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REQUIRED RATE OF RETURN VALUATION IN EMERGING MARKETS. THE CASE OF CORPORACIÓN FAVORITA

Master Thesis

Supervisor: Karin Jõeveer

Tallinn 2015

I declare I have written the master's thesis independently.

All works and major viewpoint of the authors, data from other sources of literature and elsewhere used for writing this paper have been referenced.

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The thesis conforms to the requirements set for the master's/bachelor's theses

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ABSTRACT

The evaluation of required rates of return, for a specific company, is a complex procedure that can result in erroneous perceptions. Traditional models were conceived using characteristics of efficient markets and carrying such valuations, even in advanced economies, can derive in bias results. For such reason, valuation in emerging markets require a different treatment.

This master thesis analyzes ten diverse approaches that have been adjusted to account for the specific challenges that companies in developing countries endure. Limited availability of information combined with higher inefficiency, compared to developed countries, are considered in the proposed models. The evaluation perspective is performed from the side of a potential investor that requires a rate of return for investing in the biggest corporation from Ecuador. The objective is to find which models are suitable to be used in this market and recommend the most appropriate for this specific case. This work provides explanation of the origin, original corrections, strengths and potential drawbacks for each of the models. Global and local data is incorporated to understand these hybrid approaches. All essential components are calculated and explained, including special inputs as the semi-standard deviation of returns, correction factors for double accounting and total risk ratio.

The concluding result demonstrates how rates fluctuate compared with a basic Local CAPM model and the difference they have with Ecuador’s country risk premium. The problem of comparing global data to the Ecuadorian market is demonstrated, especially for the effect of negative betas. The final required rate of return is expected to fluctuate between 14.3% and 19.3%. The author suggests procedures to diminish the effect of arbitrariness when adding specific risks and potential further applications.

Key Words: volatility, sensitivity, country risk premium, gamma, adjusted beta, CAPM.

INTRODUCTION

Any company interested in expanding, though investing in a project or acquisition, need to estimate an appropriate discount rate. However, there is not a widely standard definition of risk as, well as a method to evaluate it, for an emerging market (Estrada 2000).

The calculation for the required rate of return has been an important debate in the field of finance for the past six decades. It is crucial for strategic decision making, as well as for measuring the potential return an investor should consider, given a level of risk.

Latin America had increasingly become an attractive investment destination for international capital. The initial studies on capital asset pricing were developed targeting integrated and advanced economies. As a result, capital asset valuation techniques, adapted to deal with the characteristics of the region, have become more valuable (Pereiro 2001). A potential foreign direct investment realized in a company within a riskier market requires the most possible and precise approximation, in order to use it as benchmark or component in further valuation approaches.

Ecuador has accomplished one, in the past years, one of the highest economic growth among South America. It is a relatively open economy to international investments, in most of the economic sectors including retail manufacturing and services. Nonetheless disturbances caused by impediments for free exercise of business, especially as consequence from existing laws and economic instability, increases the risk and cost of trading with this country (U.S Department of State 2014, 2). As a result, to evaluate an adequate required returns for a specific company is a rather complicated task. Lack of capital markets information availability, the country's risk caused by past financial and political instability, as well as creditworthiness issues, draw complications when determining such rates. In contrast, current tendency for market integrations of the region, with developed economies, combined with the country's dollarized economy, have conceded attractiveness for foreign investors.

The most widely used approach to calculate the required rate of return, in financial theory, is currently the Capital Asset Pricing Model. The research problem arises from the circumstances of its simplicity when applied to emerging markets, more specifically in the case of Ecuador. The principal problems can be addressed as the next sub problems:

1) Evaluate and investigate different models proposed by diverse authors, to calculate a required rate of return in emerging markets.
2) Consider if these different approaches can be applied for the case of Ecuador's economy and its biggest corporation, as benchmark.
3) The effect of reduced or inexistent historic and specific information, throughout the determination process.
4) Possibility to apply a different perspectives to measure risk that do not rely on a variance covariance market sensitivity approach.

The before named variables open the path to establish the research question of this work that states as next:

> Which model or models that are suggested and adjusted for emerging markets, could be applied for the case of Ecuador and the country's biggest corporation?

This master thesis is developed from an investor perspective, searching to obtain the required rate for investing in a project in Ecuador, as emerging country example. The chosen company is Corporación Favorita, that is the biggest group in the nation and for which there is relatively more information available.

There are two hypothesis that had arisen from the interest on the topic, which will be developed in this master thesis and are:

1) The calculated required rates of return fluctuate 8 percentage points above Ecuador's country risk premium.

2) If there is a different approach than variance-covariance to measure sensitivity, it is more effective or useful when evaluating the rate of return in emerging markets, hence in Ecuador.

The methods of research derivate from the Capital Market Theory and comprises quantitative and qualitative analysis. The used models had been developed by different authors in order to improve and adjust the approach of basic CAPM to emerging markets.

The first chapter provides the theoretical background, where the models are presented, as well as the explanation on how each one has been adjusted. The second chapter illustrates the methodology performed, explaining the steps and requirements to calculate every needed component. The third chapters presents the result of the investigation as well as the conclusions found for the purpose of solving the research problems and questions.

The author is thankful to my parent whose example have always been inspiration to follow my dream. To my sisters whose unconditional support have been my milestone through any of my moments. To the Ecuadorian government for believing in me and helping achieve this academic adventure. To Karin Jõeveer for her support in the development of this master thesis. To Isabella Fontanini Parra, I don’t know you yet but thank you for making me smile. Finally and most important, this work is dedicated to my angel, Abraham Parra. I promised that whatever I do in life will resound in eternity with strength and courage. I will always love you my brother.

1. THEORETYCAL ASSUMPTIONS

1.1. Emerging markets, Ecuador and target company’s characteristics

1.1.1. Investing in emerging markets

According to the findings obtained by Zimmermann et al. (2003) in their „Global Asset Allocation“ book, there are drivers that have been attracting the investors’ attention to developing markets in the past decades. One of the most noticeable is the fact that emerging economies have the tendency to not follow developed market movements during times of turmoil. As a result investors have been using financial asset, in such markets, to develop hedging strategies. Other attractive features related to these markets is the potential for large returns, which are caused by high volatility.

Most emerging countries are located in Africa, Latin America and the Middle East. These regions are characterized for not completely liberalized their capital markets, however there has been more accessibility granted to international investments. This mere lack of integration is viewed as an opportunity for global capital. Potential high expected return on asset can be found in an underpriced level, compared to similar assets in advanced economies.

In the need to evaluate favorable arguments towards investing in emerging countries, these authors found that such markets provide higher historical returns, in combination with higher volatility, than developed economies. Correlation is other aspect developed and it was instituted that stock returns are less correlated with the world market portfolio. In case of diversification, when emerging markets are considered into analysis, changes in the efficient frontier are more genuine. The frontier is shifted to the upper left, which create a better relation between risk and return. Nevertheless, volatility of stock returns create difficulties for the sample to be statistically significant causing that determination of standard errors, to be an issue.

As results of such findings, these authors suggest that emerging market assets should not be treated and evaluated in the same manner as if they were from an efficient economy. Traditional portfolio theory cannot be fully developed when there is abnormality in the sample, which lead to problems in estimation of error terms. Finally there is evidence that an emerging market can be contemplated as a stand-alone asset class. (Zimmermann et al. 2003, 173-176)

1.1.2. Ecuador's economic overview

Ecuador is the 9th biggest country in South America with a total area of 283,560 square kilometers divided into 24 provinces and a population of 15.88 million inhabitants. Ecuador is a dollarized economy, mainly producer of raw material. It can be considered as a small economy that is in a process of development. The country ranks 0.458 in the GINI scale showing there is a considerable inequality in the income distribution. According to the most recent GDP publication by the Ecuadorian Central Bank, in 2014 it reached approximately 101.50 billion dollars. 32.63% of the GDP (33.12 billion dollars) is composed by the countries oil production, making it very dependent on the international trade and price fluctuations for this asset. The country's debt structure is based on 17.4% public and 6.4% private debt. The general price index level is located at an annual 4.05%. (Banco Central del Ecuador 2015)

Ecuador has accomplished a higher average GDP growth compared to the world average. In the period 2010-2014 the economy has grown 4.9%, whereas the world economy grew 2.8% and South America & Caribbean a total of 3.3%. The comparable fluctuations can be observed in the figure presented at continuation:

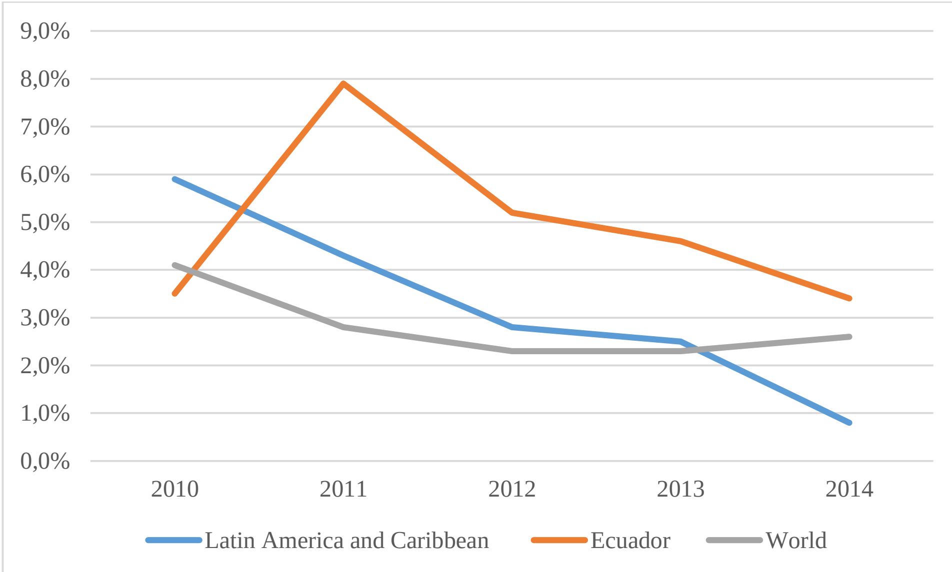


Figure 1. Ecuador perceptual GPD growth compared with world and the region
Source: (World Bank 2015)

Crude oil is the essence of Ecuador's economy, it has the 20th largest proven oil reserve in the world with approximately 8240 MMbbl (one thousand and one million barrels). The average daily production is 525000 oil barrels a day which gives an approximate oil exploitation time spam of 40 years.

1.1.3. Ecuador's financial market

The country's total financial market transacted a total effective value of 7.55 billion dollars in 2014. One of the most important characteristics of this economy, is that transactions take place in two different locations. The „Bolsa de Valores de Quito BVQ" situated in the capital and accounts for 23% of the total financial transactions, whereas „Bolsa de Valores de Guayaquil BVG" constitute the remaining 77%. Fixed income instruments accounts for 84.07% of the total transactions and the 15.92% are equity related instruments with a combined total of 18880 transactions, during 2014. The primary market corresponds 76% of the total negotiations and 24% is performed in the secondary market.

The Ecuadorian equity market principally realizes transactions in stocks and values of participation. According to BVQ (2015), the latter grant investors an aliquot on exclusive purpose equity, which participates on the equity's generating results with respect to the process of securitization. There are a total of 55 private companies listed with a combined market capitalization of 7.38 billion dollar and, 3.90 billion units of stocks and values. These companies are categorized in three main sectors described in the next table (Bolsa de Valores Quito 2015):

Table 1. Sectors and participations composing the Ecuadorian equity market.

Sector	Participation (percentage)	Participants (Number)
Commercial Sector	85.57	13
Financial Sector	13.33	32
Service Sector	1.10	10

Source: (*Ibid.*)

1.1.4. Brief history of Corporación Favorita

Corporación Favorita started in 1934 as a small grocery store in Ecuador's capital, Quito. It is in 1957 that its substantial commercial growth lead to the creation of „Ditribuidora la Favorita". In 1979 the company opened its first retail center under the name „La Favorita" and in 1983 the same centers changed to the current name. Since then, this corporation has expanded in different endeavors that cover markets related to toys, home appliances, baby products, books, electronic articles, construction materials. Currently focuses in a variety of retail and auto services with more than 16000 item; also is taking stake in entertainment, real state and shopping chains. It is currently the biggest corporation in Ecuador with more than 150 stores dispersed throughout the national territory. (Corporación Favorita 2015)

1.1.5. Financial situation of Corporación Favorita

In 2013 the corporation registered 1.75 billion dollars in revenue from their retail branches and from the corporation as a whole, it was 2.24 billion dollars. The net income reached 0.13 billion dollars and their assets are valuated in 0.86 billion dollars. With a total number of 375 million stocks traded in the Ecuadorian equity market. Corporación Favorita's market capitalization is calculated to be 1.55 billion dollars and is the most liquid followed by Holcim Ecuador S.A.

