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A firm's weighted average cost of capital is an integral component in capital budgeting decisions and in assessment of the firm's enterprise and equity value. Estimation of the cost of equity is a key component in determining the overall cost of capital. The calculation of the cost of equity for U.S. based corporations is relatively straightforward and is most often estimated as a function of the U.S. risk-free rate, the firm's beta value, and an estimate of the average risk premium associated with equity investments compared to risk free assets. Since U.S. financial markets are fairly liquid and reasonably efficient, estimates of the required input variables are relatively reliable. In contrast, the estimation of equity capital costs for corporations based in emerging markets presents many challenges. Emerging markets are often characterized by additional risks including political risks and the risks associated with operating in markets that are less liquid and transparent than mature markets. This leads to issues in identifying appropriate and reliable measures of the risk free rate, beta and the equity risk premium. In this paper we describe five commonly used approaches to estimate the cost of equity for firms based in emerging markets and then apply these to three firms headquartered in Brazil. The results show that the approach selected can have a significant impact on the resulting estimate of the firm's cost of equity. This case study may be of interest to practitioners and to students in financial management, investment, valuation and international finance courses.

THE TASK

It is early 2016. Your task is to estimate the weighted average cost of capital of 3 Brazilian firms: Embraer, Brasil Foods and Via Varejo. All firms report in local currency.

Embraer is an aerospace conglomerate that earns approximately 20% of its revenues from Brazil.

Brasil Foods produces and processes foods and earns about 40% of its revenues from Brazil.

Via Varejo retails household appliances and electronics through retail stores and earns all its revenues in Brazil.

INTRODUCTION

Estimation of the cost of capital is central to financial management and investment decisions including capital budgeting and firm valuation. A firm's weighted average cost of capital is its average cost of raising funds and is a function of its capital structure – the relative portions of debt and equity used – and the firm's cost of debt and equity.

The most common approach used in developed markets to estimate the cost of equity component of the WACC is a single factor model where the cost of equity, Ke, is a function of a risk free rate, Krf, a risk premium earned on equity investments (ERP) compared to the rate earned on risk free investments and beta, a measure of the volatility of the stock's returns.

*Ke = Krf + (ERP * Beta)*

Discussions of cost of equity estimates in developed markets surround:
➤ Whether to use a single or multifactor model
➤ Which risk free rate to use: 5, 10, 30 year U.S. government yield
➤ How to estimate beta
➤ Determination of the equity risk premium

The approach selected will impact the results but as Campbell Harvey (2005) notes, "In countries like the U.S., the different methods often yield similar results."

There is much less agreement on the appropriate approach to determining equity capital costs in emerging markets. Campbell Harvey (2005) critically reviewed twelve different approaches to estimate the international cost of equity capital and demonstrates that the various methods produce widely varying results. Mark Humphrey Von Jenner (2008) described six models for estimating the cost of equity in emerging markets and recommends one of two approaches depending on whether the investor diversifies internationally. Niso Abuaf (2011) notes that in his almost twenty years working as an investment banker, the CAPM is the technique primarily used to estimate the cost of equity. He then develops an extension of the CAPM model to incorporate a factor related to political risk. Depending on which approach is used, the resulting cost of equity can vary quite significantly.

In this paper we consider:
➤ What is currently common practice when estimating the cost of equity in emerging markets?
➤ How is country risk incorporated into the cost of equity calculation?
➤ A case study approach to estimating the cost of equity for three Brazilian firms using five common approaches.

Cost of Equity in Emerging Markets

Emerging market investments expose investors to additional risks which are commonly called "country risk". The essential questions are which risks do investors demand compensation for and how much additional return is required?

Potential risks include:

Financial markets which are illiquid and lack transparency
Less developed regulatory, corporate governance and legal framework
Inability to repatriate earnings
Economic uncertainty
War and/or political instability
Risk of expropriation of assets

Attempts to incorporate these risks into a model leads to confusion because there are many options related to estimating the cost of equity in practice.

Common questions include:

➢ Should country risk be incorporated through:
  o beta in a single factor model (assumes beta will reflect exposure to country risk)
  o the addition of a second factor reflecting a premium for country risk
  o the risk free rate by using the yield on sovereign debt
  o the equity risk premium (ERP) where this is estimated by country
  o the equity risk premium (ERP) where this is estimated based on the countries where revenues are generated or assets are located
➢ Should the risk free rate be estimated as:
  o the US ten-year yield
  o the US ten-year plus an inflation differential to reflect inflation on the emerging market country
  o the sovereign ten-year yield
➢ Is the equity risk premium:
  o the US or global ERP
  o the ERP of the emerging market country
  o an ERP estimated by weighting the ERPs of countries where the firm generates revenues
➢ Should beta be calculated by:
  o comparing firm stock returns to a local stock index
  o comparing firm stock returns to a global index
  o levering the global industry beta to the firm's capital structure

Care must be taken to ensure any inflation differential and country risk are neither ignored nor double counted. We must also consider the degree to which an individual firm is exposed to country risk. In our case study, some might view the exposure of Via Varejo to Brazilian country risk as significantly higher than that of Embraer since the former earns 100% of its revenues in Brazil while Embraer earns about 20% of its revenues in Brazil.

