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For several years, when setting discount rates Aswath Damodaran, Ph.D., has advocated more consideration of country risk premiums (CRP) when it comes to the valuation of companies with activities in emerging markets. We have to acknowledge that his approach is enjoying growing support among investment banks and auditing firms. At the same time, it is to be noted that Damodaran's concept has failed to resonate sufficiently with the academic community. This is reason enough to perform a systematic analysis and critical discussion of his CRP concept. Damodaran's initial considerations concerning a CRP can be found in Damodaran (1999a, 2003), with further essentially unchanged mentions in his more recent publications. In our contribution we will concentrate on the two aforementioned sources.

1. Introduction

For several years, when setting discount rates Damodaran has advocated more consideration of country risk premiums (CRP) when it comes to the valuation of companies with activities in emerging markets. We have to acknowledge that his approach is enjoying growing support among investment banks and auditing firms. At the same time, it is to be noted that Damodaran's concept has failed to resonate sufficiently with the academic community. This is reason enough to perform a systematic analysis and critical discussion of his CRP concept.

Damodaran's initial considerations concerning a CRP can be found in Damodaran (1999a, 2003), with further essentially unchanged mentions in his more recent publications. In our contribution we will concentrate on the two aforementioned sources.[1]

2. CRP Concept

In the following, we intend to give a neutral, that is, non-judgmental, description of Damodaran's country risk premium concept (CRPC). We will also attempt to provide a detailed reconstruction of Damodaran's thought process, which led to this approach.

Risk-return models

The cost of capital for risk-return models can be categorized as expected returns. Damodaran begins his considerations by concluding that within the framework of capital market models with J risk factors, the relationship

$$\text{expected return} = r_f + \sum_{j=1}^{J} \text{RP}_j \times \beta_j \qquad (1)$$

applies at all times, where r_f represents the risk-free interest rate, RP_j the risk premium for the j-th factor, and β_j the j-th beta factor. In the special case of CAPM, which is a single-factor model, this can be simplified to

$$\text{expected return} = r_f + \text{ERP} \times \beta, \qquad (2)$$

where ERP represents the equity risk premium (often called market risk premium). On the condition that the risk-free interest rate is known, risk premiums and beta factors must be estimated for all J risk factors. Damodaran (1999a) defines a risk premium RP_j as an excess return that investors achieve when they have to accept an average rate of risk for the j-th factor.

What should be measured and what is actually measured

Damodaran focuses on risk premiums and, in the CAPM context, discusses what ought to be measured to later be able to compare it with what is typically measured.[2]

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[1]We have only referenced the 1st articles of Damodaran to make our point clear. In subsequent publications Damodaran developed his concept further but did not touch the elements we are criticizing in our publication.

[2]There is a large body of literature pointing out why CAPM empirical estimates are not good predictors of expected returns and why the CAPM cannot be empirically tested, starting prominently with the Roll critique (see Roll, 1977). However, at least to date, finance theory has not been blessed with another, superior model that would supplant CAPM, as Fama and French (1996) pointedly made clear.

Under CAPM, one of the concerns is to determine the ERP, which is the premium that investors demand when they invest in a well-diversified portfolio of risky assets (the market portfolio). How is the ERP estimated? One source is to look at long time series to work out the historical premiums associated with investing into stocks as opposed to risk-free securities. According to Damodaran, such an approach can yield reasonable ERP estimates when working with US data, as the US stock market is large and diversified and both the stock market and the bond market enjoy a long history, though since the crisis of 2008 using the historic average has become problematic. If, however, smaller, younger markets are used, the results are meaningless. Damodaran justifies this line of argumentation by referring to the fact that the shorter the time series, the greater the standard error.

Modified historical risk premium

To address the described problem Damodaran proposes a modified process, beginning with the basic proposition

$$\text{equity risk premium} = \text{equity risk premium for a mature market} + \text{CRP} \quad (3)$$

and continuing with two questions:

1. How should one determine the first component (the equity risk premium for a mature market)?
2. Furthermore, should one also use a CRP? And if so, how should it be determined?

Damodaran's answers are as follows:

1. To determine the equity risk premium in a mature market, he proposes using US data, taking the period 1926 to 1998 as a baseline,[3] using the geometric mean and—with respect to the risk-free interest rate—using Treasury bonds.[4]
2. In regard to CRP, Damodaran points out that some scholars believe it is possible to diversify country risks.[5] He explains that this could be the case provided the stock markets of different countries do not correlate. In reality, however, they do correlate positively, he states, so it is not possible to eliminate a major part of the country risk through diversification. In order to estimate the CRP, states Damodaran, three problems must be solved: (a) The country-specific risk must be measured; (b) The country-specific risk must be converted into a country-specific risk premium; and (c) A given firm's exposure to that country-specific risk must be assessed.