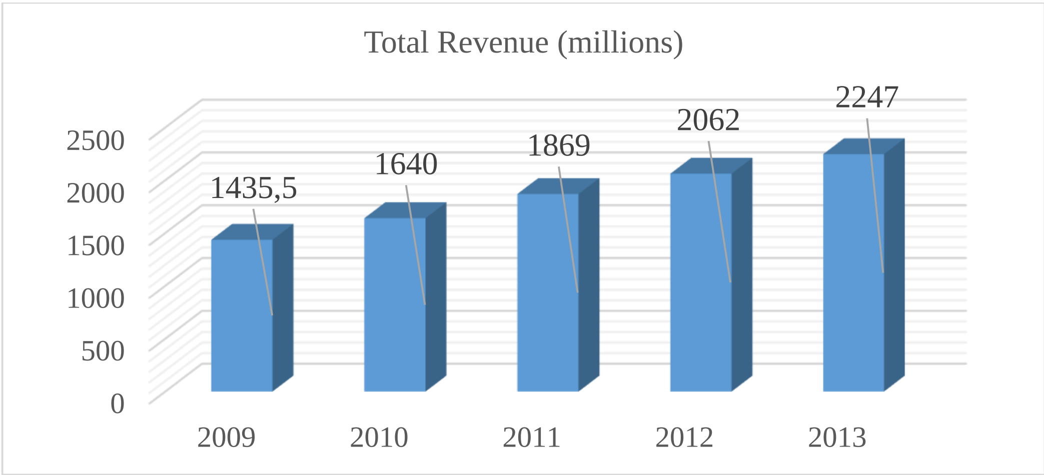


Figure 2. Total revenue evolution Corporación Favorita 2009-2013.
Source: (Corporación Favorita 2014)

1.2. Capital market theory

1.2.1 Overview of capital market theory

It is based on the foundation of the mean-variance asset pricing model stablished by Markowitz in 1952. His model proposed that the process for investment can be divided in two principal phases, which are (Markowitz 1959):

1) First phase: The choice of an exclusive combination of assets with risky characteristics in their returns.
2) Second Phase: A different selection, considering the before mentioned choice, with the addition of a sole asset with no risky characteristics in their returns.

Capital market theory's main objective is to describe in the most possible accurate approximation, the pricing of capital assets in the market. Furthermore, the work of William Sharp, complemented the initial sense, proposing the consideration of price level given level of risk. The theory strives to look for a market equilibrium under conditions of risk. Hence this theory looks to explain how investors actually behave rather than how they should, when it comes to investment decision making (Sharpe 1964).

1.2.2. Assumptions of capital market theory

There are eight assumptions proposed in capital market theory that are expected for them to hold and are as follow (Reilly and Brown 2011, 39-40):

1) All investors are Markowitz Efficient: In order to hold for this assumption, all investors should target the maximum possible return considering a given level of risk. Hence the location on the efficient frontier of a portfolio depends on the level of the investors risk aversion.
2) It is possible for all investors to lend and borrow riskless financial assets. It can be done either by borrowing at a risk free rate or lending at this rate by buying securities with no risk.
3) Homogenous expectations: Investors when faced with similar expectations and circumstances, will conclude in the same choice. Hence, if the future returns depend on several investment options, at a particular risk, investors will for example choose the greater rate of return. The effect of this assumption can hold if there are no massive different levels of expectations.
4) Same period horizon: Investors in their total, deliberate their decisions based in a homogenous time spam. A single hypothetical time horizon is required to develop the model, hence a difference in time period will derive in adjustments for risk premiums as well as for risk free requirements.
5) Investment infinite divisibility: This assumption establishes the possibility to buy or sell any fraction of any financial asset or portfolio. As this feature will hold possible investments as a continuous curve, variations on it will not greatly affect the theory.
6) No taxes or transaction costs: Considers that these costs are not reflected when buying or selling an asset. The reasonability of this assumption relies in cases where institutions are not subject to taxes. Financial transaction costs are bellow one percent and according

to Reilly and Brown (2011), relaxing this costs do modify the result but does not create changes in the end thrust.

7) No inflation or change in interest rates: there is no direct effect on returns from inflation or changes in interest rates, as proposed by the capital market theory.
8) Equilibrium in capital markets: there is a proper pricing within the capital markets and assume that all investors begin with the same efficient market in accordance to a certain level of risk.

1.2.3. Capital asset pricing model

The financial proposal known as the CAPM for the acronym, was first explored by Harry Markowitz in 1952. He proposed the evaluation of future performance of securities by considering expected returns and their variance. Posteriorly in 1964 and 1965, William Sharpe and John Lintner, recommended a different approach from the more traditional used investment models at that time. The perspective that all investors agree on the distribution of returns and may borrow or lend unlimited amounts of a riskless asset, resulted in the incorporation of the later financial tool. The combination of risk and riskless assets, lead to the linear mean-variance efficient frontier with riskless asset to be tangent to the efficient frontier with risky assets (Fama and French 2004). A graphical representation of this combination is found in Appendix 1.

The CAPM relies in the inclusion of a beta coefficient that will be explained posteriorly. The relationship between the beta and the expected return then derive in the next formula, known as the Shape-Lintner CAPM equation:

$$R_e = R_f + \beta_M \, (R_M - R_f) \tag{1}$$

where

R_e – required rate of return on equity,
R_f – riskless financial asset rate of return,
β_M – beta coefficient,
$(R_M - R_f)$ – market risk premium.

1.2.4. Beta coefficient

The development and explanation of the CAPM model is based on the approach Frank Reilly and Keith Brown in their „Investment Analysis and Portfolio Management“ book. In order to account for the sensitivity of an asset, in relation to the undiversifiable risk or systematic risk, CAPM considers the beta coefficient. Hence the beta for the complete market portfolio is equivalent to 1. Furthermore by measuring the covariance of the price returns of a financial asset with the variance of returns of the market portfolio, it is possible to obtain a standardized measure of risk for the asset.

$$\beta_M = \frac{Cov_{i,M}}{\sigma_M^2} \tag{1.2}$$

where

$Cov_{i,M}$ – covariance of the risky asset returns with the market portfolio,
σ_M^2 – variance of returns of the market portfolio.

By obtaining a beta above 1, the sensitivity of the asset compared to the overall market is to be higher and characterized by more volatility. In contrast, a beta bellow 1 will be less volatile to the market portfolio returns variations.

According to Schlueter and Sievers there is evidence of five main influencers to the level of beta that stock returns can manifest. Hence, the main causes for higher or lower betas, for a company’s stock, could be explained by these aspects of the firm (Schlueter and Sievers 2014):

1) Operational Risk: Represent the percentage change in operating income, influenced by a percentage change in the level of sales performed by the firm. It is expected that the higher the ratio the more positive the beta could result.
2) Financial Risk: Encloses the percentage change in net income associated with the percentage changes in operating income. Influenced by the level of financial leverage, this risks affect the potential earnings per share leading to an elevated beta from the riskiness of the asset.

3) Intrinsic Business Risk: Based in the demand level for a product or service related to the business cycle of the firm. Changes in the overall momentum of the economy, to higher volatility, is expected to cause positive changes in beta coefficient.
4) Spread Risk: The exposure a firm has to the level of term-structure spreads. As a result, changes in sales levels, influenced by changes in interest rates, impact the value of the sensitivity coefficient.
5) Growth Risk: Refers to effect that aggregated market sales have on the firm's sales. The higher co-movement of the firm's performance with the market performance, is likely to derive in higher beta.

1.2.5. Market portfolio

The financial world is a complicated structure of financial assets that are constantly traded between parties, supporting the basic assumptions of supply and demand. The market portfolio is the weighted average and combination of all available financial assets. Risk provided by the unification of this structure, in a theoretical perspective, refers to the systematic or non-diversifiable risk, normally measured by the beta coefficient. One of the principal financial components and most sensitive to change in price are the stock markets. The reason for such variability is that equity prices reflect, in a marginal form, the changes on the value of the corporate sector. Such characteristic allow stock markets to reflect performance in an economic basis, as well as differentiation between economies. The majority of stock portfolios are concentrated in developed economies; primarily in North America, Western Europe, Central Europe and the Pacific Rim. (Ibbotson and Brinson 1993) Whereas stocks make an important component of the financial wealth of the world, assets such as bonds, loans and deposits also play decisive transactional roll.

According to the latest available issue of „Mapping Global Capital Markets", published in 2011, the market portfolio had an interconnection of all before named assets, including foreign direct investments, in the next manner:

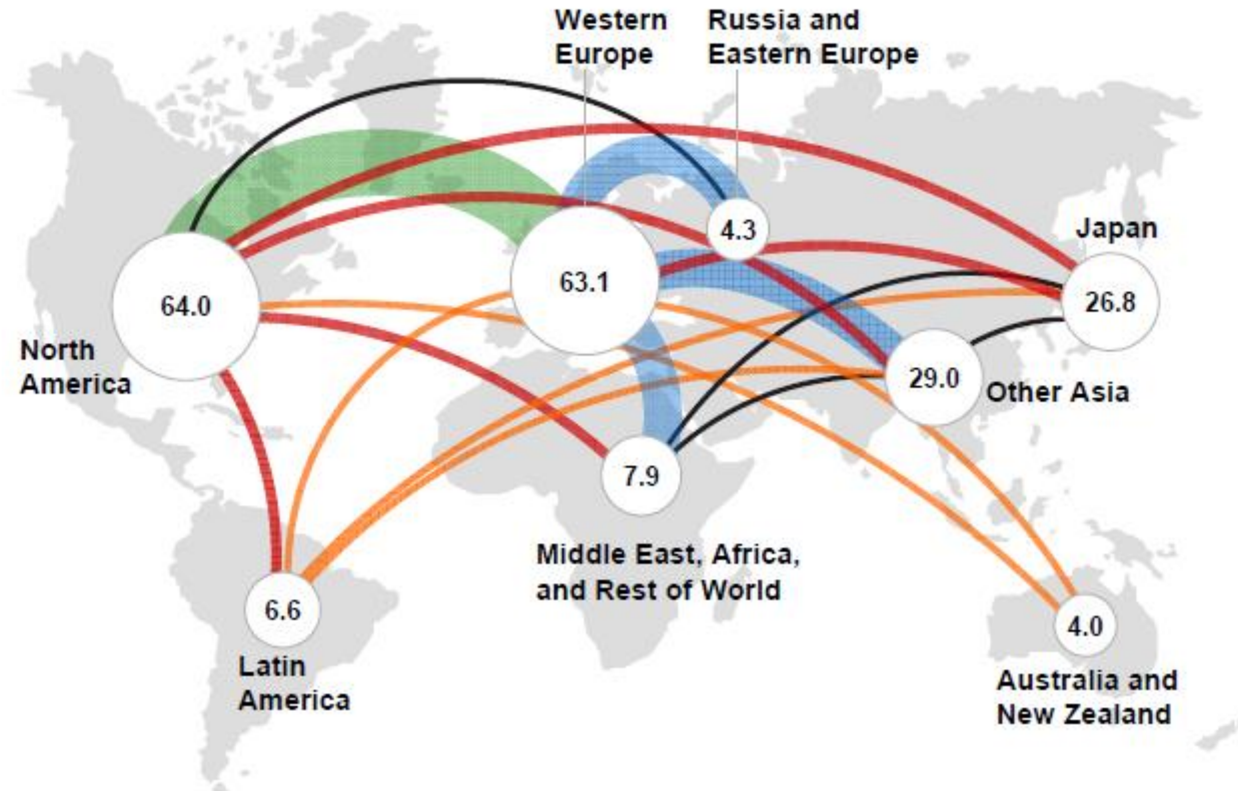


Figure 3. Value of cross-border investments among regions
Source: (Mckinsey Global Institute 2011)

Inside the bubbles are presented transaction in domestic financial assets between regions, valued in trillions dollars. For the case of Latin America the major capital and financial partners are located in North America, Western Europe, Asia and Japan.

1.2.6. Risk free rate

A riskless asset is a security that does not have a risk of default. The most commonly referred financial securities, in theory and actual finance, are bonds that include the guarantee of future payment, to the holder of the asset. Meaning that payments of coupons or values, will be entirely paid as promised and accorded. Example of this securities can include the next financial assets:

1) Sovereign Bonds
2) Treasury bills
3) Sovereign notes
4) Mortgages and debenture bonds,
5) Commercial papers

These assets can be considered risk free, taking in account the institution that issue them. Also have to be accounted arrangements related to guarantees, entrenched rights, duration and quantity of payments. (Capinski and Zastawniak 2011, 39-40)

Due to the lack of risk in such assets, their standard deviation is zero and in portfolio theory their anticipated covariance with the expected return from a risky asset is also zero. In terms of correlation, it will be zero considering the next equality:

$$Corr_{Rf,i} = \frac{Cov_{Rf,i}}{\sigma_{Rf}\sigma_i} \tag{1.3}$$

where

$Cov_{Rf,i}$ – covariance of the risky asset returns with the risk free returns,
σ_{Rf} – standard deviation of risk free asset returns, $\sigma_{Rf} = 0$,
σ_i – standard deviation of risky asset returns.

