

# **Volatility Rules: Valuing Emerging Market Companies**

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## **Volatility Rules: Valuing Emerging Market Companies**

As the center of gravity shifts from developed markets in the United States to emerging markets in Asia and Latin America, analysts are also grappling with estimation questions that arise more frequently with emerging market companies. In this paper, we begin by looking at common errors that show up in emerging market company valuations. We then deal with two big issues that underlie these valuations. The first relates to country risk and how best to deal with it in valuation. In particular, what are the country risks that we should incorporate into cash flows and when does country risk affect discount rates? The second arises from the lack of transparency and poor corporate governance that characterize many emerging market companies. We close the paper by examining how best to do relative valuation in emerging markets, especially when the comparable companies are listed in other markets.

The center of gravity for the global economy is shifting from the United States and Western Europe to Asia and Latin America. Increasingly, we are being called upon to value emerging market companies, as they become larger players in the global economy as well as candidates for investment portfolios. In this paper, we will focus on issues, which while not unique to emerging market companies, take on a larger role with them. In particular, many of these companies operate in markets with unstable currencies and inflation, as well as significant and shifting country risk. If we add on financial statements that are not always informative and weak corporate governance, valuing emerging market companies can pose serious valuation issues.

We will begin by looking at common errors made by analysts valuing emerging market companies – currency mismatches, double (or triple) counting country risk and a failure to systematically consider the effects of different classes of shares – and suggest ways in which we can avoid these mistakes. The bottom line, though, is that no matter how carefully we approach the valuation of these companies, our final estimates of value will be more volatile for these firms than for otherwise similar companies in developed markets.

## **Role of Emerging Market Companies**

At the start of the 1990s, the United States, Western Europe and Japan still represented the bulk of the global economy, and Asian and Latin American countries may have had high growth potential, but accounted for only a small portion of world output. In the last two decades, emerging markets, especially India and China, have become much larger players in global economic growth. In this section, we will begin by looking at the growing clout of emerging market companies, then examine why the valuation of these companies has become more critical to investors and analysts and close by listing factors that characterize these companies.

### ***Emerging market companies in the Global Economy***

As emerging market economies have grown, their financial markets have grown with them, and the public listings of companies have exploded. Some of the companies being listed used to be privately owned and some are new firms. In markets like India and China, the number of publicly traded companies has doubled or even tripled over the last decade.

It is not just the number of companies that testifies to the importance of emerging market companies. A few of these companies are now global players, with large market capitalization and operations outside their domestic markets. At the start of 1990, there was not a single Indian or Chinese company in the top 100 global companies, in terms of market capitalization, whereas today, there are several. In early 2009, for instance, the three largest banks in the world, in terms of market capitalization, were all Chinese banks. Reflecting the increasingly level playing field, emerging market companies have also gone from being the targets of acquisitions by developed market companies to becoming acquirers of developed market companies. In recent years, Gerdau Steel and Vale (Brazil), the Tata Group (India) and several Chinese companies have acquired developed market counterparts.

### **Why they matter?**

As financial markets in emerging economies become larger and more sophisticated, we are seeing also seeing the demand for valuation increase domestically, as investors in these markets are enticed into equity markets. The number of equity research and corporate finance analysts in Asia has increased dramatically over the last decade and that trend will probably continue.

There is another factor at work too. As investors in developed markets become more attuned to global diversification, they are more open to adding emerging market companies to their portfolios, either directly or through emerging market mutual or exchange traded funds. To smooth this process, many larger emerging market companies have listings in New York and London, thus allowing investors to buy Infosys (an Indian company) and Embraer (a Brazilian company) in U.S. dollars or British pounds. This has, however, also meant that these companies have to be valued, often by analysts in New York and London.

Finally, the increasing volume of cross border mergers and acquisitions has also meant that developed market companies are valuing target companies as potential targets, just as some emerging market companies try to reverse that process.

### **Characteristics of Emerging Market companies/ exposures**

Emerging market companies span different businesses and are located on various continents, but there are characteristics that many (though not all) share.

1. Currency volatility: In many emerging markets, the local currency is volatile, both in terms of what it buys of developed market currencies (exchange rates) and in its own purchasing power (inflation). In some emerging market economies, the exchange rate for foreign currencies is fixed, creating the illusion of stability, but there are significant shifts every time the currency is revalued or devalued. Finally, when computing risk free rates, the absence of long-term default free bonds in a currency denies us one of the basic inputs into valuation: the riskfree rate.
2. Country risk: There is substantial growth in emerging market economies, but this growth is accompanied by significant macro economic risk. Thus, the prospects of an emerging market company will depend as much on how the country in which it operates does as it does on the company's own decisions. Put another way, even the best run companies in an emerging economy will find themselves hurt badly if that economy collapses, politically or economically.
3. Unreliable market measures: When valuing publicly traded companies, we draw liberally from market-based measures of risk. To illustrate, we use betas, estimated by regressing stock returns against a market index, to estimate costs of equity and corporate bond ratings and interest rates to estimate the cost of debt. In many emerging markets, both these measures can be rendered less useful, if financial markets are not liquid and companies borrow from banks (rather than issue market-traded bonds).
4. Information gaps and accounting differences: While information disclosure requirements have become more stringent globally, the rules still require that much less information be disclosed in emerging markets than in developed markets. In fact, it is not unusual for significant and material information about earnings, reinvestment and debt to be withheld in some emerging markets, making it more arduous to value firms in these markets. On top of the information gaps are differences in accounting standards that can make it difficult to compare numbers for emerging market companies with developed market firms. Inflation accounting, uncommon in the United States and Western Europe, is still used in some emerging markets, with differences in tax treatment adding to the confusion.

5. Corporate governance: The question of how much power stockholders have over managers is a global one, but emerging market companies pose some of the most difficult challenges, both because of history and environment. Many emerging market companies used to be family-owned businesses and while they might have made the transition to being publicly traded companies, the families retain control through a variety of devices – shares with different voting rights, pyramid holdings and cross holdings across companies. In addition, investors who challenge management at these companies often find themselves stymied by legal restrictions and absence of access to capital. As a consequence, changing the management at an emerging market company is far more difficult than at a developed market company.
6. Discontinuous risk: Our earlier mention of country risk referred to the greater volatility in emerging market economies and the effect that has on companies operating in these economies. In some emerging markets, there is an added layer of risk that can cause sudden and significant changes in a firm's fortunes. Included here would be the threat of nationalization or terrorism. While the probability of these events may be small, the consequences are so dramatic that we ignore them at our own peril.

## **The Dark Side of Valuation**

Analysts who have to value emerging market companies confront more challenges than those who have to value developed market companies. Some analysts develop coping mechanisms, that while making their jobs easier, can lead to serious valuation errors over time and across companies. In this section, we will highlight the unhealthy responses to the uncertainty that we face when valuing these companies.

### **Currency mismatches**

If it is difficult to estimate the riskfree rate and other risk measures in the local currency, it is tempting to switch to another (more stable) currency when estimating discount rates. Many Latin American analysts, for instance, estimate the discount rates for local companies in U.S. dollars. That, by itself, is defensible, if the cash flows for these companies are also in dollars. In many valuations, the cash flows either remain in the local currency or are converted into dollars using today's exchange rate (which

effectively leaves them in the local currency). The mismatch – a low inflation rate built into discount rates (through the use of US dollar rates) and a high inflation rate built into cash flows (through the use of local currency cash flows or the current exchange rate) is a recipe for over valuation.

Some emerging market analysts also try to nullify the currency effect by doing everything in real terms. Again, while this approach is also defensible, the way in which discount rates and cash flows are estimated for real cash flows can create inconsistencies.

### **Miscounting and Double Counting Country Risk**

Analysts who value emerging market companies are undoubtedly aware that a layer of country risk overlays the risk of their companies, but there are four common problems we see in valuation:

- a. Currency switches: As we noted in the last section, many analysts who value emerging market companies decide to switch currencies and value their companies in US dollars or Euros. Unfortunately, some of them follow up by then ignoring country risk, arguing that the switch to a developed market currency should make this risk go away. It is clearly not that easy to eliminate country risk, and valuations based on this assumption will generate values that are too high for emerging market companies.
- b. Mistaking expected cash flows for risk-adjusted cash flows: Many analysts claim to have adjusted their cash flows for country risk, by building into the expected cashflows the possibility and consequences of bad outcomes. Note that this computing an expected value across multiple scenarios does not comprise risk adjustment and that either the cash flow or the discount rate has to be explicitly adjusted to reflect risk.
- c. Assume that beta captures country risk: Since beta is generally our measure of firm-specific risk, there are some analysts who believe that it is the best place to reflect country risk; companies in higher risk countries, they argue, will have higher betas and higher costs of equity. The problem, however, is that there is no easy way to incorporate country risk into the betas. If betas are estimated against the local index, the average beta across stocks in that market (no matter how risky the market is) should be one. If betas are estimated against the S&P 500

or a global index, there is a chance that the beta might reflect country risk, but it is unlikely, given the small size of emerging market companies (relative to the broader indices).