Measuring country-specific risk

Damodaran establishes that there are various ways to assess country risks. The simplest approach would be to use the ratings of relevant agencies (e.g., Standard & Poor's, Moody's). While their ratings always relate to the risk of default, these risks are essentially driven by the same factors that drive equity risks: currency stability, trade balances, political stability, and so forth. An additional advantage of such ratings, he continues, is that they relate directly to spreads over US Treasury bonds.

To illustrate, he uses a table with various Latin American countries (from Argentina to Venezuela) that has three additional columns:

- one for currency risks (from A− for Chile to BBB− for Colombia and Uruguay),
- another for spreads over US corporate bonds (''corporate spreads''), and, finally
- one for spreads over Treasury bonds (''country spreads'').

Damodaran believes that country spreads potentially reflect the market's risk assessment more precisely than do corporate spreads, yet he still advocates measuring country risks via corporate spreads since the market for corporate bonds is far more liquid than that for government bonds.

Finally, Damodaran touches upon other possibilities to measure country risks, casually mentioning their pros and cons without describing alternatives in more detail. Reading this section conveys the impression that, all things considered, using corporate spreads is the best, or at least a workable, method.

Estimating the CRP

Measuring country risks is just an interim step toward assessing the CRP. Country risk initially only measures default risk. According to Damodaran it makes intuitive sense for the CRP for equity positions to be greater than the default risk for outside capital positions. The likely reason is the fact that lenders of outside capital generally take priority over lenders of equity whenever financial surpluses are distributed. To allow for this fact, Damodaran compares the stock market volatility of a given country to the volatility of the bond market in the same country, producing the following equation for estimating the CRP:

$$\text{CRP} = \text{corporate spread} \times \frac{\sigma_{\text{stock}}}{\sigma_{\text{bond}}}. \quad (4)$$

Usually stocks are more volatile than bonds. Accordingly, the CRP is—usually—higher than the corporate spread when following the proposal described here.

[3]The relevant article by Damodaran was published in 1999, so we can conclude that today he would recommend using the period 1926 to 2009.
[4]Treasury bonds are US bonds with a minimum term of ten years that normally have half-yearly coupons and are taxable at the federal level only.
[5]He indicates no source.

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Valuing corporations with CRP

To determine the cost of capital for a company exposed to country risks, Damodaran distinguishes three different alternatives, as follows.

The bludgeon approach

Provided all companies in a country are exposed to the country risk in an identical manner, Damodaran recommends the approach

$$\text{expected return on equity} = r_f + \text{ERP} \times \beta + \text{CRP}. \quad (5)$$

Here, the risk-free interest rate r_f equals the US interest rate for Treasury bonds and the ERP equals the ERP of a mature market—specifically the US market.

The beta approach

Here, it is assumed that the company's country risk is proportional to the market risk, that is, it can be measured using the beta factor. In this case Damodaran recommends

$$\text{expected return on equity} = r_f + (\text{ERP} + \text{CRP}) \times \beta, \quad (6)$$

without commenting further.

The lambda approach

The broadest approach, Damodaran's preferred method, allows for a company to be exposed to market risk and country risk in different ways. While this leads to cost of capital of

$$\text{expected return on equity} = r_f + \text{ERP} \times \beta + \text{CRP} \times \lambda, \quad (7)$$

Damodaran's (1999a) work offers no further explanations on how to establish λ.[6] Damodaran's 2003 work is more informative in this respect.

Damodaran stresses that the lambda method is not a single-factor model like the standard CAPM, but rather a two-factor model. In light of Equation 1, Equation 7 could therefore be written as

$$\text{expected return on equity} = r_f + \text{ERP} \times \beta_1 + \text{CRP} \times \beta_2.$$

Damodaran (2003) provides the following information about the lambda method:

- Like beta, lambda has a value of around one where $\lambda = 1$ represents an average country risk, while $\lambda > 1 (\lambda < 1)$ reflects a company that is exposed to a greater (lesser) than average country risk.
- Most investors would accept that corporations have different lambdas.
- Damodaran describes various ways to determine a corporation's lambda factor.

