging markets.[16]

Finally, consider a back-of-the-envelope comparison between my approach and that proposed by Godfrey and Espinosa [1996], who argue that the cost of equity in the i-th emerging market ($CE_{GE,i}$) should be estimated with the expression

$$CE_{GE,i} = R_f + YS_i + (RP_{US})[(0.60)(\sigma_i/\sigma_{US})] \qquad (7)$$

where YS_i stands for yield spread.

To facilitate the comparison, I replace the risk premium and the standard deviation of returns for the U.S. market with the same parameters for the world market. Thus, based on the numbers in Exhibit 3, the cost of equity in the average emerging market should be

$$\begin{aligned} CE_{GE} &= R_f + YS + (0.055)[(0.60)\ (0.4147/0.1384)] \\ &= R_f + (YS + 0.0989) \qquad (8) \end{aligned}$$

According to my approach, on the other hand, the cost of equity in the average emerging market (CE_{DR}) should be

$$CE_{DR} = R_f + (0.055)(0.2721/0.1035) = R_f + 0.1446 \quad (9)$$

Thus, if the two approaches were to yield the same cost of equity, subtracting (9) from (8), we obtain an implied yield spread for the average emerging market of 4.6%. At year-end 1998, however the yield of the J.P. Morgan Emerging Markets Bond Index was 16.2%, roughly 11 percentage points higher than the 5.1% yield of the 30-year U.S. Treasury bond. In other words, the yield spread was over twice as high as would be expected if the two models were to generate the same cost of equity.

This result highlights another interesting difference between the model proposed by Godfrey and Espinosa [1996] and the one I proposed. The YS component of their model fluctuates widely over time, thus implying that short-term events have a significant impact on their estimate of the cost of equity. To illustrate, the yield spread between the J.P. Morgan Emerging Markets Bond Index and the 30-year U.S. Treasury bond started the year 1998 at around **5%**, increased to around **17%** by mid-September, and finished the year at around **11%. AUTHOR: % or percentage points here? For 5%, 17% and 11%.** Obviously, there is an argument to be made in favor of estimating the cost of capital, a magnitude typically used for the *long*-term evaluation of projects or valuation of companies, based on variables that are not so significantly affected by short-term economic events.

CONCLUDING REMARKS

Academicians and practitioners have struggled for decades to find an appropriate definition of risk. Although the debate goes on, there seems to be much more disagreement about the proper definition of risk in emerging markets than in developed markets. In the latter case, practitioners widely use the CAPM in order to estimate

APPENDIX

EXHIBIT A-1

Summary Statistics (monthly dollar returns)

Market	μ_A	μ_G	σ	ρ	β	SSkw	MCap	Start
Argentina	3.67	2.15	19.13	0.11	0.64	9.41	33.52	January 1988
Brazil	3.29	1.61	18.17	0.30	1.59*	2.03	110.22	January 1988
Chile	2.06	1.76	7.88	0.25	0.53*	–0.55	29.37	January 1988
China	–0.76	–1.51	12.53	0.34	1.17*	2.86	4.97	January 1993
Colombia	0.46	0.12	8.36	0.19	0.47	1.58	5.47	January 1993
Czech Republic	–0.10	–0.43	7.90	0.36	0.84*	–3.08	7.86	January 1995
Egypt	1.47	1.19	7.87	0.09	0.20	4.54	5.56	January 1995
Greece	2.22	1.62	11.75	0.25	0.76*	8.54	32.59	January 1988
Hungary	3.22	2.37	13.12	0.57	2.14*	0.35	10.30	January 1995
India	0.14	–0.18	8.17	0.21	0.46	1.70	49.47	January 1993
Indonesia	1.57	0.28	17.34	0.20	0.93*	10.42	8.78	January 1988
Israel	0.38	0.16	6.63	0.46	0.84*	–1.08	21.90	January 1993
Jordan	0.12	0.01	4.63	0.12	0.14	–0.88	1.15	January 1988
Korea	0.67	–0.02	12.23	0.35	1.05*	7.48	37.63	January 1988
Malaysia	0.59	0.10	9.96	0.51	1.30*	2.09	38.90	January 1988
Mexico	2.55	1.95	10.81	0.40	1.13*	–2.33	82.40	January 1988
Morocco	2.21	2.12	4.47	–0.37	–0.40*	2.04	6.55	January 1993
Pakistan	–0.41	–1.12	11.84	0.12	0.34	0.50	4.01	January 1993
Peru	1.25	0.68	10.76	0.44	1.40*	0.42	8.27	January 1993
Philippines	1.37	0.83	10.53	0.43	1.16*	2.20	11.72	January 1988
Poland	3.70	2.05	20.32	0.36	2.01*	8.87	5.62	January 1993
Russia	2.29	–0.85	24.58	0.49	3.64*	–0.05	23.77	January 1995
South Africa	0.91	0.55	8.38	0.49	1.21*	–2.20	84.53	January 1993
Sri Lanka	0.13	–0.33	9.55	0.37	1.02*	–0.56	0.61	January 1993
Taiwan	1.51	0.72	12.74	0.28	0.93*	2.01	138.32	January 1988
Thailand	0.92	0.19	12.09	0.43	1.39*	0.24	14.86	January 1988
Turkey	2.14	0.68	17.74	0.10	0.55	4.18	19.12	January 1988
Venezuela	1.57	0.26	15.67	0.26	1.29*	–1.62	7.85	January 1993
Average	1.40	0.61	11.97	0.29	1.03	2.11	28.76	N/A
EMF Index	1.29	1.05	6.89	0.59	1.02*	–3.90	709.81	January 1988