- d. Double counting (or triple counting risk): At the other extreme are analysts who are so sensitized by country risk that they try to build it into every dimension of value. These analysts use higher riskfree rates (incorporating a default risk spread for the country into the riskfree rate), higher equity risk premiums (augmenting mature market premiums) and haircut or reduce expected cash flows (to reflect the same country risk). Not surprisingly, they find that most emerging market companies to be over valued.

When country risk affects multiple inputs in a valuation, not only is there the danger of double or triple counting the same risk, but it becomes much more difficult to determine how much country risk affects the valuation.

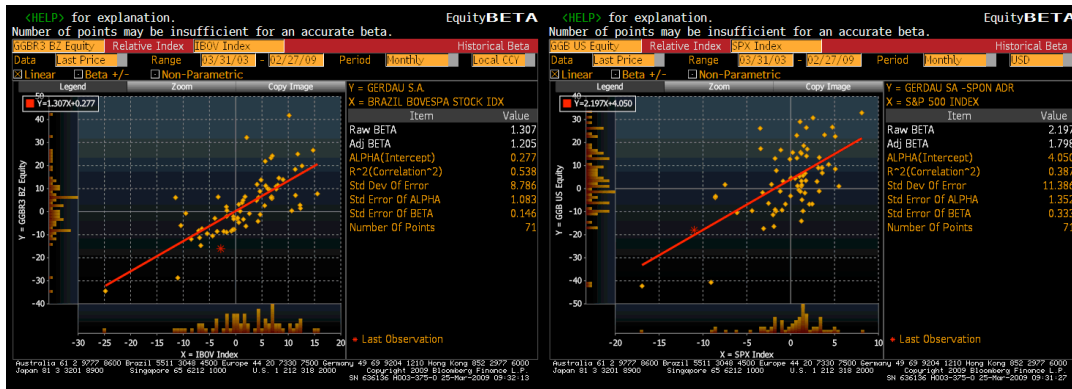
### **Risk Parameters**

In the last section, we noted the difficulties we face in estimating risk parameters (betas and default spreads) for emerging market companies, stemming from the volatility and illiquidity of the local equity markets and the absence of bond ratings for most companies. Analysts, when valuing these companies, often adopt shortcuts to get around these problems:

For cost of equity: To estimate the beta, many analysts use betas estimated against broader and (what they view as) more trustworthy indices, especially if the emerging market company has a foreign listing. For instance, many large emerging market companies have depository receipts (ADRs and GDRs) listed on the New York or London exchanges, and betas can be estimate for these listings against the S&P 500 or the FTSE. Figure 1 illustrates how different the numbers can be for Gerdau Steel, a large Brazilian company with listings on the Sao Paulo and New York exchanges.



Figure 1: Beta Estimates – Gerdau Steel



An analyst valuing this company would therefore use the beta of 1.80, estimated against the S&P 500, as the beta for the stock. While an argument can be made that this beta provides a more reasonable measure of risk than the beta against the Bovespa, there is a cost.<sup>1</sup> The standard error (or noise) in the beta estimate increases as we move from the Bovespa to the S&P 500 index.

For cost of debt: Using the absence of ratings and market-traded corporate bonds as an excuse, many analysts fall back on the book interest rate of the company as its cost of debt:<sup>2</sup>

$$\text{Book interest rate} = \frac{\text{Interest Expenses}}{\text{Book Value of Debt}}$$

This measure is perilous for any company, but it is doubly dangerous in emerging markets for two reasons. The first is that the book interest can change significantly, if an emerging market company borrows in dollars or euros, instead of the local currency, especially if there is high inflation embedded in the latter. Interest rates will be lower for dollar and euro borrowings and can reduce the book interest rate; using this interest rate for a local currency cost of debt will yield too low a number. The second is that much of the debt in emerging market companies tends to be short-term debt, which can bias the

<sup>1</sup> Some analysts justify the use of ADR betas on the grounds that they are estimating dollar costs of equity and that the beta estimated using the ADR and the S&P 500 is more consistent. This argument does not hold up to scrutiny. When estimating the cost of equity, we want to get as close as we can to the true beta of a company, not a beta that is computed against a different index. Thus, if the marginal investor in Gerdau is a Brazilian mutual fund, there is little basis for using a beta computed against the S&P 500. If the marginal investor is an institutional investor who holds primarily US stocks, we would use the beta estimated against the S&P 500, whether the valuation was in US dollars or Brazilian Reais.

<sup>2</sup> Taking a weighted average of the interest rates on existing debt of the firm will yield the same answer.

book interest rate downwards, since the long-term cost of debt (which is what we want) will tend to be higher.

### **Incorporation Effect**

When valuing emerging market companies, analysts pay too much attention to where a company is incorporated and too little to where it does business. Thus, Embraer is viewed as a Brazilian company, and the Brazilian country risk premium is attached to its cost of equity, even though it gets only about 10% of its revenues in Brazil and most of its revenues in developed markets. In fact, with the conventional practice, all Brazilian companies have the entire Brazilian country risk premium added on to their costs of equity and all Indian companies have the Indian country risk premium incorporated in their costs of equity. If we accept the proposition that different companies in an emerging market have different exposures to country risk, the consequences become obvious. We will under value companies that are less exposed than the typical company to country risk and over value companies that are more exposed. We will under estimate Embraer's value by treating it as a typical Brazilian company.

### **Ignoring missing information**

When confronted with missing information, analysts often assume that the safest assumption to make is to ignore that item. Thus, if companies in an emerging market do not provide information on lease commitments, analysts ignore leases. By doing so, though, they are essentially assuming that the lease commitments in future years are zero. We would argue that this is less defensible than assuming that the current lease expenses will continue for a specified period (say 5 or 8 years). In fact, this pattern of ignoring items that are not reported (employee options, acquisition premiums) can be challenged on the basis that there are more reasonable assumptions that can be made for most these items.

### **Corporate Governance Mood Swings**

Most analysts accept the reality that a forced change in management at many emerging market companies is impossible to accomplish. Rather than trying to incorporate this fact into value, they swing from one extreme to the other, when valuing these companies. In good times, when markets are buoyant and the economy is doing well, they ignore the weak corporate governance rules, acting as if they have no effect on

value. In bad times, when the economy is in trouble and markets are down, they use the same weak corporate governance system as justification for reducing the value at these companies, often by arbitrary amounts.

Corporate governance should matter in good and bad times. A management team that underperforms the rest of the market, when the economy is doing well, is destroying value just as much as a team that does the same, in poor economic times. However, an arbitrary or fixed discount applied to all companies misses the differences across companies and will not reflect changes in the corporate governance rules in a market.

### **Post-valuation discounts**

In emerging markets with significant risks from nationalization or terrorism, it is not uncommon to see analysts apply hefty discounts to their estimated value to reflect these risks. While the logic for these discounts is clear, the magnitude of the discounts is often “subjective”, with the analysts essentially asserting their expertise as the basis. If the two inputs into the discount are the probability that the catastrophic event will occur and the cost to equity investors of the event, there is no reason why we cannot make them explicit, even if they are estimates.

### **The Light Side of Valuation**

Emerging market companies are not easy to value, but there are some common sense rules that we can follow that will both reduce the likelihood of valuation mistakes and increase transparency in the final value. We will begin by looking at techniques that are useful in discounted cash flow valuation and follow up by examining ways in which we can value emerging market companies with multiples and comparables.

### **Discounted Cashflow Valuation**

The ingredients in a discounted cash flow valuation – cash flows and discount rates – are the same for developed market and emerging market companies. The challenge then becomes how best to incorporate the characteristics listed in the last section into the inputs.

### ***Currency Consistency***

In a companion paper on riskfree rates, we laid the foundations for moving from one currency to another.<sup>3</sup> The key, we noted, is to ensure that the expected inflation rate built into our discount rate matches the inflation rate implicit in our cash flows. Consequently, we can work with the local currency, a foreign currency or in real terms, when valuing an emerging market company, as long as we define our inputs accordingly all the way through the valuation. While the details of using each input are explored more fully in the paper on riskfree rates, table 1 summarizes the ways of preserving internal consistency.