1.2.7. Risk premium

It is the premium and investor receives for their will to endeavor in a risky investment rather than taking the return that a riskless asset can offer. The risk component is provided by the diversifiable or non-systematic risk from an asset or portfolio. The risk of these assets is normally measured by the standard deviation of the returns, which accounts for their total risk. Whereas a risk free asset does not provide any risk on investment, there are several factors that affect the measure of risk that include (Elton et al. 2009, 19-20):

:

1) The time or maturity the instrument possess, since the longer the time spam a financial asset becomes more risky.
2) The characteristics and creditworthiness of the issuer and guaranties that the instrument provides.
3) Nature and priority of the asset's owner at the moment of claiming for their owning rights.
4) Liquidity: the ability of the asset to be sold or purchased, based on tradability and affecting power to the price.
5) Type of market: Either is transacted in the primary or secondary, geographical location of the traded asset.

1.3. Proposed models for emerging markets CAPM based

1.3.1. Local CAPM

$$R_{e,i} = R_{f,EM} + R_{c,EM} + \beta_{i,EM}\ (R_{m,EM} - R_{f,EM}) \quad (2)$$

$R_{e,i}$	– required rate of return for target company,
$R_{f,EM}$	– rate for local risk free asset,
$R_{C,EM}$	– country risk premium of emerging economy,
$\beta_{i,EM}$	– beta of target company in emerging market with relation to its local equity market,
$(R_{m,EM} - R_{f,EM})$	– local emerging market risk premium.

According to Luis Pereiro, in the case of financial market integration, a geographically varied portfolio neutralizes the country risk effect, through its diversification. Nevertheless, if an investor requires to enter or leave a project in a specific country, he is subject to isolated country related risks. As the author refer in his work, such isolation can come from the following idiosyncratic risks (Pereiro 2001):

1) Social and Political stability
2) Tendency of private assets expropriation from government

3) Barriers on free flow of capital across frontiers that can cause restriction of repatriation of capital.
4) Currency devaluation potential
5) Government default probability to international lenders
6) Inflation and hyperinflation risks.

To compute $R_{e,i}$, the proposed model requires the use of local data. The addition of the country risk strives to include all the before mentioned risks. As Pereiro affirms, that in a theoretical perspective, the addition of a country risk premium infers the use of a multi-factor risk-return model that encloses country's idiosyncratic risk (Pereiro 2006).

An important disadvantages of this model is that it requires local data, which in the case of emerging economies can be limited and in some cases unavailable. Also according to Goffrey and Espinosa, to include a country risk premium in the equation can derive problems of double accounting. The latter authors uphold that the country risk might be already represented in the market risk premium (Goffrey and Espinosa 1996). Double accounting can lead to overestimations and hence a rather high required rate of return.

1.3.2. Adjusted Local CAPM model

$$R_{e,i} = R_{f,EM} + R_{c,EM} + \beta_{i,EM} \ (R_{m,EM} - R_{f,EM})(1 - \sigma_i^2) \tag{3}$$

where

$(1 - \sigma_i^2)$ – double accounting adjustment factor, σ_i^2 represents the variance in the equity volatility of target company.

In order to adjust for the possible double accounting of the Local CAPM, Pereiro proposes the correction of the systematic risk premium by the variance on the equity volatility of the analyzed firm. The adjustment main target is to partly reduce the over estimation presented by adding a country risk premium as in the Local CAPM approach (Pereiro 2006).

An important limitation presented by this correction is the lack of long term information since it tends to be unavailable in emerging markets. Also high volatility configures a computation hassle when there is not sufficient information.

1.3.3. Global CAPM model

$$R_{e,i} = R_{f,GM} + \beta_{i,GM} \, (R_{m,GM} - R_{f,GM}) \quad (4)$$

where

$R_{f,GM}$ – rate for global risk free asset,
$\beta_{i,GM}$ – beta of target company in emerging market with relation to the global equity market,
$(R_{m,GM} - R_{f,GM})$ – global market risk premium,

This $R_{e,i}$ calculation method assumes worldwide capital market integration that accept investors to be able to access a global portfolio, which include international companies' equities. For this characteristic, Rene Stulz from Ohio State University proposes that the beta should not be measured in relation to the local equity market but to the global equity portfolio. This approach asseverates that in case of integrated markets, investors should measure the sensitivity of the asset to the global economy equity returns' movement. (Stulz 1999).

A possible drawback, from this proposal, is the presence of negative betas due to the lack of correlation from emerging markets to the global portfolio. Such scenario may lead to underestimated required rates that can be lower than the risk free rate.

1.3.4. Adjusted Hybrid CAPM model

$$R_e = R_{f,GM} + R_{c,EM} + \beta_{EM,GM} \, \beta_{ic,GM} \, (R_{m,GM} - R_{f,G})(1 - \sigma_i^2) \quad (5)$$

where

$\beta_{EM,GM}$ – beta of emerging market equity portfolio returns with relation to the global equity market portfolio,

$\beta_{ic,GM}$ – beta of comparable company equity returns with relation to the global equity market,

To help mitigating the drawbacks created by the lack of information and high volatility, it is proposed to use a hybrid approach from the local and global CAPM. The use of such adjustment can attune the premium expected from the global market, to the domestic market through a domestic beta. It is considered hybrid since it consider local as well as global characteristics to calculate $R_{e,i}$. It is also added a foreign beta which is the sensitivity of a comparable globally traded returns, with the global market portfolio.

An important drawback appointed by Pereiro, to this model, is that it assumes stability between the beta from the global company and the betas from the local market. In case of instability, is suggested to use beta coefficient of the target company to the local equity index, when quotes for their socks are available. (Pereiro 2006)

1.3.5. Donald Lessard's model

$$R_{e,i} = R_{f,US} + R_{c,EM} + \beta_{EM,US}\ \beta_{ic,US}\ (R_{m,US} - R_{f,US}) \quad (6)$$

where

$R_{f,US}$ – risk free rate of a financial asset from the United States,
$\beta_{EM,US}$ – beta coefficient of equity market portfolio of emerging economy with the U.S.
$\beta_{ic,US}$ – beta coefficient of comparable company in the U.S to the market portfolio,
$(R_{m,US} - R_{f,US})$ – U.S market risk premium,

This model was originally proposed in 1996 by the international management professor at the Michigan Institute of Technology, Donald Lessard. In his effort to propose a more accurate approach to include the country risk, also strives to address the problematics of evaluating the required return on equity in an emerging market. Moreover, it considers the lack of information and difference in the volatility of risks, compared to more advanced economies. In his theory, Lessard refers to the practice of companies to establish extra premiums that tend to become arbitrary, especially for projects endeavored in emerging economies. This author established the possibility of using a beta for offshore projects by obtaining the regression of the returns on a stock price against the local market portfolio. In his first methodology, it is suggested to take into account possible differences in financial and operating leverages. The second way proposed by the MIT professor is to calculate the beta of a company in relation to the market portfolio, in its local environment and then multiply it by the country beta.

This proposal relies in the United States as benchmark market and the beta of a comparable company also from the same country. Such asseveration incurs in the notion that any project outside the U.S. requires a higher premium, for incurring in additional risk. The model assumes the addition of a country risk to account for the potential risk all companies confront in a foreign market. The author of the model asseverates that a potential drawback is the use of an arbitrary country risk premium that could lead to inefficient attitude towards risk reduction. (Lessard 1996)

1.3.6. Godfrey-Espinosa model

$$R_{e,i} = R_{f,US} + R_{c,EM} + 0.6\ (\sigma_{EM}/\sigma_{US})\left(R_{m,US} - R_{f,US}\right) \quad (7)$$

where

σ_{EM} – equity volatility of emerging market portfolio returns (annualized),

σ_{US} – U.S equity volatility of market portfolio returns (annualized).

It takes in consideration the addition of the difference in bond yields measured in the same currency between one country and the U.S; also denominated credit spread. (Krishnamurti et al. 2009, 162). In 1996, Bank of America’s Stephen Godfrey and Ramón Espinosa pointed out that a project developed in a foreign location, include especial exposure to political, sovereign, commercial and exchange risks. As a result the model incorporated $R_{c,EM}$, to compensate for the country risk. As suggested by the Lessard model, to take in consideration the country beta compared to a market benchmark, opens the possibility to dysfunctional outcomes. Hence, negative betas could come with a result of required return lower than the expected risk free. Furthermore, these authors provide the need to account for the total risk when obtaining risk premiums, rather than using only beta as a measure of sensitivity.

The model proposes the substitution of the variance-covariance based sensitivity factor with a standard deviation related beta. It refers to this as an adjusted beta that measures the emerging market equity volatility to the U.S. market volatility (Godfrey and Espinosa 1996), represented in the following ratio:

$$\text{Adjusted Beta: } (\sigma_{EM}/\sigma_{US}) \tag{7.1}$$

The model similarly proposes a further adjustment of 0.60 and it derives from the need to avoid a double counting since total risk may already contain the country risk. As a result the method defies the assumption of CAMP model for volatility measurement. Nevertheless, it can incur in weaknesses as adjusting for the 0.60 factor does not consider volatility that an emerging country equity market can develop. A different drawback, is the need for the adjusted beta, since it assumes a correlation at a global scale. For this beta to be consistent, all markets should be perfect or the equivalent to 1, which does not turn real normally in a normal basis. This model also requires issue of debt in dollar denomination, which can be mitigated by the fact that Ecuador is a dollarized economy. (*Ibid.*)

1.3.7. Goldman-Sachs model

$$R_{e,i} = R_{f,US} + \left[(R_{i,EM} + R_{c,EM)} + ((\sigma_{EM}/\sigma_{US})\left(R_{m,US} - R_{f,US}\right)\ \left(1 - Corr(Eq,B)\right)\beta_{i,EM}\right] \tag{8}$$

where

$R_{i,EM}$ – emerging market target company specific risk premium,
$Corr(Eq,B)$ – correlation between the emerging country sovereign bond index and equity markets,
$\beta_{i,EM}$ – target company sensitivity factor compared to the emerging market equity portfolio.

The model proposed by Jorge Mariscal and Kent Hargis from Goldman-Sachs investment bank in 1999, strived to further account for global and national factors. An illustration of the searched integration that the model seeks is presented in the next figure.

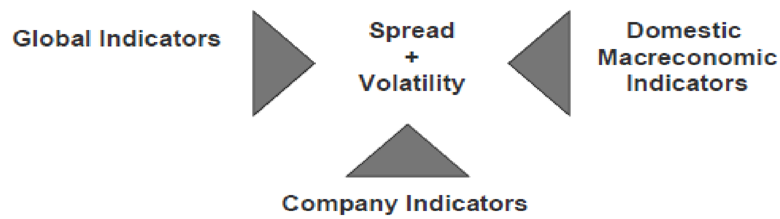


Figure 3. Goldman-Sachs model global and national factors integration approach.

Source: (Mariscal and Hargis 1999, 6)

In a similar method than the Godfrey-Espinosa model and for the same approximation, the adjusted beta is considered to measure the relative volatility. Additionally the model contemplates the issue of possible double accounting by subtracting the correlation coefficient between the stock and bond market of the emerging economy.

$$\text{Double accounting adjustment coefficient: } \left(1 - Corr(Eq, B)\right) \quad (8.1)$$

The provided reason by these authors relies in the effects of external factors that can affect relation between the dollars denominated returns. By not considering the adjustment the obtained required equity calculation could lead in an overestimation of the rate.

To reference the local volatility factors, the model accounts for the use of a local beta based on the sensitivity of returns of a company compared to its local market portfolio returns. In addition, a risk on the specific stock $R_{i,EM}$ is added to the country risk, which contradicts Godfrey-Espinosa's methodology. With the latter addition, Mariscal and Hargis sustain the model's global and national perspective. Conferring to the findings from these authors, the model allows to obtain relatively high correlation between equity instruments in an emerging market with the obtained implied discounts (Mariscal and Hargis 1999).

Nevertheless, the model incurs in weaknesses as it leaves an open window for arbitrary specification, especially in the $R_{i,EM}$ factor. The model suggests that this factor could be positive or not present, depending on the characteristics of the specific company. Hence arbitrary rate granting can be derived depending on the interested evaluators. This specific award can be based on the rate of debt, sales rate, market positioning, etc. In a different perspective, this model incurs in the addition of more factors which could lead in problems of double accounting. The main motive is the fact that specific risk of the company and country risk premium might show some level of correlation, which could increase by adding variables. (*Ibid*)

1.3.8. Salomon-Smith and Barney model

$$R_{e,i} = R_{f,EM} + \beta_{i,GM}\left(R_{m,GM} - R_{f,GM}\right) + \left(\frac{\gamma_1+\gamma_2+\gamma_3}{30}\right) R_{c,EM} \quad (9)$$

Where

$R_{f,EM}$ – risk free rate for the local emerging market,

γ_1 – access capability to capital markets (measured 1-10, 10 indicating total accessibility),

γ_2 – political risk susceptibility measure (measured 1-10, 10 indicating total susceptibility),

γ_3 – investment importance for a given company (measured 1-10, 10 indicating total importance).