μ_A: Arithmetic mean (%); μ_G: Geometric mean (%); σ: Standard deviation (%); ρ: Correlation coefficient with respect to the world market; β: Beta with respect to the world market; SSkw: Coefficient of standardized skewness; MCap: Market cap of the MSCI index at year-end 1998 (billions of $); Start: Date of inception in the MSCI database. Beta significantly different from 0 at the 5% level. All data through December 1998.

discount rates. In emerging markets, several alternative approaches have been proposed, but none of them has gained wide acceptance so far.

The reasons for this lack of consensus are not entirely surprising: All the models proposed have several shortcomings. In the end, practitioners look for a relatively simple model that generates "plausible" costs of equity; that is, costs of equity somewhat consistent with their perception of risk.

The model based on downside risk measured by the semideviation of returns with respect to the mean proposed in this article has several advantages. First, it is theoretically sound; second, it is very easy to implement (in fact, just as easy as the CAPM); third, it can be applied both at the market level and at the company level; fourth, it is not based on subjective measures of risk; fifth, if the mean is not the desired benchmark, it can easily be replaced by any other target return; and sixth, it captures the downside risk that investors want to avoid. It also generates costs of equity consistent with partially integrated

EXHIBIT A-2
Risk Variables (monthly dollar returns)

Market	SR	TR	IR	Size	Σ_μ	Σ_f	Σ_0	β^D	VaR
Argentina	0.64	19.13	16.75	9.72	10.76	8.99	8.79	1.57	-25.65
Brazil	1.59	18.17	17.87	10.96	12.10	10.75	10.57	2.22	-29.50
Chile	0.53	7.88	7.58	10.00	5.50	4.62	4.42	1.44	-11.16
China	1.17	12.53	11.60	8.24	7.93	8.64	8.39	1.84	-21.78
Colombia	0.47	8.36	8.14	8.75	5.55	5.52	5.28	1.34	-13.49
Czech Republic	0.84	7.90	7.71	9.13	6.28	6.54	6.33	1.83	-14.13
Egypt	0.20	7.87	7.45	8.35	4.46	3.85	3.63	0.54	-11.01
Greece	0.76	11.75	10.32	9.17	6.57	5.58	5.37	0.91	-16.03
Hungary	2.14	13.12	10.21	8.49	9.01	7.73	7.56	2.38	-19.36
India	0.46	8.17	7.94	10.76	5.36	5.53	5.27	0.30	-13.45
Indonesia	0.93	17.34	15.35	9.63	9.83	9.23	9.03	1.38	-25.61
Israel	0.84	6.63	5.98	9.83	4.93	4.94	4.73	0.31	-10.87
Jordan	0.14	4.63	4.65	6.93	3.23	3.38	3.16	0.01	-7.66
Korea	1.05	12.23	10.86	11.07	7.34	7.20	6.97	0.25	-19.12
Malaysia	1.30	9.96	8.54	11.03	6.96	6.87	6.67	1.70	-16.31
Mexico	1.13	10.81	10.13	10.86	8.02	6.96	6.78	1.33	-16.25
Morocco	-0.40	4.47	4.07	8.24	2.92	1.95	1.76	0.66	-5.01
Pakistan	0.34	11.84	12.20	8.60	8.08	8.52	8.30	-1.29	-21.16
Peru	1.40	10.76	9.56	8.84	7.43	7.00	6.81	1.96	-17.15
Philippines	1.16	10.53	9.32	9.25	7.10	6.59	6.39	1.83	-16.24
Poland	2.01	20.32	15.94	8.05	11.06	9.26	9.05	1.94	-26.76
Russia	3.64	24.58	22.00	9.84	17.11	16.06	15.84	4.14	-43.79