Five approaches commonly discussed in academic literature and used in practice follow and we calculate the cost of equity for each of the three case firms using these approaches.

Approaches:

1. Use the single factor CAPM and assume beta will capture country risk
2. Add a country risk premium to the CAPM model above
3. Incorporate country risk in the risk free rate by using the sovereign yield
4. Calculate a country specific equity risk premium (ERP)
5. Calculate a weighted average ERP based on the countries where revenue is generated or assets are located

A sixth approach has been recommended by academics including Damodaran and Abuaf. Here, CAPM is extended to include a second factor to capture the sensitivity of the firm's equity to country risk. This approach requires calculation of this second factor and since the data is not readily available the technique is not used much in practice and is not included here.

RESULTS – Data from April 2016

Since our three case firms are located in Brazil and report in Brazilian Reals the cost of equity is calculated in local, nominal terms – i.e. the cost of raising equity in Brazil in Reals. Data sources are shown in Appendix 1. We use information available on Bloomberg and S&P CapIQ.

Approach 1: Use the Single Factor CAPM and Assume Beta Will Capture Country Risk
Rationale: If beta is measured as firm return sensitivity compared to a global index then beta should capture country risk.

Limitations: Evidence suggests country risk is not included in this beta and the approach is rarely used in practice. Lack of liquidity may contribute to inability of beta to capture country risk.
Formula: Ke = Krf + ERP * Beta

Inputs

Krf = US or equivalent ten-year yield plus inflation differential between local country and US to capture local risk free rate
ERP = US equity risk premium per Damodaran and several investment bank estimates
Beta = firm beta calculated using US or global index (from Bloomberg calculated using S&P 500). Bloomberg did not report this beta for Via Varejo so we calculated a levered beta based off the industry beta, a common practice when there is not a published beta or when liquidity is low.

TABLE 1
USE THE SINGLE FACTOR CAPM AND ASSUME BETA WILL CAPTURE COUNTRY RISK

Inputs		
Krf US	1.8%	
Country inflation differential	6.5%	
ERP - US	6.0%	
Results		
	Beta	**Ke**
Brasil Foods	0.81	13.1%
Embraer	1.09	14.8%
Via Varejo	1.29	16.0%

While empirical studies by academics provide support ***in developed markets*** for the ability of this approach to capture country risk through beta, evidence suggests investors require an additional premium related to country risk that is not captured in the single factor CAPM. This view is consistent with the CFA Institute. As a result, other approaches have been developed in an attempt to better capture country risk. Approaches 2-5 are methodologies we have seen used in practice to capture the country risk.

Approach 2: Add a Country Risk Premium to the Single Factor CAPM Model
Rationale: Empirical evidence suggests investors require an additional premium related to country risk that is not captured in the single factor CAPM. Country risk then leads to a distinct premium, somewhat similar to a premium for lack of liquidity, which should be added to the cost of equity. Higher levels of country risk will imply higher costs of equity. The premium is most often estimated from sovereign ratings and/or CDS spreads.

Limitations: This approach applies the same country risk premium to all firms in the country despite evidence that country risk depends on a number of factors including the industry and where revenues are generated.
Formula: Ke = Krf + ERP * Beta + CRP
Inputs:
Krf = US or equivalent ten-year yield plus inflation differential to capture local risk free rate
ERP = US
Beta = local beta calculated against Brazilian market index. *(do not use the firm's actual beta calculated against a global index since this will likely lead to double counting country risk)*
CRP = Country risk premium estimated from credit spreads on debt or sources such as Damodaran. Many banks estimate CRPs. Consider the Krf and CRP sources and take care not to double count the inflation differential.

TABLE 2
ADD A COUNTRY RISK PREMIUM TO THE SINGLE FACTOR CAPM MODEL

Inputs		
Krf US	1.8%	
Country inflation differential	6.5%	
ERP - US	6.0%	
Country risk premium	3.4%	
Results		
	Beta	**Ke**
Brasil Foods	0.70	15.9%
Embraer	0.45	14.4%
Via Varejo	1.03	17.9%

Approach 3: Include Country Risk in the Risk Free Rate

Rationale: Capture country risk by using the sovereign ten-year yield as the risk free rate. Note if this technique is applied, then the risk free rate is not truly risk free since it incorporates country risk. This is another way of including country risk, similar to Approach 2.