1. A turnover or sales-based approach would be one of the most obvious methods. A corporation that generates 30% of its turnover in Brazil is less exposed to the associated country risk than a corporation generating 70% of its turnover in Brazil.
2. However, a corporation may also be exposed to country risk if it does not generate any turnover in that country but has production plants there. This is particularly true if these production plants cannot be moved easily (e.g., mines).
3. It may be possible to mitigate or even eliminate country risks using suitable instruments (insurance, derivatives, etc.). However, Damodaran believes that corporations would probably hesitate to apply such lambda-reducing instruments because (a) there are always costs associated with risk management, and (b) they would eliminate risks, but also opportunities.

According to Damodaran the crucial factor is the difficulty associated with obtaining reliable information on a corporation's production plants and/or risk management strategy. By contrast, general information about a corporation's sources of turnover is easily available. Therefore, to determine a corporation's (j) lambda factor he suggests

$$\lambda_j = \frac{\text{share of turnover generated by corporation j in a country}}{\text{share of turnover of an average corporation in that country}}.$$

To calculate lambda this way, information is needed on both the numerator and the denominator. To estimate the denominator Damodaran suggests looking at export statistics.

Furthermore he discusses the use of yardsticks of profitability rather than turnover, as well as market prices. Concerning the latter, he suggests regressing a corporation's earnings per share to the country's bond returns and to use the incline of the regression line as the lambda factor. Formally, this procedure is very similar to the one used to determine the beta factor; however, one would have to expect a considerable standard error.

We herewith conclude our analysis of Damodaran's country risk concept and turn to a systematic critique.

[6]Damodaran himself refers to Damodaran (1999b) for details. There, however, he states merely that for emerging markets, it is not possible to collect data that would allow a reliable assessment of beta factors.

3. Critique of the CRPC

3.1. The theoretical foundation of Damodaran's equations

Equation 1, which Damodaran uses as a starting point for his deliberations, merits several notes. In the case of $J = 1$ we are dealing with a one-factor model (e.g., the CAPM). Looking at the CAPM, it is *prove*n that within the limits of a neoclassical equilibrium model consisting of definitions and logical, consistent assumptions, Equation 2 is valid. This would at least put Equation 2 on a scientifically demonstrable basis.

By contrast, when using the arbitrage price theory (APT) by Ross (1976), we are dealing with a multi-factor model in which it is possible to prove that it possesses the linear structure indicated in Equation 1. Here, $J > 1$ can apply. However, it is in the nature of the model that none of the risk factors can be interpreted conceptually. We are hence not allowed to pick out one of these factors and interpret it as a country risk factor. Furthermore, for any multi-factor model it is possible to prove that it can get by with just one single factor.[7] However, this demonstrates that Equation 1 has no scientific justification. Further, if one interprets Equation 1 as a multi-factor model in the sense of an empirical model based on multiple linear regression, its linear structure is not proven as it is in the CAPM or the APT. Rather, it is simply assumed. Those who work with it without furnishing this proof later (in whatever way) are hence using unscientific arguments.[8]

Damodaran's deliberations may therefore be justified if they relate to a CAPM framework. As he explicitly differentiates between mature and emerging countries and their specific risks, he may have a CAPM in mind that distinguishes between at least two countries with specific risks. Therefore, we first devote ourselves to the question of whether two different risky asset classes (A and B) can be examined in a CAPM and what implications this has.

For this reason we concentrate on the usual model world of a CAPM with one period.[9] Investors should be able to make risky investments in countries A and B. There is no reason to assume that the investors in question can only invest in their respective countries of residence. In a capital market model such as the CAPM, the entirety of available investment opportunities plays an important role. Described here with the letter M, they comprise the sum of all risky assets in both country A and country B and are usually referred to as the market portfolio.

Besides investing in risky assets a CAPM offers the possibility to trade risk-free securities. The CAPM is without any doubt an equilibrium model. Usually, in such models one assumes that the risk-free securities are in ''zero net supply.'' This means that the sum of all risk-free investments equals the sum of all risk-free credits. If we assume a world with two countries, ''zero net supply'' means that market portfolio M contains neither risk-free securities from country A nor any from country B.

The risk-free securities yield country-specific returns that are denominated by r_f^A and r^B. There are two cases that need to be distinguished.

Different currencies

The countries may have different currencies that can be merged through an exchange rate. The exchange rate between A and B shall be set at f_0. The future currency rate $\tilde{f}_1$ is assumed to be uncertain.

Identical currencies

We also want to examine a case in which both countries have the same currency and only the risks associated with the respective government bonds are different. This is, for instance, the case in the euro zone. We assume that country A's return is risk-free. Both cases will now be discussed more precisely.