*Table 1: Currency Consistency in Valuation*

	Discount Rate Estimation	Cash flow Estimation
Local currency Valuation	<ol style="list-style-type: none"> <li>1. Estimate the discount rate in the local currency, ensuring that the riskfree rate is default free and that the equity risk premium is consistently defined (or)</li> <li>2. Estimate the discount rate in US dollars or Euros, and then convert into a local currency rate, using differential inflation.</li> </ol>	Estimate cash flows in the local currency, building into the growth rate the expected inflation in that currency.
Foreign currency Valuation	Estimate the cash flows in a foreign currency, using the riskfree rate in that currency and a consistent equity risk premium.	<ol style="list-style-type: none"> <li>1. Estimate the cash flows directly in the foreign currency, incorporating the inflation rate in that currency in the growth rate (or)</li> <li>2. Estimate cash flows in the local currency and convert into the foreign currency, using expected exchange rates, either from forward markets or using purchasing power parity.</li> </ol>
Real Valuation	Estimate the discount rate in real terms, using a real riskfree rate and a consistent equity risk premium.	<ol style="list-style-type: none"> <li>1. Estimate the cash flows in real terms. There should be no inflation component built into the growth rate (or)</li> <li>2. Estimate the cash flows in local (foreign) currency terms, and then</li> </ol>

<sup>3</sup> See Damodaran, A., 2008, What is a riskfree rate?, Working Paper, SSRN.

		deflate using the expected inflation rate in local (foreign) currency.
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A simple test of whether discount rates estimated in local currency, foreign currency and real terms are consistent is to check for the following ( $r$  is the discount rate and  $E(\eta)$  is expected inflation).

$$r_{\text{Local currency}} = (1 + r_{\text{Foreign currency}}) \frac{(1 + E(\eta)_{\text{Local currency}})}{(1 + E(\eta)_{\text{Foreign currency}})} - 1 = (1 + r_{\text{real}})(1 + E(\eta)_{\text{Local currency}}) - 1$$

Thus, the only factor that causes local currency, foreign currency and real discount rates to vary is expected inflation. The same test applies for cash flows, with expected inflation being the key driver in differences in expected growth rates over time.

### ***Consistency in Country Risk***

There are two issues associated with country risk that we have to deal with when valuing emerging market companies. The first is how best to estimate the risk premium for a specific emerging market, reflecting its risk. The second concerns the exposure of individual companies to this country risk.

#### ***a. Country Risk Premium***

In a paper on equity risk premiums, we considered the question of whether there should be a country risk premium in the first place.<sup>4</sup> Summarizing that discussion, we examined the argument that there should be no country risk premium, because it can be diversified away, and noted that the increasing correlation across markets make diversification unlikely. We then presented three different ways of estimating the premium for country risk – (a) the default spread for bonds issued by the emerging market government, (b) the volatility of the emerging market, relative to the US market and (c) a composite measure that scales up the bond default spread by the relative volatility of the equity market (relative to the government bond).

We will be valuing two companies in this paper – Gerdau Steel, a Brazilian steel company, and Tata Motors, an Indian automobile company. Since we will need estimates of the country risk premiums for India and Brazil, we have summarized the estimates, using all three approaches, for both countries in table 2.

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<sup>4</sup> Damodaran. A., 2010, Equity Risk Premiums: Determinants, Estimation and Implications: The 2010 Edition, Working Paper, SSRN.

Table 2: Country Risk Premiums Estimates for India and Brazil – March 2009

	Sovereign Rating	Default Spread	Relative Equity Market volatility	Composite Country risk premium
Brazil	Ba1	3.00%	$\frac{34\%}{20\%}(6\%) - 6\% = 4.2\%$	$\frac{34\%}{21.5\%}(3\%) = 4.75\%$
India	Ba2	4.00%	$\frac{32\%}{20\%}(6\%) - 6\% = 3.6\%$	$\frac{32\%}{21.3\%}(4\%) = 6\%$

<sup>a</sup>Estimated equity risk premium for the US = 6%

<sup>b</sup>Standard deviations: S&P 500 = 20%; Bovespa=34%; Sensex=32%; Brazilian Bond=21.5%; Indian Bond =21.3%

As we have argued in other venues, the composite estimate is the best estimate of the country risk premium, and we will use those values in the valuations.<sup>5</sup>

### b. Company Risk Exposure

If we accept the proposition of country risk, the next question that we have to address relates to the exposure of individual companies to country risk. Intuition suggests that all companies in a country with substantial country risk should not be equally exposed to country risk. To put this intuition to practical use, we will first look at scaling country risk exposure to established risk parameters such as betas and then lay out a more general process for evaluating the country risk exposure of individual companies.

#### The Beta Approach

For those investors who are uncomfortable with the notion that all companies in a market are equally exposed to country risk, a fairly simple alternative is to assume that a company's exposure to country risk is proportional to its exposure to all other market risk, which is measured by the beta. Thus, the cost of equity for a firm in an emerging market can be written as follows:

Cost of equity= Riskfree Rate+ Beta (Mature Market Premium + Country Risk Premium)

In practical terms, scaling the country risk premium to the beta of a stock implies that stocks with betas above one will be more exposed to country risk than stocks with a beta below one. The advantage of using betas is that they are easily available for most firms

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<sup>5</sup> Damodaran, A., 2010, Equity Risk Premiums: Determinants, Estimation and Implications, 2009, Financial Markets, Institutions & Instruments, v18, no 5, pg 289-370.

but the disadvantage is that while betas measure overall exposure to macro economic risk, they may not be good measures of country risk.

### *The Lambda Approach*

The more general approach to measuring company risk exposure to country risk is to allow for each company to have an exposure to country risk that is different from its exposure to other market risk. For lack of a better term, let us term the measure of a company's exposure to country risk to be lambda ( $\lambda$ ). Like a beta, a lambda will be scaled around one, with a lambda of one indicating a company with average exposure to country risk and a lambda above or below one indicating above or below average exposure to country risk. The cost of equity for a firm in an emerging market can then be written as:

$$\text{Expected Return} = R_f + \text{Beta (Mature Market Equity Risk Premium)} + \lambda (\text{Country Risk Premium})$$

Note that this approach essentially converts our single-factor expected return model to a two-factor model, with the second factor being country risk, with  $\lambda$  measuring exposure to country risk.

Most investors would accept the general proposition that different companies in a market should have different exposures to country risk. But what are the determinants of this exposure? We would expect at least three factors (and perhaps more) to play a role.

A. Revenue Source: The first and most obvious determinant is how much of the revenues a firm derives from the country in question. A company that derives 30% of its revenues from Brazil should be less exposed to Brazilian country risk than a company that derives 70% of its revenues from Brazil. Note, though, that this then opens up the possibility that a company can be exposed to the risk in many countries. Thus, the company that derives only 30% of its revenues from Brazil may derive its remaining revenues from Argentina and Venezuela, exposing it to country risk in those countries. Extending this argument to multinationals, we would argue that companies like Coca Cola and Nestle can have substantial exposure to country risk because so much of their revenues come from emerging markets.

B. Production Facilities: A company can be exposed to country risk, even if it derives no revenues from that country, if its production facilities are in that country. After all, political and economic turmoil in the country can throw off production schedules and affect the company's profits. Companies that can move their production facilities elsewhere can spread their risk across several countries, but the problem is exaggerated for those companies that cannot move their production facilities. Consider the case of mining companies. An African gold mining company may export all of its production but it will face substantial country risk exposure because its mines are not moveable.

C. Risk Management Products: Companies that would otherwise be exposed to substantial country risk may be able to reduce this exposure by buying insurance against specific (unpleasant) contingencies and by using derivatives. A company that uses risk management products should have a lower exposure to country risk – a lower lambda – than an otherwise similar company that does not use these products.

Ideally, we would like companies to provide information about all three of these factors in their financial statements.

The simplest measure of lambda is based entirely on revenues. In the last section, we argued that a company that derives a smaller proportion of its revenues from a market should be less exposed to country risk. Given the constraint that the average lambda across all stocks has to be one (some one has to bear the country risk), we cannot use the percentage of revenues that a company gets from a market as lambda. We can, however, scale this measure by dividing it by the percent of revenues that the average company in the market gets from the country to derive a lambda.

$$\text{Lambda}_j = \frac{\% \text{ of Revenue in country}_{\text{Company}}}{\% \text{ of Revenue in country}_{\text{Average company in market}}}$$

The advantage of this approach is that the information to compute it is usually easily accessible but the disadvantage is its focus on just revenues.

The second measure draws on the stock prices of a company and how they move in relation to movements in country risk. Bonds issued by countries offer a simple and updated measure of country risk; as investor assessments of country risk become more



optimistic, bonds issued by that country go up in price, just as they go down when investors become more pessimistic. A regression of the returns on a stock against the returns on a country bond should therefore yield a measure of lambda in the slope coefficient.

$$\text{Return}_{\text{Stock}} = a + \lambda \text{ Return}_{\text{Country Bond}}$$

Since stock prices should be affected by all aspects of a company's performance, this should yield a more comprehensive measure of lambda. However, it is dependent on the existence of liquid, country bonds and has a large standard error associated with it.