In 2002 Marc Zenner and Echehan Akaydin from Salomon Smith Barney investment bank criticized the Local CAPM approach especially for its unsystematic diversification viewpoint. Within the global economy, national players are subject to market failures which according to these authors, can lead to difficulties when using the same local discount rate. For example a corporation can compose a vast majority of the emerging country market portfolio. As a result, calculating betas for the company and the market could incorporate a biased result.

Therefore these authors support a Global CAPM perspective by suggesting that a discount rate should be based to a global index. In concordance to these authors findings, to invest in an emerging market is not necessarily riskier than to generate activities in a developed economy. The intrinsic potential tax, information costs, foreign exchange, and political risks should not be adjusted in the discount rate. Moreover, these risks that might have to be overcame are advised to be accounted during the cash flow projection process. (Zenner and Akaydin 2002)

The addition of the gamma values to correct the country risk premium are included by these authors under the next assumptions for the effects of gamma values:

1) By measuring γ_1 the authors asseverate that large companies tend to have wide access to capital markets. This results in a likelihood of having fully diversified investors which creates more concern in the systematic risk and less in the country specific rick that can be diversified.
2) The inclusion of γ_2 represents potential political risk that can affect susceptible companies in case of expropriation.
3) Lastly, γ_3 refers to the fact that if an investment represent a small percentage of the company's assets, then the effect of the firm's risk is not significantly increased; but it could increase due to diversification.

1.4. Proposed models for emerging markets non-CAPM based

1.4.1 Erb-Harvey-Viskanta Model

$$R_{EM,t+1} = \gamma_{0,EHV} + \gamma_{1,EHV}\,\mathrm{Ln}\big(CCR_{EM,t}\big) + \varepsilon_{EM,t} \tag{10}$$

where

$R_{EM,t+1}$ – semiannual required rate of return for a specific emerging country,
$\gamma_{0,EHV}$ – intercept of the Erb-Harvey-Viskanta expected return model,
$\gamma_{1,EHV}$ – slope of the Erb-Harvey-Viskanta expected return model,
$\mathrm{Ln}\big(CCR_{EM,t}\big)$ – natural logarithm of the analyzed country credit risk,
$\varepsilon_{EM,t}$ – regression residual or associated disturbance.

The model considers only the systematic risk based on the premises that higher undiversifiable risk should incur into higher expected return.   The model proposed by Claude Erb, Campell Harvey and Tadas Viskanta in 1996 and criticizes the traditional CAPM approach for its use of beta coefficient as a risk factor. These authors rely in finding that assert on the difficulty to reject positive relations among expected returns and betas, based for example in the work of Harvey and Zhou in 1993. Hence, the proposers of the model affirm that beta approach is suitable for developed countries, but not in a complete accurate level. Moreover, the use of CAPM becomes complex to apply in emerging economies and especially to those countries that do not possess a functional equity market.

As a result of the mentioned debate, the proposed model relies on the use of country risk though country credit ratings. The information utilized for the approach counts on the specific rate given to an economy by the „Institutional Investor Magazine". The rating scale fluctuates from 0 to a 100, been 10 the highest risk for an economy to default. The methodology used by the magazine is based on surveys from 75 to 100 international bankers and is posted every six months. In this case, it is the value attached to the $R_{c,EM}$ variable.

The model requires a cross-sectional regression where all developed and emerging countries, as well as their credit ratings are combined. Its outcome explain a log-linear model that also account for possible non-linearity created by low credit ratings. Hence, the gamma values for this proposal, as well as the residuals, are a constant recompense for risk and not specific for one economy (Erb et al. 1996).

An important drawback from the model is that even though country risk is related to the stock market, giving a required rate of return, based in such risk can become subjective. There is no influence from the characteristics of the specific company and is an index that can be considered as a qualitative criteria (Estrada 2000).

1.4.2. Estrada's Downside Risk model

$$R_{e,i}^{D} = R_{f,US} + \left(R_{m,GM} - R_{rf,GM}\right)\ \beta_{i}^{D} \tag{11}$$

where

β_i^D – downside Beta of target company in emerging market.

In the fall of 2000, Javier Estrada presented his work arguing against traditional CAPM, especially contrary to assumptions of full integration in the markets. This allow assets with similar risk, to have similar expected return without location comprise and issue. Emerging markets are characterized to be far less integrated than developed economies. Hence, Estrada proposes to treat both markets with different approaches, when calculating the required rate of return. The author point problems on the credit risk component that models as the Erb-Harvey-Viskanta propose. Since rating entities base the rating on the stock returns, semi-deviations is added order to diminish the effect on country risk in the risk at company level. Hence the proposition of including the downside risk instead of the total risk. (Estrada 2000)

Downside Beta "the ratio between the semi standard deviation of returns with respect to the mean in market *i* and the semi-standard deviation of returns with respect to the mean in the world market" (Estrada 2000, 20). The semi standard deviation in respect to the returns of the stock is given by the next equation:

$$\sigma_M^D = \sqrt{\left(\frac{1}{T}\Sigma_{t=1}^{T}(R_t - ER)^2\right)} \tag{11.1}$$

Where

$R_t < ER$

σ_M^D – semi deviation of returns with respect to the benchmark return,
T – number of observations in the downside,
R_t – sample returns in the index's time,
ER – expected Return, average of returns.

2. METHODOLOGY

2.1. Data set

The used data consists in 824 observations and the time period begins in 01/01/2013 through 02/03/2015 in the daily basis. The data had to be restricted to the availability of information to the local equity index. All historical data was gathered from DataStream Professional, which is a Thomson Reuters service, available under license. The different variables are labeled in the next manner:

1) CF: Corporación Favorita stock returns.
2) Ec: Ecuindex returns
3) WM: Walmart stock returns.
4) SP: S&P 500 stock returns as U.S. equity portfolio.
5) MSCI: As global market stock portfolio returns.
6) EMBI: JP Morgan emerging market bond index.

The processing and necessary computations of the information is explained next, as well as the procedures used for not historic data and from different sources. Additionally, all the statistical information used to regress these variables is present in appendices. The chosen program for computing and processing is Microsoft Excel 2010.

2.2. Risk free inputs

2.2.1. U.S. Risk free rate

According to Damodaran, depending on the cash flow valuation time spam, a risk free rate in U.S dollars can be used as proxy. Cash flow valuation is not the scope of this master thesis, but the required rate of return is an important component, used as discount rate in valuation process. The assets suggested for the right risk free should have a real or nominal denomination in the currency where the estimation will take place. Also an important requirement to choose the riskless rate is that the actual return should be equal to its expected return. This characteristic requires that the chosen asset do not provide coupon payments. Those features are found in government zero coupon bonds (Damodaran 1999).

The chosen risk free asset for calculation is the 10-year Treasury Bond's rate from the United States Government. It was chosen due to its zero coupon rate and dollar denomination. Also is currently rated as Aaa by the Moody's bond rating scale which assigns this characteristics:

„The bonds and stocks which are given this rating are regarded as of the highest class, both as regards security and general convertibility. Practically all such issues are dependent for their prices on the current rates for money, rather than the fluctuations in earning power. In other words, their position is such that their value is not affected, or likely to be affect-ed (except in the cases of stocks not limited as to dividends), by any normal changes in the earning capacity of the railroad itself, either for better or worse" (Moody's 2004, 6).

Hence the risk free yield quoted for the US 10-year treasury is $R_{f,US} = 2.15\%$ in 02/03/2015. This information was obtained in the Bloomberg web portal.

2.2.2. Global risk free rate

According to Pereiro in 2002, a proper global risk free rate is the one investors can associate their money in a current period of time, to the market. This author pronounces that a riskless asset from the United States is considered as epitome of efficient market and frequently used as a global benchmark. (Pereiro 2002)

For the case of this risk free, the same value of the riskless asset for the U.S. due to its availability and liquidity for international investors. $R_{f,GM} = 2.15\%$

2.2.3. Local risk free rate

Again considering the implications observed by Damodaran, in order to obtain a local risk free there should be the government entity not capable default at an international or local level (Damodaran 1999). Ecuador has defaulting financial history for not meeting debt obligations with creditors, either caused by political or economic reasons. The last recorded default took place in 2008 when the government of Rafael Correa declared the non-payment of interest for the 3.9 billion dollar worth in global bonds (Faiola 2008).

For the case of Ecuador, in order to choose the appropriate local riskless rate, it is advised to choose the largest and best rated firm in the market and its interest loan rate. Since this master thesis is developed from the perspective of the investor, the chosen asset proceeds from a bank certificate of deposit.

The selected institution is Banco Pichincha, it has the largest asset account (9.62 billion dollar) in the Ecuadorian financial system. Moreover, to the intuition is trusted with 52.65% of the net private banking investment amount that sums to 4.36 billon dollar (Supeintendencia de Bancos y Seguros del Ecuador, 2015).

Bank Watch Ratings and Pacific credit ratings evaluates their ability to meet their obligations with AAA-. (Bank Watch Ratings 2014, 1) Hence the passive interest rate paid for a long term certificate of deposit in Banco Pichincha shall be the local risk free rate. The used percentage for this input is of $R_{f,EC}$ = 5.07%. (Banco Pichincha 2015).

2.3. Risk premium inputs

2.3.1. World market risk premium

The Risk premium, in a global scale, is rather complex task that involves considering all countries and regions for an approximation. Damodaran, in his paper „Equity Risk Premium" from 2002 emphasizes the necessity to obtain a proper risk premium because its importance to determine risk and return. Thus using average estimation methods, even in advance economies with large available information, can result in inappropriate approximations. In emerging markets this becomes a deeper hassle hence the author proposes the use of an alternative approach for risk premium calculation. It takes in account the premium implied by equity prices. This factor considers the current value of the market, expected level of dividends for the next period, required rate of return for the country and the expected growth in earnings. Damodaran author follows the next steps to calculate the risk premium (Damodaran 2015):

1) Estimate the mature market risk premium: the implied equity risk premium for the S&P 500.
2) Calculate the default spread for the specific country: This author's calculations use local currency sovereign rating from Moody's and/or Credit Default Swaps (CDS) spreads when available. The ratings to spreads are performed based on estimations of typical spread for each rating class. Then is computed by averaging the CDS' spreads and sovereign bonds from the United States, beginning every year.
3) Default Spread converted to country risk premium: Use the default spread as measurement of the additional risk premium. When CDS are available, the CDS spread from the United States is subtracted, because it is used as benchmark, from the other markets CDS.
4) Calculate total equity risk premium: The mature market risk premium is added to the country risk premium.
5) Regional Averages: The simple average of the total and the country risk premium by regions is used.

The next presents the total risk premium by regions using the methodology proposed by Damodaran:

Table 2. World market risk premiums by regions

Regions	Average of Total Risk Premium
Africa	12.17%
Asia	9.48%
Australia & New Zealand	8.00%
Caribbean	11.58%
Central and South America	11.35%
Eastern Europe & Russia	10.07%
Middle East	8.13%
North America	5.75%
Western Europe	7.63%
World Risk Premium	**9.94%**

Source: (Damodaran 2015).

Hence the world risk premium used in this master thesis comes from the average of the risk premiums from all world regions $R_{m,GM}$ = 9.94%.

2.3.2. United States market risk premium

For this master thesis the United States market is used as benchmark but also some of the used approaches specifically require the use of the risk premium from this country. Since the World Market risk premium was obtain from Damodaran's country default spreads and risk premiums work, this value is obtained from the same source. For the case of the United States, the total equity risk premium is $R_{m,US}$ =5.75%. This calculation takes in account a rating-based default spread of 0% and a country risk premium of 0%. (*Ibid.*)

2.3.3. Ecuador market risk premium

Damodaran provides a market risk premium for 144 countries in order to approximate the world market risk premium. Ecuador is part of that calculation and this master thesis consider the market risk provided by the source. $R_{m,EC}$= 15.50% (Damodaran 2015).

2.3.4. Ecuador's country risk premium

For the calculation of Ecuador's specific risk premium, the author of this master thesis takes the value provided by (2015) but incorporates the sovereign yield spread as part of the country risk determination.

Currently the country qualification, according to Moody's, is B3. „Obligations rated B are considered speculative and are subject to high credit risk (…) the modifier 3 indicates a ranking in the lower end of that generic rating category" (Moody's 2004, 8). From the country a rating-based default perspective the county risk premium is 9.75%.

In order to add deeper proposition to such rating, it is also considered a bond default spread. At the moment, Ecuador has two internationally traded government bond known as global bond 2015 and 2030, or GLB-15 and GLB-30. It will be considered the GLB-15 since it was issued in 2005 with a ten year time to maturity. The annual yield for this dollar denominated asset is currently 9.375%. (BVG 2015). Hence solving the country risk premium to the yield provided by the 10-year Treasury bond from the United States, Ecuador's country yield spread is 7.23%.

