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A Practical Approach for Quantifying Country Risk

AREA: 2
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*Un enfoque práctico para cuantificar el riesgo del país
Uma abordagem prática para quantificar o risco de país*

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In most emerging market valuations a "country risk premium" is added to the CAPM discount rate of an equivalent investment in a developed market. However, this is not only a flawed procedure but also it is extremely difficult to gauge how country risk might affect the discount rate. In this paper a practical method is proposed to appraise country risk mainly through its impact on projected cash flows, leaving its possible effect on the discount rate as a secondary consideration.

En la mayoría de las valoraciones de mercados emergentes, se añade un "premio de riesgo del país" a la tasa de descuento CAPM de una inversión equivalente en un mercado desarrollado. No obstante, éste no sólo es un procedimiento erróneo, sino realmente complejo para medir el modo en que el riesgo del país afecta a la tasa de descuento. En el presente artículo, se propone un método práctico para valorar el riesgo del país a través de su impacto en flujos de caja proyectados, dejando su posible influencia en la tasa de descuento en un segundo plano.

Na maioria das avaliações de mercados emergentes, é adicionado um «prémio de risco do país» à taxa de desconto CAPM de um investimento equivalente num mercado desenvolvido. No entanto, este é não apenas um procedimento erróneo como é extremamente difícil medir o modo como o risco de país pode afectar a taxa de desconto. No presente artigo, é proposto um método práctico para avaliar o risco de país sobretudo através do respectivo impacto nos fluxos de caixa, deixando o seu possível impacto na taxa de desconto como consideração secundária.

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1. Introduction

This paper pretends to shed some light on the way country risk must be built in for valuations in emerging markets. In most emerging market valuations a risk adjustment takes place by adding a spread called the “country risk premium” to the rate determined by the CAPM of an equivalent investment in a developed market. Besides, some analysts also modify expected cash flows to reflect country uncertainties. This means that country risk is taken into account twice--in the discount rate and in the cash flow projections.

Incorporating a country risk premium in the discount rate is inconsistent with the assumptions of the CAPM. And if country risk is going to have an impact on the discount rate a way must be found to modify the CAPM without altering its fundamentals.

In this article it is proposed to appraise country risk mainly through its impact on projected cash flows, leaving its possible effect on the discount rate as a secondary consideration. The main emphasis is on building a model where all relevant variables and risks are adequately integrated. Then a Monte Carlo simulation is performed to obtain a probability distribution for the present values of the firm or project. Finally, the discount rates selected by the analyst (however inaccurate) together with their corresponding expected present values are contrasted with the simulation’s results in order to make an educated decision¹.

2. The Country Risk Adjustment

Most practitioners are convinced that developing countries are inherently riskier. Hence a higher return must be expected from investments in these nations to account for the additional “country risk.” In most valuations this risk adjustment is accomplished by adding a spread called the “country risk premium” to the discount rate of an equivalent investment in a developed market.

The majority of practical models are based on the CAPM (Capital Asset Pricing Model). The most popular one is probably the following adapted CAPM:

$$E(R)_C = R_f + \beta_{B,M} \cdot [E(R_M) - R_f] + CR \quad (1)$$

where,

$E(R)_C$ is the expected return (discount rate) of the project or firm in country C

R_f is the risk free rate (usually the yield of U.S. T-Bond with a duration similar to that of the project)

$\beta_{B,M}$ is the beta of a similar investment B in a developed country (usually the U.S.)

$E(R_M)$ is the expected return on the market portfolio (usually the S&P500

KEY WORDS

Country Risk,
Capital Budget-
ting, Discount
Rates, Valua-
tion, Emerging
Markets

PALABRAS CLAVE

Riesgo del país,
Presupuesto de
capital, Tasas de
descuento, Val-
oración, Merca-
dos emergentes

PALAVRAS- CHAVE

Risco de País,
Orçamentação
de Capital, Taxas
de Desconto,
Avaliação,
Mercados
Emergentes

JEL CODES

G150; G320

1. I am indebted to Maximiliano González for helpful comments.

or a worldwide stock market index such as the Morgan Stanley Composite Index or MSCI)

CR is a country risk premium (usually the spread of a long-term T-Bond issued by the relevant country in US\$ over a long-term U.S. T-Bond²)

It is worth reminding that one of the most important assumptions of the CAPM is that investors are fully diversified meaning that they are able to diversify at negligible cost all the intrinsic risks of their investments, so that only those risks that cannot be diversified away must be accounted for in the discount rate. These non-diversifiable risks are known as systematic since they are correlated with the market portfolio.