Different currencies

Assuming different currencies in countries A and B, we can conclude that the rate of return r_f^A for investors in country A and the rate of return r_f^B for investors in country B is risk-free. If, however, an investor in country A opts to invest at r_f^B, his rate of return becomes contingent upon the future exchange rate and is hence no longer safe unless he hedges it. The opposite also applies.

For the sake of clarity, we focus on an investor in country A and assume that he invests in bonds of both his own country and a foreign country. Within the framework of a standard CAPM, is it possible to alter the known securities market line in such a manner that a CRP becomes discernible? No. For the investor based in country A, the classic CAPM remains valid; in his case, the expected return of a risky asset j is

$$E\left[\tilde{r}_j\right] = r_f^A + \left(E[\tilde{r}_M] - r_f^A\right)\frac{Cov\left[\tilde{r}_j,\tilde{r}_M\right]}{Var[\tilde{r}_M]}. \qquad (8)$$

Since market portfolio M contains no bonds of country B (''zero net supply''), it is not discernible how a CRP could arise here. On the contrary, the standard CAPM is applicable without any modification when assuming the perspective of an investor based in country A. Nor does this change when switching perspectives to consider an investor based in country B. For this market participant the same standard

[7]The details are described in Gilles and LeRoy (1991).
[8]We shall deal with this aspect in greater detail in the next section.
[9]For details of modeling a CAPM, cf., e.g., Duffie (1988, pp. 93 ff).

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CAPM applies, and this investor now regards the bonds issued by his home country as risk-free. His risk-free return therefore amounts to r_f^B. From this perspective, the CAPM assumes the form[10]

$$E\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j)-1\right]=r_f^B+$$

$$\left(E\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]-1-r_f^B\right)\frac{Cov\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j),\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]}{Var\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]}. \quad (9)$$

If specific assumptions are made regarding the correlation between exchange rates and asset returns, Equation 9 can be simplified. We consider that it is not unreasonable to assume that exchange rates and share returns are independent of one another. While this assumption is certainly a restriction, it is by no means totally unrealistic; exchange rates are generally far more influenced by transactions on bond markets than by corresponding securities transactions.[11] However,

$$\begin{aligned}E\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]-1-r_f^B&=E\left[\frac{\tilde{f}_1}{f_0}\right]E[1+\tilde{r}_M]-1-r_f^B\\&\approx E[\tilde{r}_M]-r_f^B+E\left[\frac{\tilde{f}_1}{f_0}-1\right].\end{aligned} \quad (10)$$

In the CAPM equation, then, the ERP in one country's currency must be replaced by the ERP in another country's currency plus expected changes in the exchange rate. This replacement is economically sensible because it makes a difference whether worldwide gross domestic product growth is measured in yen, dollars, or euros. However, it is not justifiable to speak of a CRP in this context.

The beta is also subject to change. Unfortunately, these correlations are not as obvious, so the numerator and the denominator of the new beta are presented separately. If we assume again that exchange rates and asset returns are independent of one another, after a fairly complex calculation[12] we obtain

$$\begin{aligned}&Cov\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j),\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]\\&=Var\left[\frac{\tilde{f}_1}{f_0}\right]\left((1+E[\tilde{r}_M])(1+E[\tilde{r}_j])+Cov[\tilde{r}_j,\tilde{r}_M]\right)\\&+E\left[\frac{\tilde{f}_1}{f_0}\right]^2Cov[\tilde{r}_j,\tilde{r}_M],\end{aligned} \quad (11)$$

$$\begin{aligned}Var\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]&=Var\left[\frac{\tilde{f}_1}{f_0}\right]E\left[(1+\tilde{r}_M)^2\right]\\&+E\left[\frac{\tilde{f}_1}{f_0}\right]^2Var[\tilde{r}_M].\end{aligned} \quad (12)$$

And so again, in the beta factor we cannot recognize any kind of CRP.

Identical currencies

Let us assume now that countries A and B use the same currency. If the bonds of country A and of country B are riskless, every deviation from the equation $r_f^A=r_f^B$ would imply arbitrage opportunities, because one would only need to borrow money in the country with the lower return and invest it in the country with the higher interest rate. The CAPM equations of both countries are identical in this case.

Alternatively, we consider a situation in which the bonds of country A are riskless but those of country B are risky. In this case, one must assume that $E[\tilde{r}^B]>r_f^A$. Admittedly, even under these assumptions there is no place for a CRP in a typical CAPM. For the investor residing in country A, Equation 8 is still valid. Since r_f^B does not exist, the investor in country B would have a CAPM without a risk-free asset. He can nevertheless buy the government bonds of country A. Therefore, the typical CAPM without any CRP applies to him. To put this in a more current and drastic context, all investors use German government bonds to assess Greek securities and as a market portfolio use an index composed of German and Greek shares.