Therefore, by calculating the next equality, the used value for Ecuador's country risk premium is based in:

$$R_{C,EC} = \frac{rating\ based\ default + bond\ default\ spread}{2} \tag{12}$$

$$R_{C,EC} = \frac{9.75\% + 7.23\%}{2} \tag{12.1}$$

$$R_{C,EC} = 8.49\% \tag{12.2}$$

where

$R_{C,EC}$ – Ecuador's specific country risk premium.

2.4. Beta coefficient inputs

2.4.1. Corporación Favorita stock returns sensitivity to Ecuador's equity portfolio returns

Ecuindex is the Ecuadorian national stock market index. It is the most important equity index of the country and reflects the stock returns evolution, represented in U.S. dollars and for the quoted economic sectors in the nation. Those sectors are divided in financial, industrial and service. The methodology used to calculate the daily price of the indicator is based in the next variables (Superintendencia de Compañías del Ecuador 2015):

1) Stock prices in the calculated day
2) Stock prices in the day base
3) Number of available stocks by the price of the company in the initial day of the semester.
4) Correction factor that adjust for dividend payments.

Based on the theoretical assumptions that support equation (1.2) the sensitivity of CF to the changes in Ec is calculated as explained next:

$$\beta_{CF,Ec} = \frac{Cov_{CF,Ec}}{\sigma_{Ec}^2} \tag{13}$$

where

$\beta_{CF,Ec}$ – beta coefficient of CF to Ec,
$Cov_{CF,Ec}$ – covariance of the CF with the Ec,
σ_{Ec}^2 – variance of returns of the Ec,

Furthermore, the input coefficient for the models that require it, results in the next coefficient, for which the statistical information is presented in Appendix 2:

$$\beta_{CF,Ec} = \frac{0.000013}{0.000019} \tag{13.1}$$

$$\beta_{CF,Ec} = 0.67 \tag{13.2}$$

2.4.2. Corporación Favorita stock returns sensitivity to world portfolio returns

In order to calculate the volatility of CF to the world equity portfolio, information was obtained from the Morgan-Stanley Capital International index. Known as the MSCI, the index calculates the weighted average value of world equity, which is widely used as a benchmark for the global market portfolio. It is composed of stocks that represent equity compositions from different countries around the world. An important characteristic of this index comes from the fact that 99% of the stocks can be purchased by foreign investors and are available for the international market. (Harvey 1991).

$$\beta_{CF,MSCI} = \frac{Cov_{CF,MSCI}}{\sigma^2_{MSCI}} \tag{14}$$

where

$\beta_{CF,MSCI}$ – beta coefficient of CF to MSCI,
$Cov_{CF,MSCI}$ – covariance of the CF with MSCI,
σ^2_{MSCI} – variance of MSCI,

Furthermore, the value for sensitivity that Corporación Favorita's stock returns has compared to the world market portfolio consist in the next calculation and statistical information of the relation is available in Appendix 3:

$$\beta_{CF,MSCI} = \frac{-0.0000043}{0.0000441} \tag{14.1}$$

$$\beta_{CF,MSCI} = -0.0974 \tag{14.2}$$

2.4.3. Ecuador's equity portfolio returns sensitivity to the United States equity market

As required for some of the models, the measure of sensitivity for the Ecuadorian equity market to a developed market is needed. The chosen benchmark market portfolio is the Standard and Poor's 500 Composite or S&P 500. This index is commonly used as a benchmark for performance of the equity market in the United States. The index was created in 1957 as the first to measure the weighted average market capitalization and is composed of approximately 1.90 trillion dollar in assets. The index compasses 500 of the most import companies for each industry in the US and coverages 80% of the available market capitalization in this country. (McGraw Hill Financial, 2015).

Due to the previous named characteristics, as well as the shared dollar denomination transaction currency with Ecuador, the beta is obtain via the next calculation:

$$\beta_{Ec,SP} = \frac{Cov_{Ec,SP}}{\sigma^2_{SP}} \tag{15}$$

where

$\beta_{Ec,SP}$ – beta coefficient of Ec to SP,
$Cov_{CF,SP}$ – covariance of Ec with SP,
σ^2_{SP} – variance of returns of SP,

Hence as input this beta calculation for Ecuador to the equity portfolio of the United States consists in the next value. Statistical information for the regression between both variables is annexed in Appendix 4.

$$\beta_{EC,SP} = \frac{-0.00000210}{0.00005351} \tag{15.1}$$

$$\beta_{EC,SP} = -0.0393 \tag{15.2}$$

2.4.4. Comparable company equity returns sensitivity the United States equity market

Wal-Mart Stores Inc. operates in the retail industry of the United States, focused in mass merchant distribution though their various formats that include supercenters, discount stores and small stores. This company is the biggest company in the U.S. by revenue and the market capitalization is 255.59 billion dollar with a 3.23 billion publicly traded stocks. With 4835 stores spread across the U.S. territory, the coverage ratio is approximately of 1 store per 72300 residents (Walmart 2014). Corporación Favorita has a ratio 1 store per 99300 citizens' coverage. The financial and business characteristics of Walmart can suggest that it can be used as comparable for the U.S. market.

$$\beta_{WM,US} = \frac{Cov_{WM,SP}}{\sigma_{SP}^2} \tag{16}$$

where

$\beta_{WM,SP}$ – beta coefficient of WM to SP,
$Cov_{WM,SP}$ – covariance of the WM with SP,
σ_{SP}^2 – variance of SP,

Using the procedure for obtaining the beta coefficient, the value for $\beta_{WM,SP}$ is the presented next and statistical information is obtainable in appendix 5.

$$\beta_{WM,SP} = \frac{0.00002687}{0.00005351} \tag{16.1}$$

$$\beta_{WM,SP} = 0.5022 \tag{16.2}$$

2.5. Volatility inputs

2.5.1. Corporación Favorita stock return volatility and variance

In order to obtain the volatility of the CF, the standard deviation of the daily returns was calculated. The nature of the required rate of return is calculated per annum, as a result, the daily standard deviation is annualized in the next manner:

$$\sigma_{annualized,CF} = \sigma_{daily,CF}\sqrt{260} \quad (17)$$

$$\sigma_{annualized,CF} = 1.11\%\sqrt{260} \quad (17.1)$$

$$\sigma_{,CF} = 17.94\% \quad (17.2)$$

$$\sigma_{CF}^2 = 3.21\% \quad (17.3)$$

2.5.2. Ecuador's equity portfolio returns volatility and variance

With the same methodology applied before the input values for standard deviation and variance for Ec are the follow:

$$\sigma_{annualized,Ec} = \sigma_{daily,Ec}\sqrt{260} \quad (18)$$

$$\sigma_{annualized,Ec} = 0.44\%\sqrt{260} \quad (18.1)$$

$$\sigma_{,Ec} = 7.12\% \quad (18.2)$$

$$\sigma_{Ec}^2 = 0.51\% \quad (18.3)$$

2.5.3. US stock market volatility

Following the same approximation as the one used for the CF and Ec, the S&P 500 standard deviation of stock returns is the next:

$$\sigma_{annualized,SP} = \sigma_{daily,SP} \sqrt{260} \quad (19)$$

$$\sigma_{annualized,SP} = 0.73\% \sqrt{260} \quad (19.1)$$

$$\sigma_{,SP} = 11.80\% \quad (19.2)$$

$$\sigma_{SP}^{2} = 1.39\% \quad (19.3)$$

2.6. Special inputs

2.6.1 Correlation between Ecuador's equity market returns and sovereign bond market

As mentioned in the Ecuadorian financial market characteristic, the bond market correspond the majority of the participation. The official indicator used by the Ecuadorian central bank to measure the sovereign bond market fluctuations is the Emerging Market Bond Index EMBI from JP Morgan. It is an index in dollar denomination for sovereign bonds issued by a group of countries in process of development (Warnok and Hammaker 2015). The process to obtain this correlation input is described subsequently:

$$Corr_{EC,EMBI} = \frac{Cov_{Ec,EMBI}}{\sigma_{Ec}\sigma_{EMBI}} \quad (20)$$

where

$Corr_{Ec,EMBI}$ – correlation of Ec with EMBI,
$Cov_{Ec,EMBI}$ – covariance Ec with EMBI,
σ_{Ec} – standard deviation of EC,
σ_{EMBI} – standard deviation EMBI,

The input for correlation of the bond and equity market for the Ecuadorian case is computed as follows:

$$Corr_{EC,EMBI} = \frac{0.00000042}{0.0000261} \quad (20.1)$$

$$Corr_{EC,EMBI} = 0.0162 \quad (20.2)$$

2.6.2. Gamma coefficients $\gamma_1, \gamma_2, \gamma_3$

A Monte Carlo simulation is utilized as method to evaluate the level of accessibility to capital markets, political risk susceptibility and relative importance of Corporación Favorita to a potential investor.

Monte Carlo simulation relies in the procedure of generating random sampling. It is widely used in the financial world as a simulation tool to provide sensitivity results to possible scenarios, for where there is no data in advance. (Raychaudhuri 2008)

The following steps were trailed to determine the possible value of the gamma coefficients required in the Salomon-Smith and Barney model:

1) Statistic Model Generation: Since all Monte Carlo Models require a simulation starting point, the base case or input parameters begin in 1 as the least possible scenario and 10 for the best to each value of γ.
2) Random Variable Generation: To generate the random number for every value of γ, the used tool is the Excel function Random or RAND(). A total of 2000 possibilities was generated for each γ.

Table 3. Randomly generated variables for gamma values and random set combination

Indicator	$\gamma_{1,CF}$	$\gamma_{2,CF}$	$\gamma_{3,CF}$	Random set combination
Random Variables	$U_{\gamma_1} \sim U(1,10)$	$U_{\gamma_2} \sim U(1,10)$	$U_{\gamma_3} \sim U(1,10)$	$(U_{\gamma_{1,CF}}, U_{\gamma_2,CF}, U_{\gamma_{3,CF}})$

Source: Author

where

$U_{\gamma,CF}$ – Randomly generated level of gamma between for Corporación Favorita.

3) Solve to the random set: Posteriorly, the mode is solved in function of the random set combination to obtain a required rate of return with a random combination of gamma levels.

Table 4. Randomly generated gamma values in function of the Salomon-Smith and Barney model

Indicator	Salomon-Smith and Barney Model
Model in function of randomly generated variables.	$Re = SSB_{model}(U_{\gamma_{1,CF}}, U_{\gamma_{2},CF}, U_{\gamma_{3,CF}})$

Source: Author

2.6.3. La Favorita specific gamma coefficient for company risk

In a same method used for the gamma values for the Salomon-Smith and Barney model, the target company specific risk premium is simulated through Monte Carlo. For this model the next steps were followed:

1) Statistic model generation: The simulation starting point is a premium of 0% and a maximum reward for risk of 8.49%. This value will be the equivalent to add one more $R_{C,Ec}$ as the specific risk to the Corporación Favorita.
2) Random variable generation: the process is the same as implemented in the Salomon-Smith and Barney model.
3) Solve the random set: Finally the model is solved as a function of the randomly generated specific risk premiums for Corporación Favorita.

Table 5. Randomly generated gamma value in function of the Goldman-Sachs model

Indicator	Salomon-Smith and Barney Model
Model in function of randomly generated variables.	$Re = GS_{model}(U_{\gamma_{1,CF}})$

Source: Author

2.6.4. Semi standard deviation ratio Ecuador to World

The downside risk inputs is the ratio between the semi-standard deviation of Ec with the semi-standard deviation of GM. At continuation, the methodology to obtain this component is presented

$$\sigma_{Ec}^{D} = \sqrt{\left(\frac{1}{T^{D}} \Sigma_{t=1}^{T} (S_{t,EC} - ER_{t,EC})^{2}\right)} \tag{21}$$

where

$S_{t,Ec} < ER_{t,Ec}$
σ_{Ec}^{D} – semi deviation of Ec
T^{D} – number of observations of returns below the mean
$S_{t,Ec}$ – Ec returns in the index's time,
$ER_{t,Ec}$ – expected return of the Ec , average of returns

Hence the semi standard deviation for Ec will be:

$$\sigma_{Ec}^{D} = \sqrt{\left(\frac{1}{499} 0.00704\right)} \tag{21.1}$$

$$\sigma_{Ec}^{D} daily = 0.0375 \tag{21.2}$$

$$\sigma_{Ec}^{D} annualyzed = 6.06\% \tag{21.3}$$

The same procedure is applied for the case of MSCI:

$$\sigma_{MSCI}^{D} = \sqrt{\left(\frac{1}{T} \Sigma_{t=1}^{T} (R_{t,MSCI} - ER_{t,MSCI})^{2}\right)} \tag{22}$$

$S_{t,GM} < ER_{t,GM}$

σ_{MSCI}^{D} – Semi deviation MSCI returns, downs side risk.
$ER_{t,MSCI}$ – MSCI returns in the index's time,

$ER_{t,MSCI}$ – Expected return MSCI, mean returns

$$\sigma_{MSCI}^{D} = \sqrt{\left(\frac{1}{394} 0.01913\right)} \quad (22.1)$$

$$\sigma_{MSCI}^{D} daily = 0.006968 \quad (22.2)$$

$$\sigma_{MSCI}^{D} annualyzed = 11.24\% \quad (22.2)$$

Then the down side risk coefficient will be:

$$\beta_{Ec,MSCI}^{D} = \frac{\sigma_{Ec}^{D}}{\sigma_{MSCI}^{D}} \quad (23)$$

$$\beta_{Ec,MSCI}^{D} = 0.5392 \quad (23.1)$$

where

$\beta_{Ec,MSCI}^{D}$– Downside Beta of the Ec with respect to GM.