There are many other variants to this well-known approach. What they all have in common is that the discount rate is estimated using the CAPM as the base model and the resulting expected return is adjusted with a measure of country risk. Some common adjustments follow:

- An additional risk premium is added to or subtracted from the discount rate resulting from the model described above. The magnitude of this additional premium is often quite subjective and depends on the country where the project takes place, or
- The relative volatility of the stock market index of the emerging country is factored in, or
- The country risk premium is added to the market risk premium, or
- The country risk adjustment depends on the proportion of foreign revenues of the firm or project³.

Besides affecting the discount rate with some measure of country risk, many analysts also modify expected cash flows to reflect country uncertainties. This means that country risk is taken into account twice--in the discount rate and in the projections. However, to what extent this is right? Under what circumstances shall country risk affect only the discount rate, only the cash flows, or both? And whatever the case, how country risk must be quantified?

In principle, incorporating a country risk premium in the discount rate is flawed for several reasons⁴:

First, not all projects and/or companies are equally exposed to country risk in every country. Being mainly political in nature, country risk is likely to affect some business sectors more than others. For instance, regulated firms with a significant impact on the population at large (i.e. utilities) are more prone to politically motivated intervention than others with no sensible social effects (i.e. restaurants).

Second, whenever country risk is quantified as the yield spread between the relevant country government bonds and their "risk-free" equivalent (i.e. US T-Bonds), the risk premium is

2. Both bonds must have similar maturities and cash flow distributions over time. Occasionally, the country risk premium is made equal to the spread of corporate bonds with the same risk rating of the country over long-term US-T Bonds of similar maturity.

3. See Damodaran 1999a & 1999b.

4. For a more detailed exposition of this issue refer to Sabal 2002.

contaminated with the risk of default of the developing country's government. Although there might be some linkage between the probability of default and country risk, this relationship tends to be quite tenuous for most business propositions.

Third, the impact of the country risk premium on the project's present value is geometrical. That is, the farther away the cash flow the higher the effect of country risk on its present value. However, country risks might evolve differently. For instance, it is plausible that as time goes by the investor develops more abilities to deal with the target country risks, or that government policy at the recipient country becomes friendlier as the benefits of foreign investments learn to be appreciated.

Lastly, the most important critique for incorporating a country risk premium into the discount rate stems from the aforementioned key assumption of the CAPM: that only non-diversifiable (systematic) risk determines the discount rate. If as usual the CAPM is the model being employed, then including a country risk premium (however quantified) into the discount rate presumes that country risk is fully systematic.

Is country risk systematic? This is a difficult question for the simple reason that it is very hard to identify an acceptable proxy for "country risk." Many analysts tackle this problem by using hard currency bonds issued by the relevant government as a stand-in for country risk. Nonetheless, as explained above this procedure is unsound given that these bonds reflect default risk which is an inaccurate measure of country risk.

Others opt for the local stock market index as a proxy. At first glance this looks like a better choice, however in the vast majority of emerging stock markets only a handful of firms are quoted and widely traded, and this privileged group very rarely truly reflects the country's economy. In consequence, the local stock index might work only for those developing economies with the most sophisticated and diversified stock markets (for example Chile, Brazil, Singapore, India, Mexico, and Taiwan).

In conclusion, an acceptable proxy for country risk is generally hard to pinpoint making very difficult to assess how diversifiable country risk might be.

Another even more important complication is that being imbedded in a very specific way into each business there is no practical way to isolate country risk, and while it is true that country risk is usually damaging it might turn out to be beneficial. For instance, the tariffs of a water utility could be kept extremely low in times of social unrest harming the firm's profits but low subsidized energy prices could yield abnormally high returns to certain industries.