*Illustration 1: Estimating Lambdas – Gerdau Steel and Tata Motors*

To estimate the lambdas for Gerdau Steel and Tata Motors, we started with the revenue approach. In 2008, Gerdau Steel generated 51% of its revenues in Brazil and the rest of its revenues in North America. Tata Motors, on the other hand, generated about 90% of its revenues in India and the balance in other parts of the world. We scaled these numbers to what a typical Brazilian (Indian) company generated in revenues domestically in 2008. Table 3 summarizes the resulting lambdas for Gerdau and Tata Motors:

*Table 3: Revenue-based Lambdas – Gerdau and Tata Motors*

	% of Revenues in domicile	% of Revenues for typical firm in domicile	Lambda
Gerdau Steel	51%	72%	0.79
Tata Motors	90%	78%	1.15

We will assume that neither Gerdau nor Tata Motors has significant country risk exposure in other emerging markets, Gerdau, because the bulk of its remaining revenues are in the United States, and Tata Motors, because it has little revenues outside India.

We also tried the price-based approach for estimating lambdas for Gerdau Steel. Regressing the weekly returns on Gerdau stock, between January 2007 and January 2009, on the weekly returns on the Brazilian government dollar-denominated bond yields the following:

$$\text{Return}_{\text{Gerdau}} = 0.045\% + 0.6250 \text{ Return}_{\text{Brazil \$ Bond}}$$

Based upon this regression, Gerdau has a lambda of 0.625. Lacking a direct measure of country risk for India (since the Indian government does not have dollar denominated bonds outstanding), we did not try this approach for Tata Motors.<sup>6</sup>

### *Risk Estimates in volatile markets*

In the last section, we noted the problems with using estimating the beta (cost of equity) and default risk (cost of debt) in volatile markets, where few companies have bond ratings. Rather than use partial solutions to this problem (such as using betas computed from ADRs), we will draw on approaches that we have used for other groups of companies in this book.

- a. For equity risk parameters: We have repeatedly emphasized the superiority of bottom-up betas (where we start with sector averages and adjust for operating and financial leverage differences) throughout this book. With emerging market companies, this approach provides a lifeline for estimating more meaningful and precise betas. We would however expand on the notion of “comparable firms” to include not only firms that operate in the same business in the country in which the company being valued is domiciled, but companies listed in other markets as well. To those analysts who worry about using the betas computed in other markets (that may be safer or riskier than the company’s home market), we would present two counterpoints. The first is that beta is a relative measure of risk; there is no currency attached to it. The second is that the country risk premium, rather than the beta, will take care of country risk differences. If we accept the proposition that comparable firms can include firms in other markets, the final question to address is whether we should segregate companies, based on whether they are in emerging markets or developed markets. The answer will depend upon the sector in which the company operates. With oil companies or aerospace companies, where operating risks are similar across markets and the products are sold into a global market, we are open to using all companies listed globally, in both developed and emerging markets. With telecommunication or consumer product companies, it can be argued that the same product or service (water,

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<sup>6</sup> We considered running a regression of Tata Motors stock returns against the Indian government credit default swap (CDS) spreads.

electricity, phone service) that is non-discretionary in a developed market can be discretionary in emerging markets, where large proportions of the population may still be lacking these services (but will acquire them, if the economy does well). In these cases, we would use only emerging market companies as our comparable firms, for estimating betas.

- b. For default spread estimates: With unrated companies in the United States, we made the argument for the synthetic rating being the basis for the cost of debt. Since these synthetic ratings were computed using the interest coverage ratio, there is no reason why we cannot do the same for emerging market companies. In effect, we could use the interest coverage ratio for an Indian or Brazilian company to compute a synthetic rating, and then estimate a default spread based upon the rating.<sup>7</sup> There are two estimation issues that have to be confronted in the process. First, the table that we use to estimate the ratings was developed using rated companies in the United States. If we were looking at markets that have interest rates similar to the United States, the table should still provide reasonable ratings. However, in emerging markets that have much higher inflation and interest rates, using this table may result in ratings that are too low even for safe companies.<sup>8</sup> Second, the synthetic rating that we obtain for a company will not reflect the default risk of the country in which the company operates. Consequently, when we compute the cost of debt for an emerging market company, we may have to consider adding two default spreads to the riskfree rate – one for the company's default risk and the other for the country's default risk.

$$\text{Cost of debt}_{\text{Emerging market company}} = \text{Riskfree Rate} + \text{Default Spread}_{\text{Country}} + \text{Default Spread}_{\text{Company}}$$

In effect, a AA rated Argentine company will have a higher dollar cost of debt than a AA rated US company, because the former will have the default spread for Argentina added on to its cost of debt.

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<sup>7</sup> Damodaran, A., 2009, Applied Corporate Finance, Third Edition, John Wiley & Sons.

<sup>8</sup> If the riskfree rate is 12%, interest expenses will be higher for any given level of debt, which in turn will lower interest coverage ratios.

*Illustration 2: Estimating Costs of Debt and Equity – Gerdau Steel and Tata Motors*

To estimate the costs of equity for Gerdau Steel and Tata Motors, we first estimated the average unlevered beta for comparable firms. For Gerdau Steel, we used the average unlevered beta for steel companies listed globally, using the argument that steel is a commodity that is bought and sold on a world market. For Tata Motors, we used the unlevered beta estimated by looking at only emerging market automobile firms (including auto parts firms), since it is very likely that automobiles are far more discretionary in emerging markets than in developed markets (and that emerging market auto firms should therefore have higher betas than developed market auto firms). We then used the debt to equity ratios and marginal tax rates for Gerdau and Tata Motors to estimate the levered betas for the firms. Table 4 summarizes the computation:

*Table 4: Levered Betas – Gerdau Steel and Tata Motors*

	Comparable firms	Unlevered Beta	Firm's Debt to Equity Ratio	Marginal tax rate	Levered Beta
Gerdau Steel	Global steel companies	1.01	138.89%	34.00%	1.94
Tata Motors	Emerging market auto firms	0.77	108.29%	33.99%	1.32

To estimate the dollar cost of equity for Gerdau, we used the US treasury bond rate of 3%, at the time of the analysis, as the riskfree rate, a mature market equity risk premium of 6%, the country risk premium for Brazil of 4.75% and the lambda of 0.625 that we estimated from the regression of stock returns against returns on the dollar denominated Brazilian bond. The resulting cost of equity is 17.61%:

$$\text{Cost of Equity for Gerdau} = 3.00\% + 1.94 (6\%) + 0.625 (4.75\%) = 17.61\%$$

For Tata Motors, we estimated the cost of equity in rupee terms, since the valuation will be in the local currency. To estimate a riskfree rate, we started with the 10-year rupee bond issued by the Indian government that was trading at an interest rate of approximately 8% at the time of this analysis, and subtracted out the 4% default spread that we estimated earlier for India, based upon its rating, to arrive at a riskfree rate in Rupees of 4.00%:

$$\begin{aligned} \text{Riskfree rate in rupees} &= \text{Indian government bond rate} - \text{Default spread for India} \\ &= 8\% - 4\% = 4\% \end{aligned}$$

For the mature market risk premium we stuck with the estimate that we obtained for the United States (roughly 6%). To evaluate the effect of country risk, we used the lambda of 1.15 that we estimated for Tata Motors, based upon its revenues, and the additional country risk premium of 6% that we estimated earlier for India. The resulting cost of capital is summarized below:

$$\text{Cost of Equity in RS for Tata Motors} = 4\% + 1.32(6\%) + 1.15(6\%) = 18.82\%$$

To estimate the cost of debt for the two companies, we estimated the interest coverage ratios for each, using information from their 2008 financial statements, and a synthetic rating based on the interest coverage ratios.<sup>9</sup> We added the default spreads based on these ratings to the country default spreads for Brazil and India (from table 5) to obtain pre-tax costs of debt for the firms in table 6:

*Table 5: Cost of Debt – Gerdau Steel and Tata Motors*

	<i>Interest coverage ratio</i>	<i>Rating</i>	<i>Company default spread</i>	<i>Country Default spread</i>	<i>Cost of debt</i>
Gerdau Steel (\$)	$\frac{8005}{1620} = 4.94$	A-	3.00%	3.00%	9.00%
Tata Motors (Rs)	$\frac{19421}{1756} = 11.06$	AA	1.75%	4.00%	9.75%

As a final step, we used the market values of debt and equity in March 2009 to estimate the weights for the two components and the resulting costs of capital are estimated in table 6:

*Table 6: Debt Ratios and Cost of Capital*

	Cost of equity	After-tax cost of debt	Debt to capital ratio	Cost of capital
Gerdau Steel (US \$)	17.61%	$9.00\%(1-.34) = 5.94\%$	58.45%	10.79%
Tata Motors (Rs)	18.82%	$9.75\%(1-.3399) = 6.44\%$	51.92%	12.38%

For Gerdau, we will use the dollar cost of capital as our discount rate, because we will be doing our valuation in dollars. For Tata Motors, however, we derive a rupee cost of capital of 12.38%. If we wanted to convert this to a US dollar cost of capital, we would have to make assumptions about expected inflation in the US and the emerging market. If

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<sup>9</sup> We used the interest coverage ratio/rating relationship we developed for smaller companies in the United States to estimate the ratings. The default spreads reflect the spreads at the start of 2009.

we assume, for instance, that the expected inflation rate in US dollars is 2% and in Rupees is 3.5%, the cost of capital in US dollar terms for Tata Motors can be estimated as follows:

$$\begin{aligned}\text{Cost of capital}_\$ &= (1 + \text{Cost of capital}_{\text{Local currency}}) \frac{(1 + \text{Exp Inflation}_\$)}{(1 + \text{Exp Inflation}_{\text{Local currency}})} \\ &= 1.1238 \left[ \frac{1.02}{1.035} \right] - 1 \\ &= 10.75\%\end{aligned}$$

In summary, the secret to moving consistently from one currency to another and from nominal to real numbers is to ensure that the cash flows and discount rate have the same expectation of inflation built into them.