Limitations: This assumes that the country risk on ten-year government debt is identical to the country risk on equity investments and that all equity investments are exposed to identical levels of country risk.

Formula: Ke = Krf + ERP * Beta

Inputs

Krf = Sovereign ten-year yield

ERP = US

Beta = local beta (calculated against Brazilian market index)

TABLE 3
INCLUDE COUNTRY RISK IN THE RISK FREE RATE

Inputs		
Local risk free rate	10.25%	
ERP - US	6.0%	
Results		
	Beta	**Ke**
Brasil Foods	0.70	14.5%
Embraer	0.45	13.0%
Via Varejo	1.03	16.4%

Note that approaches 2 and 3 may yield identical results, depending on how the CRP is calculated and whether the sovereign yield is an actual value at a specific date or has been smoothed.

Approach 4: Calculate a Country Specific Equity Risk Premium (ERP)

Rationale: Capture country risk by using an equity risk premium specific to the country. This can differ from Approach 3 if, for example, equities are deemed more volatile and therefore riskier than debt. In such cases the country specific ERP used would be higher than the CDS spread or the spread embedded in sovereign bonds. It is also used when no sovereign bonds trade or liquidity is limited.

Limitations: Like approach 3, this approach assumes all equity investments are exposed to identical levels of country risk.

Formula: Ke = Krf + ERP * Beta

Inputs:

Krf = US or equivalent ten-year yield plus inflation differential between local country and US to capture local risk free rate

ERP = Brazilian ERP
Beta = local beta (calculated against Brazilian market index)

TABLE 4
CALCULATE A COUNTRY SPECIFIC EQUITY RISK PREMIUM (ERP)

Inputs		
Krf US	1.8%	
Country inflation differential	6.5%	
ERP - Brazil	9.65%	
Results		
	Beta	**Ke**
Brasil Foods	0.70	15.0%
Embraer	0.45	12.6%
Via Varejo	1.03	18.2%

Approach 5: Calculate a Country Weighted Average ERP Based on Where Revenue is Generated
Rationale: Investors may perceive country risk as a function of the countries or regions where the firm operates rather than just the country where the firm is headquartered.
Limitations: Requires more computation time since a weighted ERP is not available in online sources such as Bloomberg or Cap IQ.
Formula: Ke = Krf + ERP * Beta
Inputs
Krf = US or equivalent ten-year yield plus inflation differential between local country and US to capture local risk free rate
ERP = Country weighted ERP based on where revenues are generated
Beta = firm beta calculated using US or global index (from Bloomberg calculated using S&P 500). Bloomberg did not report this beta for Via Varejo so we calculated a levered beta based off the industry beta.

TABLE 5
CALCULATE A COUNTRY WEIGHTED AVERAGE ERP BASED ON WHERE REVENUE IS GENERATED

Inputs			
Krf US	1.8%		
Country inflation differential	6.5%		
Results			
	Wtd ERP	**Beta**	**Ke**
Brasil Foods	8.6%	0.81	15.2%
Embraer	7.1%	1.09	16.0%
Via Varejo	9.7%	1.29	20.7%

CONCLUSION

Although the formula generally used for the cost of equity appears simple, actually calculating cost of equity in emerging markets can be quite challenging since there are many possible options to use for the risk free rate, the equity risk premium and beta. The decision on if and how to incorporate country risk adds an additional level of complexity. Utilizing five approaches we have seen used in practice to estimate the cost of equity for three Brazilian firms in April 2016 we get a fairly wide range of results. For firms with significant country risk, prior studies and our own results suggest that the first approach

may underestimate the cost of equity for some firms since the country risk premium is not explicitly incorporated. The results are also strongly impacted by the beta selected. Here we used a global beta in approaches 1 and 5 and a local beta in approaches 2, 3 and 4. Approaches two through four incorporate country risk but apply the same premium to all firm, regardless of the nature of the industry or where the revenues are generated. The final approach requires additional effort since the equity risk premium must be calculated. Here we determined an equity risk premium based on the weighted average of the country equity risk premium where revenues were generated. Accordingly, Via Varejo has a higher cost of equity, compared to the other approaches, since all revenues are earned in Brazil

The results would have a significant impact of financial decision making including valuation and capital budgeting decisions.

TABLE 6
SUMMARY OF RESULTS

	Appr 1	Appr 2	Appr 3	Appr 4	Appr 5
Ke BRF	13.1%	15.9%	14.5%	15.0%	15.2%
Ke EMBR	14.8%	14.4%	13.0%	12.6%	16.0%
Ke VIA	16.0%	17.9%	16.4%	18.2%	20.7%

DATA SOURCES

Bloomberg
S&P Capital IQ
Damodaran: Country and Equity risk premium data found at:
http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

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