Another case in point might be that of a firm with simultaneous operations in several countries. There must be a different country risk adjustment for investment projects in each country? What should be the country risk premium for the corporation as a whole? The Modified International CAPM explained below offers a practical solution to this problem.

Finally, even if there were a right proxy for country risk a manner must be found to incorporate it into the CAPM in consistency with the fundamentals of the model (not an easy challenge).

There is however one instance in which country risk can be correctly appraised and incorporated into the discount rate. This is the case of emerging market firms whose shares in the form of American or Global Depositary Receipts (ADRs and GDRs) or other similar vehicles are actively traded in a prime stock market. Since, these companies' stock betas can be computed directly from their historical returns they will inevitably reflect all systematic risks (including the systematic component of country risks)⁵.

In short, with the exception of this select group of companies, it is not known how to correctly incorporate the right measure of systematic country risk into a CAPM discount rate. Hence, there is no way to have an acceptable discount rate for the great majority of investments in emerging markets.

3. Emerging Market Discount Rates

In practice, a number of alternative discount rates must be employed, all of them inaccurate. Up to this point there are two obvious ones:

- The CAPM discount rate with no country risk at all, meaning the equivalent “developed country rate”, and
- The CAPM rate plus a country risk premium. That is, the “traditional country risk premium rate”

For the sake of illustration in this paper two supplementary rates are presented that, together with the ones previously mentioned, will exemplify the practical approach to evaluate country risk that is proposed further on. Of course, analysts are free to employ their own rates.

First, the Modified International CAPM (MICAPM)⁶ is introduced:

3.1. Modified International CAPM

This model permits the estimation of the discount rate for projects or firms with operations in different countries. The MICAPM discount rate is computed as⁷:

$$E(R) = R_f + \beta_w [E(R_M) - R_f] \quad (2)$$

This expression very much resembles the CAPM. The only difference is that beta is “weighted” (β_w) as follows:

5. Beware that these betas will be useful only for evaluating investments affecting the whole corporation. For those projects focused in a different geographical setting, beta must be adjusted accordingly. Refer to the Modified International CAPM below.

6. Refer to Sabal 2002.

7. An approach along the same lines has been proposed by Damodaran 2003.

$$\beta_w = \sum_{i=1}^n \alpha_i \cdot \beta_{B,i} \quad (3)$$

$$\sum_{i=1}^n \alpha_i = 1 \quad (4)$$

where,

$\beta_{B,i}$ stands for the beta of a similar investment in country i

α_i is the net weight in the firm's overall operating cash flows of the portion of cash flows associated with country i

$\beta_{B,i}$ is computed as:

$$\beta_{B,i} = \beta_{B,M} \cdot \beta_{i,M} \quad (5)$$

where,

$\beta_{B,M}$ is the beta of a similar business in a developed country with respect to a market proxy (i.e. S&P 500)

$\beta_{i,M}$ is the beta of the relevant country stock market index with respect to the market proxy

The other approach is the "Systematic Country Risk Modulator" (SCRM).

3.2. Systematic Country Risk Modulator

This model allows for a correction of expected return based on country risk very much along the lines of the traditional country risk premium method. However, the term added to the CAPM formula attempts to modulate country risk by its systematic component.

The formula is:

$$E(R) = R_f + \beta_{B,M} [E(R_M) - R_f] + \lambda CR \quad (6)$$

where,

CR is a proxy for the country risk premium, say the yield spread between government bonds

λ is the square of the sample correlation coefficient between the historical returns of the local stock market index and the market proxy index.

This parameter can be interpreted as the proportion of total variability of the returns of the local stock market index that can be explained by the returns of the proxy market index.

$$\lambda = (\beta_{LM})^2 \cdot \left[\frac{\sigma_M}{\sigma_i} \right]^2 \quad (7)$$

where,

β_{LM} is the beta of the local stock market index with respect to the market proxy

σ_M is the standard deviation of the market proxy returns

σ_i is the standard deviation of the local index returns

As many others that may be proposed, these two discount rates are far from perfect. To start with, as explained before the country risk adjustments in both methods are not consistent with the theoretical fundamentals of the CAPM formula.