### ***Filling in Information Gaps***

We are far more likely to find critical pieces of information missing with emerging market companies than with developed market companies. Rather than ignore missing items, we should make the most reasonable and consistent estimates we can for these inputs. In this endeavor, the following might help:

- a. Alternate Estimates: Even if there is no information provided in one part of the financial statements, there may be clues or data in other parts that can be used to plug the hole. For example, some emerging market companies do not have statements of cash flows; they have income statements, balance sheets and statements of changes in equity. While we normally obtain our estimates of capital expenditures from the cash flow statement, we can estimate the gross(net) capital expenditure from the balance sheet by looking at the change in gross (net) fixed assets from period to period. Similarly, the absence of a reported effective tax rate can be easily remedied by looking at the taxes paid and taxable income in the income statement.
- b. Current year clues: Lease expenses are financial expenses, and the present value of lease commitments, discounted back at the pre-tax cost of debt, should be considered debt. In the United States and many other developed markets, where companies report lease commitments for the future in the footnotes to the financial statements, this is easy to do. However, many emerging market companies do not provide this information. Rather than assume that these

companies have no lease commitments, we could assume a reasonable life for the leases, given normal leasing terms in that market, and then extrapolate this year's lease or rental expense as annuities over this period.<sup>10</sup>

- c. Look at industry averages: When critical information needed to value a company is missing, it may help to look at companies in the sector in the same or other markets, that have fuller information available on them. For a steel company that does not provide key information on inventory or accounts receivable, we could use the data from other steel companies to make estimates. Thus, if non-cash working capital at the comparable companies is 3% of revenues, we can use that number to value the company with missing information.
- d. Ensure consistency with your other inputs: When valuing companies, it is just as critical that we ensure that the inputs are internally consistent as it is that we estimate each input well. Put another way, if we assume a high expected growth rate for an emerging market company, where little or no information is provided on capital expenditures, we have to assume a high reinvestment rate to sustain that growth rate. With emerging market companies that have missing or unreliable data, a case can be made that our inputs should be less reflective of what we see in the financial statements and more driven by the fundamentals.

In closing, though, we cannot let managers at emerging market companies off the hook when they fail to provide critical information. While their defense is that information disclosure laws in their markets are weak, note that these laws put a floor on what you can reveal to investors and not a ceiling. There is nothing that prevents an emerging market company from providing information on cross holdings or leases to investors. We should be more willing to use the threat that we will assume the worst, when information is withheld, and carry through on the threat.

### ***Dealing with poor corporate governance***

To evaluate how best to deal with corporate governance, we should consider why governance matters. In markets with good corporate governance, bad managers will be quickly replaced and their practices reversed by new management. To value control, we

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<sup>10</sup> In most markets, lease periods are standardized. Most retail leases in the United States, for instance, are 10-12 years. In emerging markets, the lease periods may be shorter.

can estimate two values for a firm –the status quo value (based upon incumbent managers running the firm) and optimal value (based upon a new and better management team running the firm) - and the value of the firm will be a weighted average of these two numbers, with the weights reflecting the likelihood of control changing. That framework should stand us in good stead, when valuing emerging market companies that operate in weak corporate governance environments.

Consider the extreme scenario first, where management changes are impossible (either because all the voting shares are held by incumbent managers or institutional considerations). The value of every firm in this market will be its status quo value. If a firm is badly managed, we are in effect locked into that poor management in perpetuity (or at least until they drive the firm to ruin). In practical terms, the implications of poor corporate governance on the valuation of emerging market companies are as follows:

- a. Reinvestment and Growth: If incumbent managers have made value-destroying investments in the past, they will continue to do so, essentially forever. Thus, if a firm with a cost of capital of 9% has invested in projects that generate a return on capital of 6%, it will do so in the future, which will result in long term value destruction.
- b. Financing optimization: There is potential for increasing value by optimizing the mix of debt and equity used to fund the business. Thus, a firm with a debt ratio of 10% might be able to have a higher value, if it employs a debt ratio of 30%. When valuing developed market companies, analysts often use target debt ratios in valuation, with the implicit assumptions that firms that are not at the target will feel pressure from stockholders to move that target. With weak corporate governance, this assumption can be dangerous. Instead, we would be better served leaving debt ratios where they are now and estimating lower values for these companies.

If we incorporate the bad practices of management into our valuation inputs (through the return on capital, growth rates and cost of capital), we have, in effect, already discounted the firm's value for poor corporate governance and any additional discounts will be double counting.



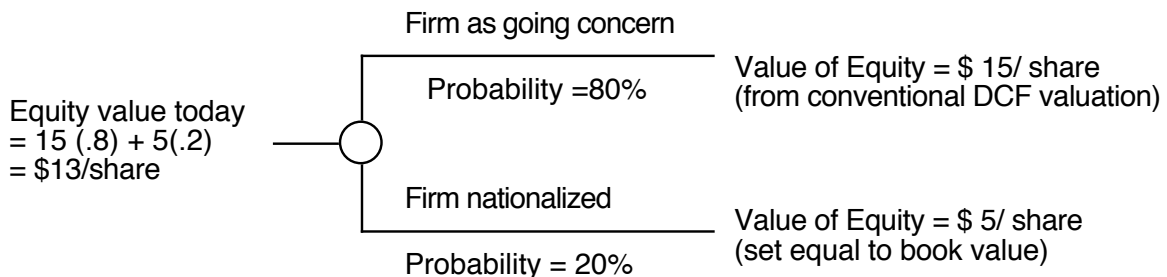
The advantage of this approach is that it allows us to respond to changes in corporate governance rules and standards, both at the company level and for the entire market. Thus, a Brazilian company that eliminates voting differences across shares can be revalued easily. While the status quo and optimal values themselves might not have changed, the probability of control shifting has increased and the expected value of the firm should reflect this. As the laws and regulations governing firms changes in many emerging markets, it behooves us to be flexible in how we deal with corporate governance in valuation.

***Adjusting for discontinuous risk***

In some emerging markets, a significant concern may be that the firm will be expropriated or nationalized, leaving equity investors with a fraction of their fair value, or subject to catastrophic risk (from a terrorist attack, for instance). While we may be tempted to try to bring these risks into the costs of debt and equity, discount rates are not designed to carry this kind of risk; there is no easy way to adjust the beta or the default spread for a risk that could effectively end the cash flow streams.

In probabilistic analysis, there is a technique, decision trees, that may be useful in this context. Consider the nationalization threat. We could develop a decision tree that reflects the risk and the payoffs, in the event of nationalization (see figure 2):

*Figure 2: Effect of Nationalization on Value*



In valuing the firm under the “going concern” branch, we can act as if that threat does not exist. Hence, our discount rates and expected cash flows will not be affected by the possibility of nationalization. The nationalization branch is where we bring our concerns about lost value to the analysis through two inputs – the probability of nationalization and the consequences for equity value of the nationalization.

1. Probability of nationalization. Unfortunately (or fortunately), this is not an exercise in financial analysis but one of political assessments. By looking at a

government's past history, we can extract some information on what types of firms have been nationalized and how frequently. Thus, we may conclude that the threat is nationalization is greater for natural resource firms (that are trapped by geography) than for technology firms.

2. Consequences for nationalization: The same historical record that we scoured for the probability of nationalization carries information on how much equity investors in these firms will receive in the event of nationalization. In some countries, for instance, equity investors in nationalized companies are entitled to book value (which may be well below market value). In others, they may receive nothing.

In the final assessment, we compute an expected value across both scenarios and use that as our value for the firm.