South Africa	1.21	8.38	7.48	11.38	6.20	5.97	5.79	1.85	-13.73
Sri Lanka	1.02	9.55	9.03	6.68	6.84	6.98	6.77	1.57	-16.33
Taiwan	0.93	12.74	12.02	11.51	8.40	7.79	7.57	1.40	-19.91
Thailand	1.39	12.09	11.01	10.31	8.49	8.23	8.03	2.12	-20.04
Turkey	0.55	17.74	16.80	9.07	11.00	9.99	9.76	1.26	-27.08
Venezuela	1.29	15.67	16.17	8.59	11.51	10.95	10.76	2.56	-27.29
Average	1.03	11.97	10.95	9.40	7.86	7.34	7.14	1.41	-18.78
World	1.00	4.00	0.00	15.91	2.99	2.69	2.51	1.00	-5.65

SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Σ_μ: Semideviation with respect to μ; Σ_f: Semideviation with respect to R_f; Σ_0: Semideviation with respect to 0; β^D: Downside beta; VAR: Value at risk.

emerging markets, and it could perhaps be argued that the estimates from the model proposed are "more plausible" than those based on systematic risk or total risk. But risk, of course, is in the eye of the beholder.

The search for an appropriate measure of risk in emerging markets has just started. Several methods have been proposed, and several others will surely be proposed in the near future. Just as happened in developed markets with the CAPM, practitioners will eventually embrace a simple model that will become the standard method to estimate the cost of equity in emerging markets. Until such consensus is achieved, the model proposed in this article has several advantages that make it a good candidate to be adopted by practitioners.

ENDNOTE

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[1]See, however, Roll and Ross [1994], who argue that although theoretically correct, the CAPM is of little practical use to explain the cross-section of stock returns. In their view, this follows from the fact that a market proxy arbitrarily close to (but not *exactly on*) the efficient frontier may generate essentially no cross-sectional correlation between expected returns and betas.

[2]In segmented markets, in contrast, barriers to arbitrage may allow assets with the same risk characteristics, but

EXHIBIT A-3

Cross-Sectional Analysis—Multiple Regressions

	$MR_i = \gamma_0 + \gamma_1 RV_{1i} + \gamma_2 RV_{2i} + v_i$						
RV_1/RV_2	γ_0	p-value	γ_1	p-value	γ_2	p-value	R^2
SR/TR	–0.34	0.54	–0.19	0.62	0.16	0.01	0.32
SR/IR	–0.12	0.84	0.05	0.90	0.13	0.04	0.24
SR/Size	0.19	0.91	0.51	0.12	0.07	0.70	0.11
SR/Σ_μ	–0.25	0.70	–0.21	0.65	0.24	0.04	0.24
SR/Σ_f	0.65	0.37	0.40	0.43	0.05	0.73	0.11
SR/Σ_0	0.64	0.36	0.38	0.44	0.05	0.71	0.11
SR/β^D	0.69	0.09	–0.01	0.98	0.52	0.17	0.17
SR/VaR	0.31	0.61	0.12	0.79	–0.05	0.24	0.15

MR: Mean return; RV: Risk variable; SR: Systematic risk (Beta); TR: Total risk; IR: Idiosyncratic risk; Size: Log of average market cap; Σ_μ: Semideviation with respect to μ; Σ_f: Semideviation with respect to R_f; Σ_0: Semideviation with respect to 0; β^D: Downside beta; VaR: Value at risk.