In addition, it was mentioned that any beta based on local returns tends to be imprecise in most emerging markets. Still MICAPM relies on the accuracy of the local stock market betas with respect to the market proxy and, similarly the SCRM is pretty much dependent on the extent to which the local stock market mirrors the country's economy.

4. Country Risk and Cash Flows

It is clear that in the vast majority of situations there is not a practical manner to assess to what extent country risk might affect a CAPM determined discount rate. Nevertheless, one thing is known: all risks be they diversifiable or not affect cash flows. Hence, being no conceptually different from any other risks country risks will also fully impact projected cash flows.

What this paper proposes is to appraise country risk mainly through its impact on forecasted cash flows, leaving its possible effect on the discount rate as a secondary consideration. The main emphasis is on building a model where all relevant variables and risks are adequately integrated. Then a Monte Carlo simulation is performed in order to obtain a reasonable probability distribution for the present values of the firm or project.

Once the simulation results are obtained, the discount rates selected by the analyst together with their corresponding expected present values are contrasted with the simulation's probability distribution in order to make an educated decision.

Let us demonstrate with a simple example:

Publihouse is a non-publicly quoted publishing company doing business in an emerging market. The Board of Directors has held preliminary conversations with a multinational who might be interested in acquiring 30% of the firm. A consultant has been hired in order to get a better sense of the company's value.

The analysis takes place in four steps.

Step 1: Information Gathering

After a number of sessions management and consultant reached the following conclusions:

- Cash flows will be projected for a 10 year horizon with a terminal value
- The terminal value will be equivalent to a no-growing perpetuity
- Three base case scenarios will be established: expected, optimistic and pessimistic

From the partners' experience the key variables, meaning those having a larger impact on firm value, are:

- Average annual income growth
- Average annual variable cost growth
- Average annual fixed cost growth
- The perpetuity's growth rate
- The foreign exchange rate (Pesos/US\$) for each year within the horizon (XR)
- The local inflation rate for each year of the horizon (CPI)

The agreed upon percentage values for these variables were:

	Expected	Optimistic	Pessimistic
Average Annual Income Growth	3.61	7.96	0
Average Annual Variable Cost Growth	3.30	6.59	0
Average Annual Fixed Cost Growth	2.39	0	7.00
Growth Rate of the Perpetuity	1.00	3.00	0

The expected values for the other two variables follow:

Year	1	2	3	4	5	6	7	8	9	10
XR	4850	5650	6400	8000	10000	11200	12800	14500	16000	17500
CPI	19.77	23.10	34.93	22.00	18.00	15.00	10.00	8.00	8.00	8.00

The corresponding values for the pessimistic scenario are:

Year	1	2	3	4	5	6	7	8	9	10
XR	5100	5900	6700	8300	10300	11500	13100	14600	16100	17600
CPI	24.20	28.00	60.80	24.00	20.00	17.00	12.00	9.00	9.00	9.00

And for the optimistic scenario:

Year	1	2	3	4	5	6	7	8	9	10
XR	4600	5400	6100	7700	9700	10900	12500	14400	15900	17400
CPI	15.10	18.00	20.70	17.00	13.00	10.00	6.00	7.00	7.00	7.00

Step 2: Setting Up the Distributions

All six variables were assigned triangular distributions defined by the three values for each scenario. The exchange rate and inflation variables were correlated in the same way across time. The correlation coefficient was assumed to be 0.9 for consecutive years, 0.8 for years separated by two years and so on, according to the following table:

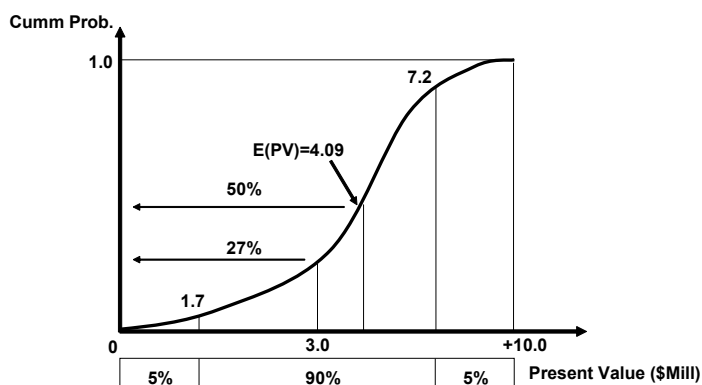
Years in Between	1	2	3	4	5	6	7	8	9
Correlation Coefficient	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1

Step 3: Running the Simulation

Five thousand runs were performed using the software @RISK. Cash flows were discounted using the CAPM rate with no country risk at all (the equivalent “developed country rate”) that in this case was 9.2%. This serves as the “base case”.

The resulting cumulative distribution of present values (under the agreed upon assumptions) is shown in [Graph 1](#):

Simulation Result



Graph 1

From [Graph 1](#) it can be concluded that:

- The expected present value of *Publihouse* is \$4.09 Million. This implies that there is a 50% probability that the company will be worth less and a 50% probability that it will be worth more
- There is a 27% probability that the company is worth less than \$3 Million
- There is a 90% probability that the firm's value falls between \$1.7 Million and \$7.2 Million

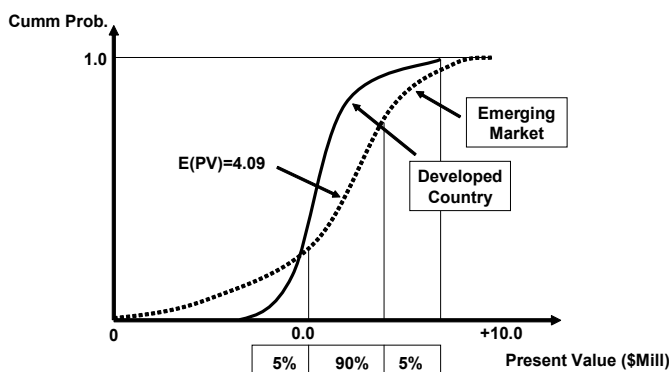
Notice that the ranges are quite wide. This is to be expected in emerging markets where there is considerable uncertainty about future cash flows.

[Contrast with a Developed Country](#)

If *Publihouse* had the same expected values for the key variables but were established instead in a developed country, the range around the expected values would have been narrower and there would be much more certainty about the true value of the company.

In [Graph 2](#), an imaginary present value distribution for a “developed country *Publihouse*” is placed over the original emerging market distribution.

Developed vs Emerging Market Results



Graph 2

Observe that the expected present value for the firm remains the same. The only difference is that there is much more certainty around this present value. In other words, it can be stated that the range of values about the mean is narrower.

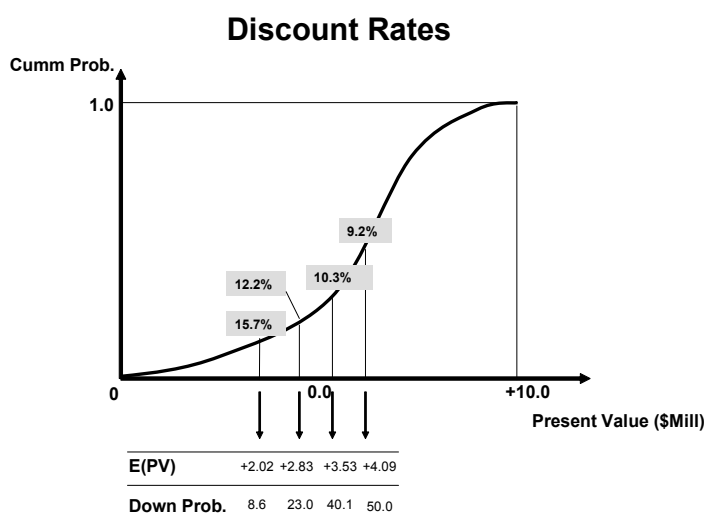
In fact, the main difference between investing in emerging markets as opposed to developed markets is that emerging markets tend to be more uncertain. And this additional uncertainty is not necessarily systematic. On the contrary, stemming mainly from political and social issues most of the risk in emerging market investments is likely to be diversifiable. This is why, the best approach to assess it is through its effect on cash flows.