3. RESULTS

3.1. CAPM based model results

3.1.1. Local CAPM results

$$R_{e,CF} = R_{f,EC} + R_{C,EC} + \beta_{CF,Ec}\,(R_{m,EC} - R_{f,EC}) \tag{24}$$

where

$$R_{e,CF} = 5.07\% + 8.49\% + 0.67\,(15.50\% - 5.07\%) \tag{24.1}$$

$$R_{e,CF} = 20.55\% \tag{24.2}$$

The result generated by this model represent the highest required rate of return produced by the methods implemented during this master thesis. As it was appointed by Goffrey and Espinosa, there is a potential over estimation of the rate since the country risk is included without considering any adjustment. Subsequently, the local CAPM is the most basic model used during this work and will serve as control to observe the different outcomes resulting from the various models. Also the model is the most related to the basic proposition of CAPM calculation formulated hence the adjustments proposed by different authors affected in different manners.

The return is 12.06% higher than the country risk. Accepting this rate as solely perspective could lead to over estimations if it is used as a discount rate. Also could lead to turning down a potential investment in a project for Corporación Favorita, due to the elevated required rate.

3.1.2. Adjusted Local CAPM results

$$R_{e,CF} = R_{f,EC} + R_{C,EC} + \beta_{CF,Ec}\;\;(R_{m,Ec} - R_{f,EC})(1 - \sigma_{CF}^2) \tag{25}$$

where

$R_{e,CF} = 5.07\% + 8.49\% + \ 0.67 \ \ (15.50\% - 5.07\%)(100\% - 3.21\%)$ (25.1)

$R_{e,CF} = 20.32\%$ (25.2)

The use of the adjustment coefficient to prevent double accounting show a correction of the Local CAPM in 0.23%. It is important to mention that the addition of this factor is the only difference, but it has an effect on the outcome that could affect further valuation. With this model $R_{e,CF}$ requires 11.83% more than the expected country premium. As mentioned during the methodology process, the time spam does not allow to study how variability of CF is affected in a longer run. Nevertheless, variance of stock returns during the studied period is relatively low, explained by the price fluctuation. CF minimum registered price was 3.91 dollar with a maximum of 4.91 dollar; 1 dollar change.

3.1.3. Global CAPM results

$$R_{e,CF} = R_{f,GM} + \beta_{CF,MSCI} \ (R_{m,GM} - R_{f,GM}) \quad (26)$$

where

$R_{e,CF} = 2.15 + (-0.097)(9.54\% - 2.15\%)$ (26.1)

$R_{e,CF} = 1.43\%$ (26.1)

A required rate of return, smaller than the risk free rate is an unfair result to an emerging economy as is the Ecuadorian economy. The negative sensitivity of Corporación Favorita stock returns to the global market movements results in negative beta. This outcome conveys to a negative world risk premium resulting in an underestimated $R_{e,CF}$.

The use of only global data to compare the sensitivity of stock returns results inefficient as for this particular case. One explanation for the lack validity for this model, is the Ecuadorian dependence on oil revenues. Ecuador's GDP grew at the highest rate in the region and as is shown in Appendix 6 oil prices have an important impact in the nation's economy and oil prices have been relatively high during this period. This situation could let equities in emerging economies, dependent in this commodity, to outperform the global benchmark.

The model does not add a country risk premium because it assumes complete integration between Ecuador and the world economy. Even though, South America has been increasingly opening their markets, the region is only more integrated than Russia, Eastern Europe, Australia and New Zealand. The final result is 19.12% less than the control model and 7.06% under the risk for Ecuador.

3.1.4. Adjusted Hybrid CAPM

$$R_{e,CF} = R_{f,GM} + R_{C,EC} + \beta_{Ec,MSCI}\,\beta_{WM,MSCI}\ (R_{GM} - R_{f,GM})(1 - \sigma_{Ec}^2) \tag{27}$$

where

$$R_{e,CF} = 2.15\% + 8.49\% + (-0.040)0.448\ (9.94\% - 2.15\%)(100\% - 0.51\%) \tag{27.1}$$

$$R_{e,CF} = 10.51\% \tag{27.2}$$

By adjusting the local and global CAMP to formulating a hybrid approach, the required return is reduced by 9.08 percentage points from the Global CAPM. There has to be considered that for this case, the Ecuindex returns to the world market beta is used and is also negative. Furthermore, when this beta is adjusted to a comparable company in a developed country the sensitivity is reduced and adjusted to -0.018.

This model does not account for complete integration of capital markets, hence the country risk premium is added. Contrary to the Adjusted Local CAPM, the model is adjusting the global market premium to the variance in the Ecuindex returns. The final combination that is affected by the negative beta of Ec to the world market is -0.12%. This value is subtracted from the expected country risk premium and risk free premium.

The amalgamation of local and global information allows to calculate adjusted required rate of return, even when there is limited information available. The case of Ecuador was not the exception, especially with the limited quantity of Ecuindex daily prices information. Most important, this model permits the evaluation of required rates when there is evidence of negative betas.

One important problem in the hybrid model, is that does not account for a specific analysis for Corporación Favorita. This could lead avoidance on firm specific risks that could trigger under and over estimations. The difference to the control model is of 10.04% and 2.02% with $R_{C,Ec}$.

3.1.5. Donald Lessard model results

$$R_{e,CF} = R_{f,US} + R_{C,EC} + \beta_{Ec,SP}\,\beta_{WM,SP}(R_{eq,US} - R_{f,US}) \tag{28}$$

where

$$R_{e,CF} = 2.15\% + 8.49\% + (-0.039)0.502\,(5.75\% - 2.15\%) \tag{28.1}$$

$$R_{e,CF} = 10.57\% \tag{28.2}$$

In a close closed outcome to the result obtained by the Adjusted Hybrid CAPM, this model provide an adjustment of 9.98% compared to the basic Local CAPM. To rely in information from the United States derives in a lower market risk premium. When compared to a global market premium this reduction is 3.79%.

Since the benchmark is the North American country, when comparing Ecuindex to the S&P 500, also results in negative beta. The combination of the inputs affected by this negative sensitivity adds to -0.07%, that is deducted from the country risk and riskless rate. As a result, for the case of Corporación Favorita, to use this model incurs in higher rate of return than using an Adjusted Hybrid CAMP.

Nevertheless, there is no consideration on double accounting, since this model was proposed before addressing such issue. As a consequence, there is possibility for potential over estimations, especially if both betas were positive. Also, still it does not consider specific risk for Corporación Favorita. Compared to $R_{C,Ec}$ the model returns a 2.08% award.

3.1.6. Godfrey-Espinosa model results

$$R_{e,EM} = R_{f,US} + R_{C,EC} + 0.6\,(\sigma_{Ec}/\sigma_{SP})\left(R_{eq,US} - R_{f,US}\right) \tag{29}$$

where

$$R_{e,CF} = 2.15\% + 8.49\% + 0.6\,(\frac{7.12\%}{11.80\%})\,(5.75\% - 2.15\%\,) \quad (29.1)$$

$$R_{e,CF} = 11.94\% \quad (29.2)$$

In the same way as the Lessard's model, the benchmark is the U.S market. The Godfrey-Espinosa model represents a more complex approach due to the application of total risk with the presentation of an adjusted beta. The ratio obtained for the total risk coefficient is 0.603 (60.3%) which demonstrates that Ecuindex returns are less volatile than the U.S equity market portfolio, for the analyzed period. Hence, the total risk for the Ecuadorian equity market, based on volatility of equity results in a positive coefficient. Compared to the use of sensitivity betas, total risk ratio represents a suitable option for the case of assigning a market risk premium to a project in Ecuador, but does not yet consider the target company.

This model does consider a country risk premium and an adjustment for potential double accounting for its inclusion. The volatility in this particular case is below the benchmark volatility. Hence the higher the volatility of the emerging market, the greater will be the effect of the double accounting correction factor. When adjusting the market risk premium with the double accounting correction factor and the total risk ratio coefficient, 1.30% is added to risk free rate and the country risk premium.

As result, the required rate of return is 8.61% less than the control CAMP and 3.45% higher that the country risk premium.

3.1.7. Goldman-Sachs model

$$R_{e,CF} = R_{f,US} + \left[R_{CF} + R_{C,EC} + ((\sigma_{Ec}/\sigma_{SP})\,(R_{eq,US} - R_{f,US})(1 - Corr_{Ec,EMBI})\,\beta_{CF,Ec}\right] \quad (30)$$

where

$$R_{e,CF} = 2.15\% + [(4.27\% + 8.49\%) + (\frac{7.12\%}{11.80\%})\,(5.75\% - 2.15\%)(1 - 0.0162)\,0.67] \quad (30.1)$$

$$R_{e,CF} = 16.32\% \quad (30.2)$$

The suggestions made by Mariscal and Hargis, for this model for R_e in emerging markets, involve some advances compared to the analyzed model until this point. Here the problem of target company risk is addressed by including a premium and for this case a specific premium for

Corporación Favorita. One of the potential problems of this addition is the possible arbitrariness in the value designation. The author of this thesis performed a Monte Carlo analysis to elaborate possible outcomes caused by the insertion of the variable. The rage of fluctuation of the rate of return between 2000 different premium possibilities produce a frequency range that goes form 14.3% to 19.3% The next figure presents the histogram, than encloses the frequency probability of required returns:

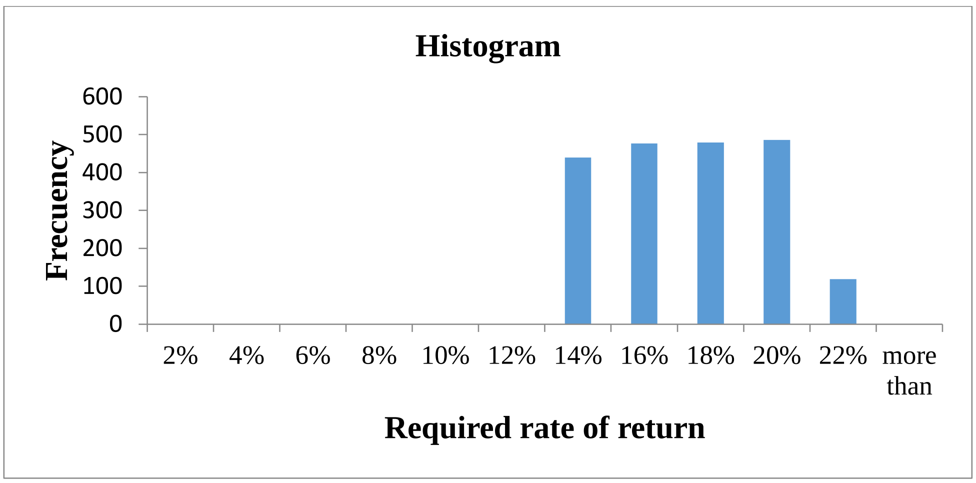


Figure 4. Simulation of Corporación Favorita specific premium.

Source: Author's Calculations

The statistical information in Table 6. Demonstrate that the simulation do not present fat tails in the distribution of the observations, due to the skewness close to zero. The kurtosis is also low which demonstrate that the created random variables are fairly distributed around the mean. It is important for this simulation to be normally distributed, because the author of this master thesis searched for different results caused by the fluctuations of Corporación Favorita specific risk premiums.

As a result, the minimum risk granted to the target company is 0.001%, the maximum was 8.49% and the mean awards a 4.34%. With the addition of the minimum premium, which will be the case where an investor do not fear any potential risk from Corporación Favorita, results in a required rate of 12.07%. In the other hand, if the investor senses a maximum risk, the rate would increase to 20.55%. The mean of the random observation will locate the rate in 16.32%.

Table 6. Statistical information for Monte Carlo simulation to Goldman-Sachs Model

Indicator	Corporación Favorita premium	Required Rate of Return
Mean	4.24%	16.32%
Standard Error	0.00055439	0.00055199
Median	4.34%	16.31%
Standard Deviation	0.02479939	0.02469184
Sample Variance	0.00061501	0.00060969
Kurtosis	-1.19866416	-1.2146961
Skewness	0.00340042	0.0003725
Minimum	0.001%	12.07%
Maximum	8.49%	20.55%
Count	2000	2000

Source: Author's Calculations

This model complement the basic CAPM with the inclusion of CF's beta to EMBI, but the correcting coefficient for double accounting is different than other models. For this particular case the factor's value is 0.983 slightly different from the 0.968 of the Local CAPM, 0.994 from the Adjusted Hybrid CAPM and 0.6 in the Lessard's model.