### *Illustration 3: Valuing Tata Motors*

We valued Tata Motors in Indian rupees, using the 2008 financial statements (with December 31, 2008, as the ending date) as the basis for the valuation. The steps in the valuation are described below:

a. Base year numbers: In 2008, Tata Motors reported pre-tax operating income of Rs 19,421 million on revenues of Rs 284,349 million; interest expenses amounted to Rs 1,756 million and the marginal tax rate (for India) was 33.99%. The return on capital for the year was computed to be 10.43%, based upon the book values of equity (Rs 68,698 m), debt (Rs 60,130 m) and cash (Rs 5,888 m), at the beginning of the year:

$$\text{Return on capital} = \frac{19421 (1 - .3399)}{(68698 + 60130 - 5888)} = .1043$$

Note that this number is lower than the cost of capital of 12.38% that we estimated in illustration 2 for Tata Motors. The capital expenditures for the year were augmented by the acquisition of Jaguar and amounted to Rs 22,034 million, significantly higher than the depreciation of Rs 6,478 million for the year; the non-cash working capital increased by Rs 1,000 million.<sup>11</sup> The resulting reinvestment rate for the year is 129.14%.

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<sup>11</sup> The change in non-cash working capital for the year was estimated using the non-cash working capital as a percent of revenues (5.60%) and the change in revenues from 2007 to 2008.

$$\text{Reinvestment Rate} = \frac{(22034 - 6478 + 1000)}{19421(1 - .3399)} = 129.14\%$$

b. Forecasted growth and cash flows: In forecasting the growth rate, we assumed that the reinvestment rate would decline to 80% for the next 5 years, since it is unlikely that the firm will replicate the Jaguar acquisition each year.<sup>12</sup> We also assumed that the return on capital would stay at its existing level (or 10.43%) for the high growth period, resulting in an expected growth rate of

$$\text{Expected growth rate} = \text{Reinvestment Rate} * \text{Return on capital} = .80 * .1043 = 8.34\%$$

The expected free cash flows to the firm for the next 5 years are summarized in table 7 below:

*Table 7: Expected Free Cash flows for next 5 years – Tata Motors*

Year	1	2	3	4	5
EBIT (1-t)	RS 13,889	RS 15,048	RS 16,303	RS 17,663	RS 19,137
- Reinvestment	RS 11,111	RS 12,038	RS 13,043	RS 14,131	RS 15,309
FCFF	RS 2,778	RS 3,010	RS 3,261	RS 3,533	RS 3,827

Note that the after-tax operating income is estimated using the 8.34% growth rate each year and that we have consolidated the net capital expenditures and working capital investments into one item (reinvestment) and set it to 80% of after-tax operating income.

c. Stable growth: After year 5, Tata Motors is assumed to be in stable growth, growing 4% a year (still in Indian rupees and capped at the Indian rupee riskfree rate). The beta is expected to drop to 1.20, the mature market equity risk premium will stay at 6% and the country risk premium will decline to 4% (from 6%) and the in perpetuity. While the debt ratio remains unchanged at 51.99%, the cost of debt will decline from 9.75% to 9%, resulting in a cost of capital of 10.67%.<sup>13</sup> We will assume that the firm will continue to generate its current return on capital of 10.43% in perpetuity. While this is lower than the cost of capital and thus represents permanent value destruction, the structure of governance at the company is such that there is little that can be done to change management. The terminal value can be computed with these inputs:

<sup>12</sup> To compute this number, we looked at the average reinvestment rate over the last 5 years at Tata Motors.

<sup>13</sup> Stable cost of equity = Riskfree Rate + Beta (Mature ERP)+ Lambda (Country risk premium)  
 $= 4\% + 1.20 (6\%) + 1.15 (4\%) = 15.80\%$

Stable cost of capital = 15.80% (.4801) + 9.00% (1-.3399) (.5199) = 10.67%

$$\text{Reinvestment Rate} = \frac{\text{Stable Growth Rate}}{\text{Stable ROC}} = \frac{4\%}{10.43\%} = 38.36\%$$

$$\begin{aligned} \text{Terminal value} &= \frac{\text{After - tax Operating Income}_5 (1 + g_{\text{stable}})(1 - \text{Reinvestment Rate})}{(\text{Cost of capital}_{\text{stable}} - g_{\text{stable}})} \\ &= \frac{19,137(1.04)(1 - .3836)}{(.1067 - .04)} = \text{Rs } 183,809 \text{ million} \end{aligned}$$

**c. Firm and equity valuation:** To get to the firm value, we discount the cash flows and the terminal value back at the current cost of capital of 12.38%, in table 8:

*Table 8: Present Value of Cash flows – Tata Motors*

Year	1	2	3	4	5
FCFF	RS 2,778	RS 3,010	RS 3,261	RS 3,533	RS 3,827
Terminal Value					RS 183,809
Present Value (@12.38%)	RS 2,472	RS 2,383	RS 2,297	RS 2,215	RS 104,675
Value of Operating Assets	RS 114,042				

To the value of the operating assets (Rs 114,042 million) we add the current cash balance (Rs. 26,644 m), and the value of Tata Motor's cross holdings in other Tata firms, estimated to be Rs 49,103 million.<sup>14</sup> Subtracting the estimated market value of debt outstanding (Rs 80,933 million) and dividing by the number of shares outstanding (449.82) results in a value per share of Rs 242.

$$\text{Value per share} = \frac{114,042 + 26,644 + 49,103 - 80,933}{449.82} = \text{Rs } 242/\text{share}$$

While this is significantly higher than the stock price of Rs 166/share, prevailing in March 2009, there are two concerns that we have about making this judgment. The first is that a large portion of the value of the stock comes from cross holdings in other Tata companies. While we have assigned a value of Rs 49,103 million to these holdings, we have really not taken a close look at any of the companies from which this value is derived. The second is that while we have built in some of the aspects of poor corporate governance into the value, by keeping the return on capital below the cost of capital in perpetuity and the debt ratio at the existing level, we remain exposed to other actions on the part of management that may destroy value further.

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<sup>14</sup> The value of the cross holdings is set equal to its balance sheet figure. Optimally, we would have liked to value these cross holdings independently, but there were (a) too many holdings and (b) insufficient information to do this effectively.

*Illustration 4: Valuing Gerdau Steel*

As we noted earlier, we chose to value Gerdau Steel in US dollars, partly because of the difficulties we faced in estimating risk free rates and risk premiums in Brazilian reais (R\$). We used the 2008 financial statements and exchange rates at the time of the statements to convert the cashflows in R\$ to US dollars.

- a. Base year numbers: In the 2008 financial year, Gerdau reported operating income of R\$ 8,005 million, after depreciation of R\$ 1,896 million and interest expenses of R\$ 1,620 million. During the year, acquisitions and internal investments combined to create capital expenditures of R\$ 6,818 million and non-cash working capital increased by R\$ 1,083 million. Gerdau earned an after-tax return on capital of 18.68%, based upon a marginal tax rate (for Brazil) of 34%, and start-of-the-year book values for equity of R\$17,449 million, book value of debt of R\$ 15,979 million and a cash balance of R\$ 5,139 million:

$$\text{Return on capital} = \frac{8005 (1 - .34)}{(17449 + 15979 - 5139)} = .1868$$

$$\text{Reinvestment Rate} = \frac{(6818 - 1896 + 1083)}{8005(1 - .34)} = 113.66\%$$

- b. Forecasted growth and cash flows: We do not believe that either the return on capital or the reinvestment rate is sustainable in the long term. Consequently, we use a reinvestment rate of 60% and a return on capital of 16% to estimate the expected growth rate of 9.60%, in R\$, for the next 5 years.

$$\text{Expected growth rate} = \text{Reinvestment Rate} * \text{Return on capital} = .60 * .16 = .096$$

We use this expected growth rate to estimate expected cash flows for the next 5 years, in R\$, in table 9:

*Table 9: Expected Free Cash flows in R\$: Gerdau Steel*

Year	1	2	3	4	5
EBIT (1-t)	R\$ 5,790	R\$ 6,346	R\$ 6,956	R\$ 7,623	R\$ 8,355
- Reinvestment	R\$ 3,474	R\$ 3,808	R\$ 4,173	R\$ 4,574	R\$ 5,013
FCFF	R\$ 2,316	R\$ 2,539	R\$ 2,782	R\$ 3,049	R\$ 3,342

Again, the reinvestment each year is the consolidated value of net capital expenditures, acquisitions and investments in working capital, and amounts to 60% of after-tax operating income each year.