EXHIBIT A-4

Time-Varying Statistics (monthly dollar returns)

	μ_{A1}	μ_{A2}	σ_1	σ_2	ρ_1	ρ_2	β_1	β_2
Argentina	6.27	1.08	25.06	9.78	–0.07	0.68	–0.31	1.85
Brazil	5.04	1.55	22.78	11.83	0.24	0.49	1.54	1.68
Chile	3.51	0.62	7.57	7.98	–0.05	0.60	–0.08	1.33
Greece	2.10	2.35	14.28	8.62	0.15	0.46	0.49	1.08
Indonesia	3.67	–0.54	17.83	16.71	–0.05	0.52	–0.11	2.27
Jordan	0.63	–0.39	5.09	4.09	0.07	0.20	0.09	0.20
Korea	0.86	0.48	8.84	14.94	0.40	0.35	0.81	1.37
Malaysia	1.80	–0.62	6.27	12.56	0.56	0.56	0.85	1.90
Mexico	4.55	0.55	9.97	11.32	0.25	0.58	0.58	1.86
Philippines	2.32	0.42	8.54	12.19	0.33	0.55	0.69	1.76
Taiwan	1.97	1.04	14.85	10.30	0.18	0.45	0.73	1.19
Thailand	2.52	–0.68	8.41	14.79	0.36	0.54	0.77	2.21
Turkey	3.01	1.27	19.51	15.88	–0.01	0.25	–0.02	1.28
Average	2.94	0.55	13.00	11.61	0.18	0.48	0.46	1.54

μ_A: Arithmetic mean (%); σ: Standard deviation (%); ρ: Correlation coefficient with respect to the world market; β: Beta with respect to the world market. Subscripts 1 and 2 denote the January 1988-June 1993 sample period and the July 1993-December 1998 sample period, respectively.

traded in different locations, to have different returns.

[3]Bekaert [1995] distinguishes three types of barriers to the integration of emerging markets: direct barriers, such as restrictions on foreign ownership and capital controls; indirect barriers, such as poor information and accounting standards; and barriers arising from emerging market specific risks, such as macroeconomic instability and political risk. He finds that poor credit ratings, high and variable inflation, exchange rate controls, the lack of a developed regulatory and accounting framework, the lack of country funds and cross-listed securities, and the limited size of some stock markets are the most important barriers to integration.

[4]For a taxonomy of the risks that should be accounted for in the discount rate, and those that should be taken into account through changes in expected cash flows, see Lessard [1996].

[5]Markowitz's reasons for neglecting the semideviation as the proper measure of risk were twofold, neither relevant today. First, efficient portfolios based on mean and semivariance were then computationally much more expensive than

those based on mean and variance; and second, semivariance (unlike variance) was then a relatively unknown measure of risk.

[6]All correlations and betas are computed with respect to the MSCI All-Country World Index.

[7]Let $R_{it} = \alpha_i + \beta_i R_{Wt} + u_{it}$, where R_i and R_W denote returns in market i and in the world market, respectively; α_i and β_i are parameters to be estimated, u_i is an error term, and t indexes time. Applying the variance operator on both sides of the equation, we obtain $\sigma_i^2 = (\beta_i)^2\sigma_W^2 + \sigma_u^2$. The square root of σ_u^2 (that is, the standard deviation of the residuals from the regression of R_i on R_W) is our measure of idiosyncratic (hence, diversifiable) risk.

[8]Asness, Liew, and Stevens [1997] report that size explains not only the cross-section of U.S. stock returns but also that of international stock returns. Furthermore, Malkiel and Xu [1997] report that size and idiosyncratic risk are highly correlated, and argue that the size effect may actually be picking up a diversifiable risk effect.

[9]Interestingly, Exhibit 1 shows a very high correlation between systematic risk and the downside risk variables, which is consistent with an argument advanced by Grundy and Malkiel [1996]. In one of the many articles that attempts to defend the CAPM from the Fama-French [1992] attack, they show that the larger the beta of a portfolio, the lower its return in down markets. Hence, they argue, beta is a good measure of downside risk.

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