The combination to total risk ratio, markets risk premium, correction factor and beta adds a 1.41% to the risk free and the country risk premium. Comparing the control basic CAPM and considering a mean Corporación Favorita specific risk premium, this model adjusts 4.33% the required rate of return and award of risk 7.83% above $R_{C,Ec}$.

3.1.8. Salomon-Smith and Barney model

$$R_{e,CF} = R_{f,EC} + \beta_{CF,MSCI}\left(R_{m,GM} - R_{f,GM}\right) + \left(\frac{\gamma_{1,CF}+\gamma_{2,CF}+\gamma_{3,CF}}{30}\right) R_{C,Ec} \tag{31}$$

where

$$R_{e,CF} = 5.07\% + (-0.097)(9.54\% - 2.15\%) + \left(\frac{4.88+5.12+4.87}{30}\right) 8.49\% \tag{31.1}$$

$$R_{e,CF} = 8.63\% \tag{31.2}$$

This model assumes the MSCI index as reference, but with the use of the risk free rate for Ecuador, as riskless component.

The usage of the model further develops how the company's specific risk has an effect over the calculations by correcting it directly to the country risk premium. The values of gamma were obtained using a similar method to the company specific risk of the Goldman-Sachs model. By generating 2000 random possible combinations, the frequency of required returns have higher probability to result from 8% to 10%. The next histogram represent the frequency distribution of required rate of returns from the different possible gamma combinations:

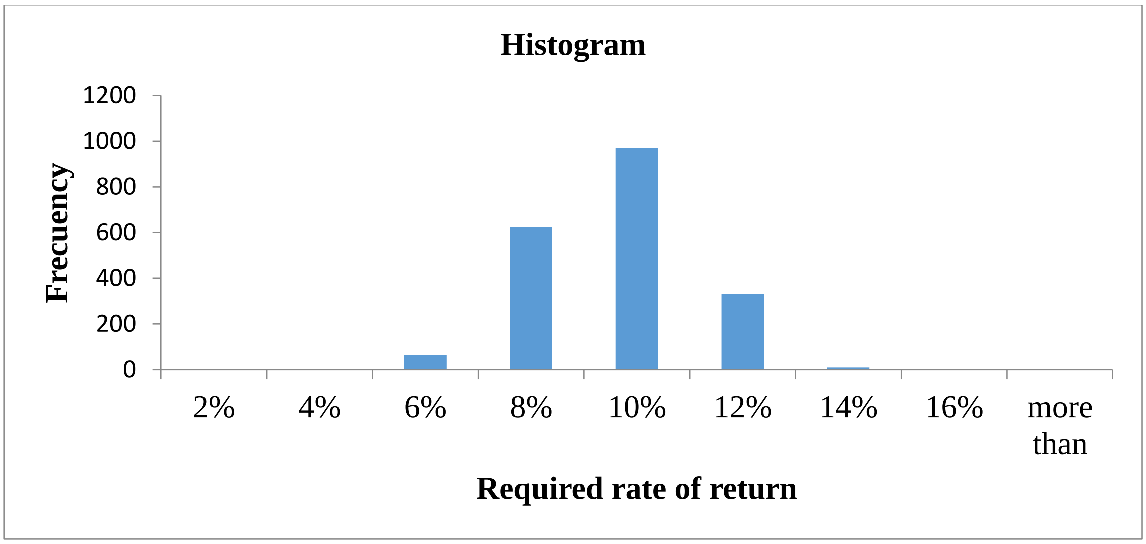


Figure 5. Simulation of Corporación Favorita gamma premiums.

Source: Author's Calculations

Considering the statistical information in Table 7, for random values for the gammas, there is no presence of fat tails and kurtosis also demonstrate that the observations are fairly normally distributed. The importance of a normal distribution has the same reason as for the country specific risk premium in the Goldman-Sachs model. Different than the last named model, the Salomon-Smith and Barney model applies a grading value to the gammas of Corporación Favorita that is after adjusted to become a percentage.

The minimum and maximum granted values for $\gamma_{1,CF}, \gamma_{2,CF}, \gamma_{3,CF}$ are 0.002, 0.004, 0.010 and 9.998, 9.996, 9.992 respectively. With a minimum combination of gamma values, the required return is

4.74% while using a maximum combination this rate situates in 12.44%. With a mean mixture of random gammas the rate is 8.63%.

Table 5. Statistical information for Monte Carlo simulation to Salomon-Smith and Barney Model

Indicator	γ_1	γ_2	γ_3	Required Rate of Return
Mean	4.881	5.122	4.878	8.63%
Standard Error	0.064	0.064	0.066	0.0003186
Median	4.867	5.303	4.862	8.65%
Standard Deviation	2.854	2.874	2.941	0.0142546
Sample Variance	8.147	8.260	8.649	0.0002032
Kurtosis	-1.175	-1.179	-1.221	-0.511
Skewness	0.066	-0.070	0.057	-0.075
Minimum	0.002	0.004	0.010	4.74%
Maximum	9.998	9.996	9.992	12.34%
Count	2000	2000	2000	2000

Source: Author’s calculations

Since this model relies on similar assumptions as the Global CAPM, especially in the beta and market premium, there is the problem of negative coefficient. Therefore, there should be a theoretical subtraction of 0.71% in the market risk premium for a required rate to a potential investment Corporación Favorita. The mean $R_{e,CF}$ is 11.92% below the control CAPM and 0.14% above the country risk premium.

3.2. Non-CAPM based model results

3.2.1. Downside Risk model

$$R_{e,CF}^{D} = R_{f,US} + \beta_{Ec,MSCI}^{D}\left(R_{m,GM} - R_{f,GM}\right) \tag{32}$$

where

$$R_{e,CF}^{D} = 2.15 + 0.5392(9.94\% - 2.15\%) \tag{32.1}$$

$$R_{e,CF}^{D} = 6.134\% \tag{32.2}$$

The model considers a different approach by the usual CAPM by allowing for not a total, but a partial integration of risks. The ratio results in a downside risk of the Ecuadorian equity returns almost half compared to the same risk in a global market. It is important to mention that more than 80% of Ecuador's capital market is formed by fixed income instruments and there is only 55 companies trading in the equity market hence semi-variance have to be carefully interpreted. As this master thesis is written from the perspective of an investor, its author suggests it should be adjusted to company's specific risk, as is the case of the Goldman-Sachs model. The problem with this model is the capacity to analyze larger historical observations that could lead to a more specific measure of volatility.

As mentioned before, some findings suggest that emerging markets tend to be more volatile than the world benchmark. Since this model was created to fit such assumption, it does not completely fit for obtaining$R_{e,CF}$. Further availability of historical rates could prove otherwise but the $R_{e,CF}^{D}$ result in required reward of 2.35% below the country risk premium and 14.42% less than the control calculations.

3.2.2. Erb-Harvey-Viskanta model

$$R_{EC,t+1} = \gamma_0 + \gamma_1 \text{ Ln}\left(CCR_{EC,t}\right) + \varepsilon_{Country,t} \tag{33}$$

where

$$R_{EC,t+1} = 66.21\% + (-14.09\%)\text{Ln}(32.5) + 1.8\% \tag{33.1}$$

$$R_{EC,t+1} = 17.17\% \tag{33.2}$$

The concept behind the proposal of this mode seeks to suggest a standard method to calculate $R_{e,CF}$ for any country in the world, weather it has a functional equity market or not, but has a credit rating. The result for the model assigns a 17.17% required rate for a potential project developed in Ecuador therefore to any company within the country, including Corporación Favorita. It is important to mention that the intercept and slope used in this formula (33) are obtained directly from the finding that the authors of the E-H-V model computed in a cross sectional analysis between 135 countries. Some of this countries did not have functional capital markets and their expected returns were analyzed though the study.

The value of the before mentioned coefficients correspond a study executed in 1996 and combined with the latest rate available from the „Institutional Investors Magazine“. The author of this master thesis, found that there is potential a sources for updated intercepts and slopes. It is from the „International Valuation Handbook“, but it constitutes a private source. According to the description, Ecuador is not considered in the analysis before mentioned source, thus the author of this master thesis has include as a potential method in future investigations.

The insertion of the E-H-V model opens the opportunity for further analysis in posterior replications that can potentially include the analyzed country. Nevertheless, the formula gives an approximation for which can be the designated to $R_{e,CF}$. It is 3.38% below the control Local CAPM and 8.68% above the $R_{C,Ec}$.

3.3. Models results comparisons with other authors

3.3.1. Result comparison with required rates of return in the region

The latest issue of the „Business Association of Latin American Studies BALA“ conference calculates the required rate of return for some countries in the region. These include Colombia, Brazil, Chile, Peru and Mexico. The authors of this report use and average of 116 companies in the period 2011-2012 to calculate R_e (Garay et al. 2014). The results obtained by the author of this master thesis show that for the Local, Global and Adjusted Hybrid CAPM models, $R_{e,CF}$ relies between the BALA minimum and maximum values. The downside risk model offer a similar result compared with those from the reference. Nonetheless, the Godfrey-Espinosa model is 3.2% and 5.54% above the maximum and average R_e from the five countries. In a similar aftermath, for Lessard model, $R_{e,CF}$ is 2.13% above the maximum and 4.23% above the average of five countries in the region. The following table presents the complete results obtained in the conference including the author of this master thesis results, for comparison:

Table 6. Results from the latest Business Association of Latin American Studies

Model	Region average	Author's results	Region min	Region max
Local CAPM	14.13%	20.55%	8.09%	35.17%
Global CAPM	4.81%	1.43%	1.22%	10.24%
Adjusted Hybrid CAPM	11.35%	10.51%	2.24%	35.75%
Downside risk	4.78%	6.13%	2.64%	8.60%
Godfrey-Espinosa	6.36%	11.94%	5.30%	8.37%
Donald Lessard	6.34%	10.57%	4.98%	8.44%

Source: (Garay et al. 2014)

An important observation is the effect of the correction factor of the Gordfrey-Espinosa model. The fact that R_e increases with the application of the double accounting correction factor, explains that the total volatility ratio is similar to the Ecuadorian ratio, bellow 1.

3.3.1. Result comparison for Goldman-Sachs model required rates of return in the region

Marical and Hargis implemented a cross sectional and time series data analysis for the period 1994-1999. Their process use forecasting in sovereign spreads to consider different scenarios that could affect R_e (Mariscal and Hargis 1999). The implication of different scenarios and results is presented in appendix 7. The following table show the required rate of return for some countries in of the region, as well as the forecasted R_e.

Table 7. Domestic required rate of returns and forecasts for the Goldman-Sachs model

Indicator	obtained Re	Long term Re
Latin America	15.2%	15.5%
Argentina	16.4%	14.5%
Brazil	18.1%	16.5%
Chile	12.0%	13.1%
Colombia	14.7%	13.8%
Mexico	14.2%	16.0%
Peru	16.6%	16.0%
Venezuela	19.1%	17.8%

Source: (*Ibid.*)

According to the findings of these authors, at the moment of the study, the average R_e for Latin America was 15.02%. In a forecasted perspective, it was expected to rise 0.3% in the next 5 years. The $R_{e,CF}$ with this same model is 16.32%, which is 0.82% above the region. Nevertheless, $R_{e,CF}$ calculation presents a rate below the expected in Venezuela and Brazil.

4. CONCLUSION

The valuation of a required rate of return for a company is a complex task that has caught the attention of the financial world for several decades. This calculation challenge evolved into the capital asset market theory, which is based in the premises of efficient markets. Furthermore the capital asset pricing model introduced the evaluation of future performances based on the combination of risky and risk-free assets. Moreover, efficiency in markets is closely met in advanced economies and even in such environments, it is complicated to measure required returns. Furthermore, it becomes more difficult to apply it in emerging economies since those do not share the same level of interconnection, liquidity and openness of capital markets, as in developed countries.

Emerging markets have become more attractive to international investors due to their potential lack of correlation to advance economies, during times of turmoil. Also, such markets contain financial assets that can represent opportunities for equity investments at underpriced levels.

Ecuador has achieved one of the highest positives GDP growth rates in its region, making it an attractive market for international investments. On this background, the master thesis present different CAPM and non-CAPM models, that try to adjust calculation for valuation of required rate of returns in an emerging economy, as is the case of the South American country. Using the biggest and most liquid corporation in the target nation, the author of the master applied the models in order to test their applicability.