Summing up, it is fair to claim that Damodaran's idea of introducing a CRP is not scientifically justified within a CAPM.

3.2. Damodoran's empirical basis

Additional points of criticism are presented in the following section. It will emerge that while Damodaran

[10]To follow this line of argumentation note that within the framework of Equation 8, payments for *all* assets, bonds, etc., must be converted into the currency of country A. To find out how the equation changes if we take the perspective of an investor based in country B, the currency of country B has to be used for all calculations; a currency exchange risk must, hence, be considered. Generally, the return on a title j, which today carries a price tag of $p(\tilde{x}_j)$, and over the course of one year will generate uncertain cashflows of $\tilde{r}_j=\frac{\tilde{x}_j}{p(\tilde{x}_j)}-1$. Taking the currency exchange risk into account, asset j will yield (in a foreign currency) the uncertain amount of $\tilde{f}_1\tilde{X}_j$ and has a price of $f_0p(\tilde{x}_j)$. The return in the foreign currency will therefore amount to $\frac{\tilde{f}_1\tilde{X}_j}{f_0p(\tilde{X}_j)}-1=\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j)-1$.

[11]This is borne out by the fact that bond market turnover is far greater than capital market turnover.

[12]These calculations can be found in the Appendix.

has plenty of imaginative ideas on how to determine CRP, all of them turn out to be problematic at 2nd glance.

Lack of a formal definition of CRP

When determining country risks it is fair to expect that there exists a clear definition of a CRP. Yet Damodaran fails to provide such a definition. It is unclear what exactly must be measured in order to calculate the CRP. To avoid any misunderstandings we take another look at the classic standard CAPM:

$$E[\tilde{r}_j] = r_f + \mathrm{ERP} \times \beta_j. \quad (13)$$

The left side of the equation shows the costs of equity of an enterprise j in the sense of an expected return; to the right are the risk-free interest rate, the ERP, and the beta factor. Each of these three quantities is defined in such a way that it is clear what is meant. The ERP is defined as

$$\mathrm{ERP} = E[\tilde{r}_M] - r_f, \quad (14)$$

we can state that it represents the difference between market yield and the risk-free interest rate, where the market yield is the return an investor can expect if he invests in a diversified portfolio of risky assets (the market portfolio). We do not deny that estimating the ERP is a challenging affair, but with a view to Equation 14 it is at least possible to state that there is a precise formal definition of this term. Unfortunately, this is not the case for the CRP.

However, in connection with his Equation 1, Damodaran claims that a risk premium is generally a surcharge that investors demand on top of the risk-free interest rate if they have to accept an average risk concerning the relevant factor. When trying to see matters from Damodaran's perspective, one needs to distinguish between mature and emerging markets, for which we will use A and B. Now Damodaran leaves no doubt that with ERP he fully concentrates on A markets, while the CRP is all about B markets. In analogy to Equation 14 one could assume that it would be possible to follow Damodaran by using definitions such as

$$\mathrm{ERP} = E[\tilde{r}_M^A] - r_f \quad (15)$$

and

$$\mathrm{CRP} = E[\tilde{r}_M^B] - r_f. \quad (16)$$

Yet these two definitions are by no means as clear as the definition of the ERP according to Equation 14.

1. When Equation 14 refers to the market portfolio, at least it is on principle clear that it includes *all* risky assets in the world. However, when using Equations 15 and 16, all risky assets must be divided into two classes, namely those that can be attributed to the A market and those that belong to the B market. In this context it must be borne in mind that Damodaran fails to draw a clear dividing line between the A market and the B market. Also, there may be further markets with risky assets that can be attributed neither to A nor to B. Damodaran fails to indicate how to deal with titles belonging to such a C market.
2. It is striking that Equations 15 and 16 work with a uniform risk-free interest rate. If A and B represent two countries (or country groups), each with its own currency, and if one also assumes that both countries' government bonds are (virtually) risk-free, $r_f^A = r_f^B$ does not necessarily apply. Damodaran does not state how to deal with the resulting problems.

Practical estimation of CRP

In order to estimate the ERP according to Equation 15, Damodaran suggests using the usual method. He recommends falling back on market data drawn from the mature A market and analyzing long time series. To him, it is not possible to similarly estimate the CRP according to Equation 16 using data drawn from the B market since he believes there to be insufficient data on emerging markets. He therefore has to choose an alternative and recommends two steps, both of which contain plenty of arbitrary elements.