Step 4: Reaching a Decision

Let us now bring the other discount rates into the analysis. After the corresponding computations their values for *Publihouse* were:

CAPM + Country Risk Premium	15.7%
MICAPM	12.2%
SCRM	10.3%

Contrasting the present values corresponding to these discount rates with the original probability distribution, the following results are obtained:



Graph 3

Notice that anyone of the selected discount rates could have been used to set up the base case. Obviously, whichever the base case rate there will be a 50% probability that the company will be worth less and a 50% probability that it will be worth more than the corresponding expected present value. In other words, there will be a different cumulative distribution function for each selected discount rate.

However, in order to make a more meaningful comparison it is preferable to use just one cumulative distribution function (the one corresponding to the selected base case rate) and then contrasting the expected present values for the other rates with this distribution.

It was thought appropriate to choose the discount rate without country risk as the base case rate because in this example it is expected for country risk to carry a very negligible systematic component, and the purpose is to assess the impact of different treatments of country risk on value. Naturally, the analyst is free to choose whatever base case rate he feels more appropriate for the case under analysis.

From [Graph 3](#) it can be concluded that:

- If country risk does not have any systematic component the discount rate is 9.2% and expected present value is \$4.09 Million
- When the SCRM is used the discount rate rises to 10.3% and E(PV) descends to \$3.53 Million. Contrasting with the original probability distribution there is a 40.1% probability that the firm will be worth even less
- The MICAPM discount rate is 12.2% yielding an E(PV) of \$2.83 Million. The probability of smaller values is 23%
- If the computation is done with the traditional country risk premium, E(PV) is a \$2.02 Million and the probability of an even lower value is 8.6%

What can be finally concluded from this analysis? Probably that the company is worth between \$3 million and \$4 million and that any negotiation on the basis of this range will be a fair deal for the stockholders.

It is very important to be aware that there is no such thing as a unique value for a firm, and that this is even more definite in highly volatile emerging markets. The best an investor in emerging markets can do is to make a well educated decision as to a reasonable price range. The higher the price, the higher the probability that the true value be lower.

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5. Conclusions

In most emerging market valuations a risk adjustment is accomplished by adding a spread called the “country risk premium” to the discount rate for an equivalent investment in a developed market. Besides, some analysts also modify expected cash flows to reflect country uncertainties. This means that country risk is taken into account twice--in the discount rate and in the projections.

In principle, incorporating a country risk premium in the discount rate is flawed for several reasons: a) not all projects and/or companies are equally exposed to country risk in every country; b) usually the risk premium is simplistically equated to the risk of default of the developing country government; c) the impact of country risk over time is not necessarily geometrical and; d) when incorporating a country risk premium the implicit assumption is made that country risk is fully systematic.

Furthermore, not only it is extremely difficult to gauge to what extent country risk is or not diversifiable, but also if the discount rate is going to be affected, a manner must be found to modify the CAPM maintaining consistency with the fundamentals of the model.

However, there is no need to focus only on the discount rate. There is no doubt that all risks be they diversifiable or not affect cash flows. Hence, being not conceptually different from any other risks, country risks will also fully impact projected cash flows. This paper proposes to appraise country risk mainly through its impact on projected cash flows, leaving its possible effect on the discount rate as a secondary consideration.

The main emphasis is on building a model where all relevant variables and risks are adequately integrated. Then a Monte Carlo simulation is performed to obtain a reasonable probability distribution for the present values of the firm or project. Finally, the discount rates selected by the analyst (however inaccurate) together with their corresponding expected present values can be contrasted with the simulation's results in order to make an educated decision.

The bottom line is that there is no such thing as a unique value for a firm, and that this statement is even stronger in highly volatile emerging markets. The best an investor in these markets can do is to make a well-founded decision as to a reasonable price range.

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