- c. Conversion to U.S. dollars: To convert the cash flows in R\$ to US dollars, we start with the current exchange rate of R\$ 2.252/ \$ but forecast exchange rates for future years based upon expected inflation rates of 2% in US dollars and 5% in BR. The resulting expected exchange rates and cash flows in US dollars are reported in table 10:

*Table 10: Expected Free Cash Flows in US dollars: Gerdau Steel*

Year	1	2	3	4	5
FCFF (in R\$)	R\$ 2,316	R\$ 2,539	R\$ 2,782	R\$ 3,049	R\$ 3,342
Expected Exchange rate	2.32	2.39	2.46	2.53	2.60
FCFF (In US \$)	R\$ 999	R\$ 1,064	R\$ 1,133	R\$ 1,206	R\$ 1,284

The difference in expected inflation results in R\$ depreciating in value, relative to the US dollar, over the 5-year period.

- d. Stable growth: In stable growth, we assume that Gerdau will grow 3% a year, in dollar terms, and that its return on capital in stable growth will converge on its cost of capital (also in dollar terms). To estimate the dollar cost of capital in stable growth, we assume that the stock will have a beta of 1.20 and that the country risk premium will decline to 3%. Using a debt ratio of 50% and a cost of debt of 8%, we estimate a cost of capital of 8.68%.<sup>15</sup> To estimate the terminal value, we first compute the after-tax operating income in dollar terms in year 5:

$$\text{\$ EBIT (1-t)} = \frac{\text{EBIT (1-t) in R\$}}{\text{R\$/\$}_{\text{year5}}} = \frac{8,355}{2.60} = \$3,213$$

We then compute the reinvestment rate and terminal value:

$$\text{Reinvestment Rate} = \frac{\text{Stable Growth Rate}}{\text{Stable ROC}} = \frac{3\%}{8.68\%} = 34.57\%$$

$$\begin{aligned} \text{Terminal value} &= \frac{\text{After-tax Operating Income}_5 (1 + g_{\text{stable}})(1 - \text{Reinvestment Rate})}{(\text{Cost of capital}_{\text{stable}} - g_{\text{stable}})} \\ &= \frac{\$3,213(1.03)(1 - .3457)}{(.0868 - .03)} = \$ 38,096 \text{ million} \end{aligned}$$

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<sup>15</sup> Cost of equity in stable growth = 3% + 1.20 (6%) + 0.625 (3%) = 12.08%  
 Cost of debt in stable growth = 8% (1-.34) = 5.28%  
 Cost of capital in stable growth = 12.08% (.50) + 5.28% (.50) =

- e. Firm and Equity Valuation: To complete the analysis, we first discount the expected cash flows in US dollars at the cost of capital of 10.79% (in figure 11), that we estimated for Gerdau (in dollar terms) in illustration 2:

*Table 11: Expected Cash flows and Present Value*

Year	1	2	3	4	5
FCFF (In US \$)	R\$ 999	R\$ 1,064	R\$ 1,133	R\$ 1,206	R\$ 1,284
Terminal value					38,096
Present Value @ 10.79%	\$902	\$867	\$833	\$800	\$23,595
Value of operating assets	\$26,996				

To get to firm value, we add in dollar value of the cash holdings of the firm (\$2,404 million) and subtract out the dollar value of debt (\$9.788 million), with the conversion at today's exchange rate. Since Gerdau has consolidated holdings, we subtract out the estimated market value of the minority interest in these holdings of \$2,599 million (in dollar terms) and then divide by the number of shares outstanding (1681.12 million) to arrive at a dollar value per share of \$10.12:<sup>16</sup>

$$\text{Value per share} = \frac{26,996 + 2,403 - 9.788 - 2,599}{449.82} = \text{R\$}10.12/\text{share}$$

Converted at today's exchange rate of 2.252 R\$/\$, we arrive at an estimate of value of R\$ 22.79/ shares, making it significantly under valued at the price of R\$9.32/share at which it was trading in March 2009.

### **Relative Valuation**

When valuing companies on a relative basis in emerging markets, we face two problems. The first is that there may be very few comparable firms, especially if we define comparable to mean firms in the same business and in the same emerging market. The second is that there can be large differences on fundamentals– risk, cash flows and growth – across the firms, even if we stay within the same market, but especially so, if we try to expand our sample to bring in companies from other markets. In this section, we will consider ways in which we can mitigate both problems.

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<sup>16</sup> Optimally, we would have liked to value the consolidated holdings and estimated the value of the minority interests. Since we were missing much of the information to be able to do this, we applied a price to book ratio of 1.20 (based on the price to book ratio of businesses that the cross holdings were in) to the book value of the minority interests.

### ***Emerging Market Comparables***

When valuing an Indian retail companies, it seems logical that we should look at how the market is pricing other Indian retail companies. Similarly, when pricing an Argentine bank, logic would suggest that we should look the multiples of earnings at which other Argentine banks trade. Following up, when valuing an emerging market company, it does make sense to start with a narrow definition of comparable firms, i.e. other companies operating in the same business in the same market. There are, however, three considerations that should enter into this process:

- a. Size of sample: In many of the smaller emerging markets, there will be only a handful of companies that come through as comparable, if we define this group to include firms in the same market and in the same business. As a general rule, relative valuation based upon sample sizes that are in the single digits are precarious, simply because we are making judgments on limited data. There are three techniques we can use to increase sample size. In the first, we can look at other publicly traded companies that form part of the economic chain that binds this business together. Thus, we can use auto parts manufacturers and auto distributors as comparable firms, when looking at automobile companies. In the second, we can expand the sample geographically to include firms in the same business in other emerging markets. Thus, we can consider all retail firms in Latin America as comparable firms, when analyzing a Chilean retail firm. In the third, we stay within the same market and consider all firm in that market to be comparable, while using regressions to control for differences in risk, growth and cash flows.
- b. Differences across firms: Even when we can get large numbers of firms into the comparison, there can be big differences across these firms on risk and growth characteristics that can make any comparison that does not control for them subject to error. When comparing the Chilean retail firm to other Latin American retail firms, we have to deal with the differences in risk across Latin America. In earlier papers on valuing growth and distressed companies, we used statistical tools (regressions) to control for these differences. In the case of emerging market companies, we will find more use for these same tools.



- c. Liquidity/ Pricing issues: In many emerging markets, only the top tier of stocks are liquid and widely traded and smaller companies often are illiquid and are closely held. If the stock prices at these companies reflect the illiquidity and the lack of diversification on the part of their owner/managers, we can get widely divergent answers when we compare PE ratios or EV/EBITDA multiples, depending upon how we define our comparable firms. In fact, we should be controlling for differences in liquidity (using trading volume or the bid ask spread as proxies) when making comparisons across firms.

*Illustration 5: Valuing Tata Motors - Indian Auto firms*

In March 2009, Tata Motors was trading at a price of Rs 166/share, representing a multiple of 6.2 of earnings per share in the most recent 12 months. To judge its relative value, we compared Tata Motor's PE ratio to the PE ratios of other Indian automobile companies in table 12:

*Table 12: Indian automobile companies*

Company Name	Market Capitalization (Millions of Rs)	PE	Beta	Turnover Ratio
Atlas Honda Ltd.	RS 2,736	9.22	0.26	1.06%
Atul Auto Limited	RS 137	9.25	1.30	17.09%
Bajaj Auto Ltd.	RS 76,781	8.54	0.80	10.02%
Hero Honda Motors Ltd.	RS 189,072	16.25	0.44	9.26%
Hindustan Motors Ltd.	RS 1,800	3.94	1.22	47.30%
Indus Motor Co. Ltd.	RS 3,317	5.01	0.40	38.80%
Maharashtra Scooters Ltd.	RS 734	7.18	0.97	6.58%
Mahindra & Mahindra Ltd.	RS 91,954	4.88	0.79	11.94%
Majestic Auto Ltd.	RS 230	4.86	0.85	4.81%
Maruti Suzuki India Ltd	RS 195,230	9.09	0.56	19.73%
Pak Suzuki Motor Co. Ltd.	RS 2,539	2.65	0.59	21.26%
<b>Tata Motors</b>	<b>RS 74,737</b>	<b>3.05</b>	<b>1.48</b>	<b>24.50%</b>

The problems with running comparisons across these companies are clear when we look at the immense difference in market capitalization and liquidity (as measured by the turnover ratio) at these firms. In fact, most of the firms in this sample are very small, lightly traded companies and only four companies represent true comparables to Tata Motors – Hero Honda, Mahindra & Mahindra, Bajaj Auto and Maruti Suzuki. Of these companies, Hero Honda seems to be the outlier (with a PE of 16.25), but Tata Motors

seems has the lowest PE in this group. The small size of the sample does make us reluctant to draw any conclusions.