Estimating country risk

The first step concerns the determination of country risk. This is generally understood to represent the risk of default in foreign trade and payments, which threatens the settlement of accounts receivable between foreign contracting partners. Normally, a distinction is made between original and derivative default risks, depending on whether the foreign government or a borrower residing in a foreign country (foreign company) is considered the debtor. Damodaran prefers to use derivative default risks, arguing that markets for corporate bonds are more liquid than government bond markets. However, he does not exclude the use of data on original default risks, providing the user of the Damodaran concept with ample scope for action, considering that original and derivative default risks may correlate negatively.

Original or derivative country risks are reflected in credit spreads, that is, in interest markups for loans or bonds granted by a given country to a country with a triple A rating.[13] The fact that default risks associated with foreign corporate bonds are not subject to the same forces as the

[13]This kind of information is available from rating agencies such as Fitch Ratings, Moody's, and Standard & Poor's.

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risks associated with foreign shares is mentioned by Damodaran, but he deemphasizes this fact. This is hardly surprising, since he is preoccupied with finding pragmatic ''solutions'' rather than with developing a well-founded theoretical model.

Identifying CRP

In the 2nd step Damodaran attempts to derive the CRP using company-specific credit spreads. To address these relationships formally and unambiguously, we assign the symbol CS to the credit spreads. We are therefore looking for a functional relationship between CS and CRP.

In this context it must be remarked that the risks associated with shares and bonds have little to do with one another. Knoll, Vorndran, and Zimmermann (2006) provide ample proof that these risk categories are essentially incommensurate.

However, our criticism goes beyond that. Damodaran establishes the relationship between CS and CRP without reference to a clear theoretical foundation that is logically verifiable by 3rd parties. Rather, he relies on the fact that shareholders usually take a more risky position than lenders and pragmatically suggests converting the credit spread to the desired CRP using a simple rule of three. As a conversion factor he recommends the ratio between the volatilities, that is

$$\frac{\text{CRP}}{\text{CS}} = \frac{\text{asset volatility}}{\text{bond volatility}}. \qquad (17)$$

His recommendation is a problem for two reasons:

1. Since Damodaran's model is not based on a sound line of argumentation, there are no clear rules on how to measure volatility. He himself uses the standard deviation. Yet by the same token one could also apply the variance or another dispersion measure, and

$$\frac{\sigma_{\text{stock}}}{\sigma_{\text{bond}}} \neq \frac{\sigma^2_{\text{stock}}}{\sigma^2_{\text{bond}}} \qquad (18)$$

   applies as a general rule. Using variances instead of standard deviations would therefore, all else being equal, lead to entirely different CRP. Without a model-theoretical foundation we once again observe arbitrary results.
2. The volatilities must be estimated on the basis of empirical data, regardless of whether they are measured with standard deviations or variances. We assume that in order to do so one has to fall back on capital market data of emerging markets. Yet, according to Damodaran, these do not constitute a reliable basis, and it is precisely this fact that caused him to develop his country risk concept. This is clearly an instance of a vicious circular statement.

Standard error and structural changes

Damodaran duly describes the procedure to be followed in order to estimate the CAPM's ERP. He considers long time series. He also correctly points out that the shorter the considered time series, the greater the standard error. He distinguishes between fully developed markets on the one hand and emerging markets on the other, asserting that ERPs that are evaluated using data from emerging markets are useless owing to the too-short time series.

However, this does not imply that ERPs that have been evaluated using data from mature markets are more reliable. Yet this is exactly what Damodaran suggests. He overlooks or at least omits the fact that time series can have structural breaks, and it is fairly certain that the time series between 1926 and 1998 contain several such breaks.[14] Damodaran is not concerned about that. Independently of (presumed) structural interruptions, he recommends a time series of this length in order to evaluate the ERP for the mature US market. From this angle, it cannot be excluded that ERPs that have been evaluated using data from emerging markets are statistically more reliable than ERPs based on data from mature markets.

Diversifiability of country-specific risks

Damodaran justifies the necessity of country-specific risk premiums by arguing that diversification does not significantly diminish country-specific risk. In order to successfully support this line of argumentation we see two possible avenues: Either one shows that such attempts at diversification are technically impossible, as, for example, the trade with certain financial instruments is unlawful; alternatively, one can demonstrate that financial instruments from two different countries (or groups of countries) correlate in such a manner that diversification would not realistically lead to a meaningful risk reduction.

Damodaran does not bring forward arguments of the first type. In addition, they would be hard to confirm in this day and age. He instead uses arguments of the 2nd variety, explaining that diversification is only possible if the markets of two different countries are ''uncorrelated.'' This is not a very precise statement. We interpret it in such a way that the correlation coefficient between the

[14]This can be properly analyzed by using models of structural interruption. Hence, there is no need to rely on ''anecdotes'' about the global economic crisis, the Korean War, the banking crisis, or other similar events.

assets of country A and those of country B would have to be $\rho_{A,B} = 0$. This is a very odd view of things. It is at least possible to show that even a positive correlation allows for the set-up of portfolios that are less risky than if one were to invest solely in the lowest-risk asset. The only precondition would be that $\rho_{A,B} < 1$, so only a *perfec*t positive correlation is to be avoided.[15]

Naturally, the effects of diversification increase as the correlation effect diminishes. Yet it remains a mystery why one needs to postulate $\rho_{A,B} = 0$ to assert substantial diversification. Also, Damodaran makes absolutely no reference to how strongly one has to diversify in order to eliminate the need for a country-specific risk premium. His views regarding this aspect, too, need to be considered arbitrary.

Incidentally, those correlations between assets from different countries need to be clarified. Damodaran fails to provide concrete figures based on verifiable empirical studies. He limits himself, again, to qualitative generalized assumptions.

Cost of capital and CRP

Damodaran names three possibilities for integrating CRP into a company's equity cost of capital. All three are difficult. First of all, we observe that the choice of procedure seems to be at the discretion of the person performing the valuation. None of the three possibilities is logically derivable from a theoretical model. They are merely the product of their inventor's imagination. In the following we limit ourselves to the beta and the lambda approaches, without considering the option that Damodaran refers to as the bludgeon approach.

Beta method

This concept is formally based on

$$E[\tilde{r}_j] = r_f + (\underbrace{\mathrm{ERP} + \mathrm{CRP}_j}_{\mathrm{ERP}_j^*}) \times \beta_j; \qquad (19)$$

in other words, it basically consists of raising the ERP by a CRP.[16]

The questionable nature of this concept is exacerbated in that Damodaran claims to depart from CAPM only once he introduces the (subsequent) lambda method. The fact that he makes no such statement concerning the beta method could mislead practitioners, especially, into thinking that this concept leaves them within the bounds of CAPM. This, however, is not the case. Why not? Within the framework of CAPM a ERP is an entity that is wholly independent of the company under review. The ERP has the exact same value for all companies under review. Yet this is precisely not the case for the country-specific risk premium. After all, it only becomes relevant for companies with activities in emerging markets.[17] If this were not the case, there would be no compelling reason to raise the cost of capital by a country-specific risk premium and to compute a ''market risk premium'' ERP_j^*.[15] In contrast to ERP the modified ERP_j^* is always a company-specific value, and this is simply irreconcilable with the traditional CAPM. The assumption that CAPM is the foundation for determining the cost of capital leads to a logical contradiction, to the extent that Damodaran's beta method is used.

Even if one were to ignore this major problem there is still one further question. In order to clarify it, we assume that the company's activities abroad account for a_j of its overall activities.[18]

We further assume that an average proportion of foreign activity $\bar{a}$ is typical of all participants in this emerging market. This produces three conceivable cases. Either the foreign activity of the company in question is above the average ($a_j > \bar{a}$), or it corresponds to the average ($a_j = \bar{a}$), or it is below the average ($a_j < \bar{a}$). Which procedure ought to be used when employing the beta method? Damodaran remains silent on this. Intuitively it may seem reasonable to apply a risk premium in the 1st case, to dispense with a country-specific risk-premium in the 2nd, and to apply a risk discount in the 3rd. However, such a solution would seem entirely ad hoc and, like the entire CRP approach, lacks a stable theoretical foundation.

Lambda method

In the same way Damodaran fails to provide a formally clear definition of the CRP, he fails to provide a corresponding definition of the lambda factor. He merely provides the equation[19]

$$E[\tilde{r}_j] = r_f + \mathrm{ERP} \times \beta_j + \mathrm{CRP} \times \lambda \qquad (20)$$

and states that, on average, lambda is equal to one. This is a largely uninformative statement, merely allowing for lambda to be greater or smaller than one. For instance, nothing is said as to whether lambda can also be negative or

[15]It is worth pointing out that even a perfect positive correlation allows for complete risk obliteration if short selling was permitted.