To expand on the analysis, we ran a regression of PE ratios against fundamentals – beta, growth rate in earnings per share (g) and payout ratio – across all publicly traded Indian companies with data available on these items in January 2009.<sup>17</sup> The resulting regression is summarized below:

$$\text{PE} = 4.91 g - 8.63 (\text{Beta}) + 74.41 (\text{Payout Ratio}) \quad R^2 = 95.3\%$$

(1.77)    (4.40)            (57.4)

Plugging in the values for Tata Motors (g=10%, Beta =1.32, Payout ratio =29%) into this regression, we get a predicted PE ratio of 5.48:

$$\text{PE} = 4.91 (.10) - 8.63 (1.32) + 74.41 (.29) = 10.68$$

Since this is lower than the current PE of 3.05, this would make Tata Motors significantly undervalued (by more than 70%).

### ***Developed Market Comparables***

When valuing emerging market companies in some sectors, analysts have to expand their sample to include developed market firms. This would be the case, for instance, if we were valuing Embraer, a Brazilian aerospace company; almost every other publicly traded company in this space is in a developed market. In other cases, analysts choose to use only developed market companies, simply because they do not trust the prices or multiples that they observe in emerging market counterparts.

When we value an emerging market company, using a sample of primarily developed market companies, there are three issues that we have to confront.

- a. Accounting standards: The first relates to accounting differences between emerging and developed markets and the effect that they have on the scaling variable – earnings per share, EBITDA or book value. Comparing the accounting earnings of a Brazilian firm to that of a US firm may not represent a fair comparison, because accounting standards vary across these two countries.
- b. Risk Differences: Earlier in this paper, we noted the difference in country risk and the resulting country risk premiums can cause companies in the same business in

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<sup>17</sup> Since expected growth rates were not available for most firms in the sample, we used the historical growth rate in earnings per share over the last 5 years as the proxy for growth.

emerging and developed markets to have very different discount rates (even in the same currency). The higher discount rates at emerging market companies should lead them to trade at lower multiples of earnings, revenues and book value than otherwise similar developed market companies.

- c. Macro differences: To the extent that expected inflation and interest rates vary across markets, there can be significant differences in the multiples at which firms trade at markets. In general, we would expect companies to trade at much higher multiples of earnings, in low interest rate environments, than in high interest rate environments.

To legitimately compare emerging market companies to developed market companies in the same business, we therefore have to do the following:

1. Adjust the scaling variable to reflect accounting differences: If the emerging market company has an depository receipt (ADR) listed in the US, the company has to restate its earnings using US accounting standards, thus bringing it into line with the developed market companies in the sample. If it does not have a developed market listing, we have to attempt to make the numbers more comparable by restating the earnings of the emerging market company, to reflect at least the biggest differences in accounting differences.
2. Control for country risk: There are two ways we can adjust for country risk. One is to bring country risk into the comparison explicitly, using country ratings or default spreads as proxies for this risk. In effect, we can examine whether and how much of the differences in PE ratios across companies can be explained by differences in country ratings or default spreads. Another is to divide the overall sample of comparable firms into developed and emerging market subgroups and to examine what the market is charging as a discount for emerging market risk. Thus, if the average PE ratio for developed market chemical companies is 10.50 and the average PE ratio for emerging market chemical companies is 7.00, the market discount for emerging market companies is 33%.
3. Control for interest rates and inflation: As we noted earlier in this paper, differences in interest rates and inflation become an issue only when we use different currencies for different companies. Comparing the PE ratio for an Indian

company, computed using Indian rupee market price and earnings, to the PE ratio for a US company, where both numbers are stated in US dollars, can be problematic. If the company has an ADR listed in the US, the problem resolves itself, since all of the numbers are stated in US dollar terms. If not, we have to explicitly adjust for differences across markets.

*Illustration 6: Valuing Gerdau Steel: Steel companies listed in the United States*

Gerdau Steel has an ADR listed on the New York Stock Exchange. In table 13, we compare the EV/EBITDA multiple for Gerdau to the multiples of EBITDA of other steel companies listed in the United States.

*Table 13: EV/EBITDA Multiples – Steel Companies in January 2009*

Company Name	EV/EBITDA	ROC	Tax Rate	Debt/Capital
AK Steel Holding	0.83	69.33%	34.43%	40.91%
Schuff International Inc	1.08	51.45%	34.89%	33.55%
Shiloh Inds.	1.38	14.55%	44.00%	63.73%
Mueller (Paul) Co	1.53	42.08%	37.65%	6.95%
Carpenter Technology	1.80	31.66%	32.56%	26.87%
Unvl Stainless & Alloy Prods	1.97	20.31%	32.74%	4.28%
Ampco-Pittsburgh	2.19	33.30%	32.78%	5.86%
Castle (A.M.) & Co.	2.28	14.78%	40.23%	26.85%
Schnitzer Steel Inds 'A'	2.29	24.46%	36.39%	16.15%
ArcelorMittal	2.37	19.20%	20.41%	48.23%
Posco ADR	2.43	19.43%	26.01%	22.69%
Reliance Steel	2.72	16.08%	37.64%	43.81%
U.S. Steel Corp.	3.07	16.42%	19.87%	45.11%
Olympic Steel Inc.	3.37	11.85%	37.61%	9.16%
Tenaris S.A.	3.53	25.87%	28.75%	25.69%
Canam Group Inc	3.54	13.71%	39.26%	17.85%
Commercial Metals	3.65	13.26%	30.96%	50.53%
Samuel Manu-Tech Inc.	3.85	9.83%	25.47%	41.25%
General Steel Holdings Inc	3.85	29.79%	12.32%	50.13%
Steel Dynamics	4.07	14.71%	37.39%	51.14%
Nucor Corp.	4.29	33.23%	34.68%	14.22%
Moro Corp	4.49	11.65%	40.98%	51.28%
<b>Gerdau Ameristeel Corp</b>	<b>4.60</b>	<b>10.87%</b>	<b>30.54%</b>	<b>51.60%</b>
Worthington Inds.	4.64	11.57%	26.51%	30.70%
Russel Metals Inc.	4.72	14.63%	35.42%	14.49%
Cliffs Natural Res.	5.14	22.93%	22.09%	17.70%
Gibraltar Inds.	5.17	6.88%	38.55%	61.29%
Northwest Pipe Co	7.92	7.99%	36.33%	25.20%
Great Northern Iron Ore	8.40	245.00%	0.00%	0.00%
Omega Flex Inc	13.52	57.23%	37.94%	0.00%

The median EV/EBITDA across the sample is 3.6, indicating that Gerdau is expensive, relative to the average steel company in the United States.

There are several problems in this relative valuation that are difficult to overcome. One is that the comparable companies here include both US companies and foreign steel company listings. To the extent that country risk can vary across the foreign listings, the multiples will be affected. The other is that steel companies in the United States are not only mature businesses, with low growth potential, but generate widely divergent returns on capital on existing assets.

## **Conclusion**

As corporations and investors globalize, more and more of the companies that we value are in emerging markets. In valuing these companies, we face four issues – working with local currencies that are unstable and where riskfree rates can be difficult to estimate, an overlay of country risk, an absence of key information required for valuation and poor corporate governance. In many emerging market company valuations, we see either an unwillingness to confront these issues (ignore accounting differences and corporate governance issues) or the adoption of simplistic rules (such as adding a country default spread on to the cost of equity of every company in a market to reflect country risk).

In this paper, we develop a systematic framework for valuing emerging market companies. We begin by choosing a currency to do the valuation in, and staying consistent to that choice, both in how we estimate the riskfree rate and also in the way we estimate the other parameters in the valuation. We follow up by measuring a country risk premium that reflects the additional risk of investing in an emerging market, and then determining how exposed a specific company in that market is to that country risk (though the use of a beta or lambda). We also argue for using a sector-based beta, to estimate the cost of equity, to avoid the skewed values that will emerge from a conventional regression against a narrow, local index. With missing information, we either look for an alternative measure for the data, based upon existing financial statements, or use the link between growth and fundamentals to estimate the absent inputs. There is no explicit adjustment that we make for poor corporate governance, since the cash flows and discount rates of the company today should reflect not only the quality

of management but also the change that the management can be changed. Finally, if the threat of nationalization or terrorism overhangs the value, we can account for its likelihood by first estimating the probability of the event (nationalization, terrorism) occurring and the effect on value (firm, as well as equity).

In the last part of the paper, we examined the relative valuation of emerging market companies. In the event that there are a large number of publicly traded companies in the sector and in the same market that the company operates, our task may seem simple: estimate the multiple of earnings, book value or revenues that investors are paying for the company being analyzed and compare this value to the multiples other companies trade at in the same market. The problem that we face is that these companies have significant differences on both valuation fundamentals and liquidity that can lead to variance in multiples. When comparing emerging market companies to developed market companies, we noted the need to control for differences in accounting standards and betas.

In closing, the principles for valuing emerging market companies are the same as those for valuing developed market companies, but the estimation challenges are more daunting. As long as we keep the estimation issues in perspective, we should still be able to value emerging market companies, using both intrinsic and relative valuation techniques.