[16]It should be mentioned here that, following Damodaran's concept, the magnitude of the ERP should be assessed based on data from a developed capital market.

[17]For the reason mentioned in footnote 16, this variable, too, is marked with index j.

[18]How this proportion is measured is of no concern to us at this point. We address this in the context of the lambda method.

[19]In ''proper'' terms this would probably have to be rewritten as

$$E[\tilde{r}_j] = r_f + \mathrm{ERP} \times \beta_j + \mathrm{CRP} \times \lambda_j.$$

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whether it has an upper limit. It is hence entirely open what λ is supposed to be. This is very different when it comes to the beta factor. Everyone familiar with the CAPM knows that it represents the ratio between a covariance and a variance, namely

$$\beta_j = \frac{Cov[\tilde{r}_j, \tilde{r}_M]}{Var[\tilde{r}_M]}. \quad (21)$$

Those wishing to know how to determine a lambda factor can only employ the examples supplied by Damodaran in this particular context. They will want to base their calculations on quantitatively measurable entities that describe a company's level of economic activity in an emerging market. These entities could be turnover, production costs, or even key financial indicators (cash flow, net profit), so once again there is a pronounced risk of arbitrariness since using turnover to estimate lambda will not produce the same figures as using earnings before interest, income taxes, depreciation, and amortization (EBITDA). When Damodaran primarily argues in favor of using turnover-related figures, he does so merely in the interest of pragmatism, not on the basis of a convincing theoretical foundation.

4. Conclusion

We are aware that practitioners often pose questions the answers to which require complicated academic analysis. Practitioners tend to lack the time and sometimes also the necessary theoretical foundation to tackle these issues in a scientifically convincing manner. It is entirely understandable if, under the circumstances, they make assumptions that in an ideal world would attract strong criticism or if they take recourse in simple ad hoc solutions. Accordingly, it is possible that practitioners propose CRP simply to deal with certain problems.

Unfortunately, we feel we have to level the following criticism at Damodaran:

1. It is not fair to claim that the CRPC has a strong theoretical basis. Indeed, this is impossible within the framework of a traditional CAPM. Neither is the CRPC empirically supported, where ''empirical'' means based on a sound econometric methodology.
2. Since Damodaran's CRP can be neither theoretically nor empirically supported, the rates of return on capital that are derived by such methods are highly arbitrary.

The observation that his concept is making inroads among both investment banks and auditing firms is therefore cause for considerable concern.

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APPENDIX

Using the fact that the covariance is linear in both variables we obtain

$$Cov\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j),\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]=Cov\left[\frac{\tilde{f}_1}{f_0},\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]+Cov\left[\frac{\tilde{f}_1}{f_0}\tilde{r}_j,\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]=Cov\left[\frac{\tilde{f}_1}{f_0},\frac{\tilde{f}_1}{f_0}\right]+Cov\left[\frac{\tilde{f}_1}{f_0},\frac{\tilde{f}_1}{f_0}\tilde{r}_M\right]$$
$$+Cov\left[\frac{\tilde{f}_1}{f_0}\tilde{r}_j,\frac{\tilde{f}_1}{f_0}\right]+Cov\left[\frac{\tilde{f}_1}{f_0}\tilde{r}_j,\frac{\tilde{f}_1}{f_0}\tilde{r}_M\right].$$

Assuming that exchange rates and returns are independent, we obtain

$$Cov\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j),\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]=Var\left[\frac{\tilde{f}_1}{f_0}\right]+E[\tilde{r}_M]Var\left[\frac{\tilde{f}_1}{f_0}\right]+E[\tilde{r}_j]Var\left[\frac{\tilde{f}_1}{f_0}\right]+E[\tilde{r}_j]E[\tilde{r}_M]Var\left[\frac{\tilde{f}_1}{f_0}\right]$$
$$+Cov[\tilde{r}_j,\tilde{r}_M]\left(E\left[\frac{\tilde{f}_1}{f_0}\right]^2+Var\left[\frac{\tilde{f}_1}{f_0}\right]\right),$$

which simplifies to

$$Cov\left[\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_j),\frac{\tilde{f}_1}{f_0}(1+\tilde{r}_M)\right]=Var\left[\frac{\tilde{f}_1}{f_0}\right](1+E[\tilde{r}_M])(1+E[\tilde{r}_j])+Cov[\tilde{r}_j,\tilde{r}_M]\left(E\left[\frac{\tilde{f}_1}{f_0}\right]^2+Var\left[\frac{\tilde{f}_1}{f_0}\right]\right).$$

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