The issue of dealing with an emerging market represents mainly information hassles, that this master thesis was not exempt. The principal problem came from the availability of historic information, especially for the Ecuadorian equity portfolio index. This obstacle lead to a time spam adjustment of the other needed variables. The reduction in the time spectrum leads to potential difficulties in the trust of outcomes, as is the case of volatility measures and beta coefficients. Nevertheless, application of hybrid models considers such drawbacks and strive to diminish the effects of information availability

One important inclusion, by most of the models, is the country risk premium. It raised the hypothesis of 8 percentage point fluctuation from $R_{C,EC}$. The outcome show a maximum 12.06% upwards and 7.06% downwards risk award to the idiosyncratic risk premium. Out of the 10 tested models, 7 of them stayed in the range stablished by the hypothesis. The use of variance-covariance, as a measure for sensitivity, represented a problem for calculations because some betas resulted in negative values. Especially when computing betas from the Ecuadorian equity portfolio and Corporación Favorita stock returns with respect to S&P 500 and MSCI global index returns. Models as the Goldman-Sachs and Godfrey-Espinosa propose the use of total risk ratio, as a replacement or further support for beta usage. In case of Ecuador, due to negative sensitivity to the developed benchmark and the world index, the use of standard deviation related beta will represent a suitable analytical option.

Although all analyzed models can potentially be applied to calculate $R_{e,CF}$, there is one specific model that the author of this master thesis found more complete. The Goldman-Sachs model adjusts to various potential drawbacks of investing in an emerging market. The model incorporates an expected premium for the investing in Ecuador and also allows for a risk premium assign to Corporación Favorita. Uses the total risk ratio of the Ecuindex return volatility compared to United States that helps mitigate the issue of negative beta. The model also applies an adjustment for the sensitivity coefficient of Ecuindex to Corporación Favorita stock returns. Finally it alleviates the issue of double accounting, using the correction factor obtained from the correlation of Ecuador's equity index to its sovereign bond returns. The model advices a required rate of return for the target company between 14.3% and 19.3%, with and average of 16.32%.

Comparing $R_{e,CF}$ with the average required returns from 116 companies in the region, the rate lays between the minimum and maximum R_e. The Godfrey-Espinosa and Lessar'd models do not place within the spectrum, but the deviation from the average is 5.58% and 4.23% respectively. $R_{e,CF}$ from the Goldman-Sachs model calculated in this master thesis, is comparable with forecasted long term required, in several countries of the region, obtained by Mariscal and Hargis.

Accounting for the fact that this master thesis was prepared from the perspective of an investor, the author generated recommendations for the application of the presented work. The addition of premium rates, specifically those based on target company specific risk premiums could result arbitrary. Hence, the use of simulations to determine as many potential outcomes as the investor considers rational, is advised. This can lead to potential ranges of required rates and then adjust to the perception of risk, based in fundamentals and risk aversion. Arbitrariness may lead to over and underestimation, for such reason the added premium rates have to be meticulously chosen. Every potential investment requires different inputs and perspectives, in this particular case negative sensitivity of the target market to the benchmarks represented implementation impediments.

Finally the required rate of return range suggested in this master thesis could be used as component to posterior evaluation tools. It can specially be applied as element to achieve the weighted average cost of capital for a company in an emerging market; considering adjustments from the perspective of the corporation. Such use can derive in an emerging market more suitable discount rate, for analytical tools as the discount cash flow model.

REFERENCES

Banco Pichincha. (2015). Tarifario de Inversiones. Tasas de interés pasivas.

Banco Central del Ecuador (2015). Estadísticas Macroeconómicas. Presentación coyuntural. Dirección Nacional de Síntesis Macroeconómica. http://www.bce.fin.ec/index.php/component/k2/item/756 (06.04.2015).

Banco Central del Ecuador (2015).Decretos y tablas de amortización de la deuda pública interna. Condiciones financieras de los de deuda pública interna del gobierno nacional. http://contenido.bce.fin.ec/docs.php?path=/documentos/Estadisticas/SectorFiscal/DeudaInterna/Condiciones/T-201503.htm. (03.18.2015).

Bolsa de Valores Quito. (2014). Pulso Mensual.Diciembre 2014. Renta Variable. http://www.bolsadequito.info/uploads/inicio/boletines-mensuales/renta-variable1/150109194237-723ace33cb547008053886b88a525f1d_rentaVarDic14.pdf (07.04.2015).

Bolsa de Valores Guayaquil. (2015). Sobre mercado. Bonos globales. http://www.bolsadevaloresguayaquil.com/bonosglobal.asp. (04/04/2015).

Bank Watch Rating. (2014).Calificadora de Riesgos. Informe Global Pichincha, pp. 1.

Capinski, M., Zastawniak, T. (2011). Mathematics for Finance-An Introduction to Financial Engineering. 8th edition, pp. (39-40).

Corporación Favorita. (2015).Institucional. Cifras de interés Corporación Favorita C.A. http://www.corporacionfavorita.com/portal/es/web/favorita/cifras (06.04.2015).

Datastream.(2015). Thomson Reuters.

Damodaran, A. (1999). Estimating risk free rates. Stern school of Business.

Damodaran, A. (2015). Country Default Spreads and Risk Premiums. Stern school of Business

Damodaran, A. (2002). Equity Risk Premiums. *Ratings, Rating Agencies and the Global Financial System*. Springer US, pp. 269-285.

Elton, E.J., Gruber, M.J., Brown, S.J., Goetzmann, W.N. (2009). Modern portfolio theory and investment analysis. John Wiley & Sons. 6th edition, pp. 19-20.

Erb, C.B., Campbell R.H., Tadas E.V. (1996). Expected returns and volatility in 135 countries. *Available at SSRN 871253.*

Estrada, J. (2000). The cost of equity in emerging markets: a downside risk approach. IESE Business School. 19-29.

Estrada, Javier. "Systematic risk in emerging markets: the D-CAPM." *Emerging Markets Review* 3.4 (2002): 365-379.

Fama, E. F. and French, K.R. (2003). The capital asset pricing model: Theory and evidence, pp. 03-26.

Faiola, A. (2008) Calling Foreign Debt Immoral, Leader Allows Ecuador to Default." Washington Post. http://www.washingtonpost.com/wp-dyn/content/article/2008/12/12/AR2008121204105.html (04/20/2015)

Fuenzalida, D. and Samuel A.M. (2010) Estimation of discount rates in Latin America: empirical evidence and challenges. *Journal of Economics, Finance & Administrative Science* 15.28.

Garay, U., González, M., & Rosso, J. (2014). The cost of equity in emerging markets: the case of Latin America. Universidad de Los Andes.

Godfrey, S. and Espinosa, R. (1996). A practical approach to calculating costs of equity for investments in emerging markets. *Journal of Applied Corporate Finance* 9.3: 80-90.

Harvey, C. R. (2001). The international cost of capital and risk calculator (ICCRC)." *Duke University*.

Harvey, C. R. (1991). The world price of covariance risk. *The Journal of Finance* 46.1, pp. 111-157.

Ibbotson, R.G. Brinson G.P. (1993). Global investing. The Professional's Guide to the

World Capital Markets. - *Mac Graw Hill*.

Institutional Investors Magazine. Global rankings. http://www.institutionalinvestor.com/Research/5501/Global-Rankings.html#.VVlfCJPdpT8 (27/04/2015)

Mariscal J.O. and Hargis K. (1999). A Long-Term Perspective on Short-Term Risk. Long-Term Discount Rates for Emerging Markets. Goldman Sachs Investment Research.

Krishnamurti, Chandrasekhar; Vishwanath, S. R. (2009). Advanced Corporate Finance. New Delhi. PHI Learning Private Limited, pp. 162.

Krotschek, M. Modern Investment Theory. http://www.krotscheck.net/2008/02/24/modern-investment-theory.html. (18/05/2015)

Lessard, D. R. (1996). Incorporating country risk in the valuation of offshore projects. *Journal of Applied Corporate Finance 9.3*, ppt. 52-63.

McGraw Hill Financial. S&P Dow Jones Indexes. S&P 500 Index Attributes.

Markowitz, H. (1959). Portfolio selection: efficient diversification of investments. Basil Blackwall, New York.

Markowitz, H. (1952). Portfolio selection. - *The journal of finance* 7.1, pp. 77-91.

Moody's. (2002). Moody's rating symbols & definitions. Moody's Investors Service, Report 79004.08.

Faculty and Research. Donald Lessard profile. MIT Sloan Management. http://mitsloan.mit.edu/faculty/detail.php?in_spseqno=41413 (03.17.2015)

Pereiro, L. E. (2001). The valuation of closely-held companies in Latin America. *Emerging Markets Review* 2.4, pp. 330-370.

Pereiro, L. E. (2006). The practice of investment valuation in emerging markets: Evidence from Argentina. *Journal of Multinational Financial Management* 16.2, pp. 160-183.

Ponce, J. ANEFI Administradora de fondos fiduciarios. Ecuador un futuro incierto. http://www.anefi.com.ec/12-articulos-de-interes/69-ecuador-un-futuro-incierto-jose-samaniego-ponce-24-03-2015-2.html (18/05/2015)

Raychaudhuri, S. (2008). Introduction to Monte Carlo simulation. *Simulation Conference, 2008. WSC 2008. Winter*. IEEE.

Reilly, F., and Brown, K. (2011). Investment analysis and portfolio management. Cengage Learning, pp. 39-40.

Roxburgh, C., Lund, S., Piotrowski, J. (2011). Mapping global capital markets 2011. McKinsey Global Institute, pp. 1-38.

Sharpe, W.F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance* 19.3, pp. 425-442.

Superintendencia de Bancos y Seguros del Ecuador. (2015). Dirección Nacional de Estudios. Estados de Situación de Sistema de Bancos Privados.

Superintendencia de Compañías del Ecuador. (2015). Glosario de Terminos Bursatiles. 181.198.3.74/wps/wcm/connect/b761b546-7dbf-4fb0-8fe7-eb2d88d25c13/Glosariomv.pdf?MOD=AJPERES&CACHEID=b761b546-7dbf-4fb0-8fe7-eb2d88d25c13. (17/04/2015).

Stulz, R.M. (1999). Globalization, corporate finance, and the cost of capital. *Journal of applied corporate finance 12.3*, pp. 8-25.

Schlueter, T. Sievers S. (2014). Determinants of market beta: the impacts of firm- specific accounting figures and market conditions." Review of Quantitative Finance and Accounting 42, pp. 535-570.

United States Government Bonds. US TREASURY YIELDS. Bloomberg Business. http://www.bloomberg.com/markets/rates-bonds/government-bonds/us/. (03/02/2015)

U.S Department of State. Economic and Commercial Sector. U.S Embassy of Ecuador. http://www.state.gov/documents/organization/228171.pdf. (05/07/2015).

Zenner, M. and Akaydin, E. (2002). A practical approach to the international valuation and capital allocation puzzle. Global Corporate Finance Report. Salomon Smith Barney.

Wal-Mart Stores Inc. Corporate and stock information. Annual report 2014.

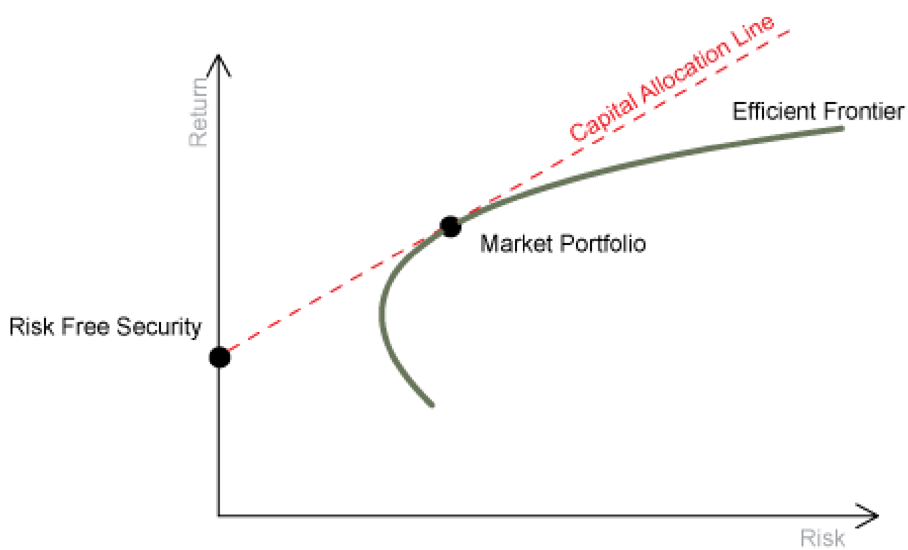
Warnock. F, Hammaker. P. Financial Times.Lexicon. http://lexicon.ft.com/Term?term=EMBI (16/05/2015)

World Bank. (2015). Data. GDP growth (% annual). http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/XJ-EC-1W?display=graph (18/05/2015)

Zimmermann, H., Wolfgang, D., and Oertmann, P. (2003) Global asset allocation: new methods and applications. Vol. 197. John Wiley & Sons, pp. 173-176.

APPENDICES

Appendix 1. Efficient frontier graphical representation



Source: (Krotschek 2008)

Appendix 2. Regression summary output CF to Ec

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.26595336
R Square	0.07073119
Adjusted R Square	0.06960069
Standard Error	0.01073225
Observations	824

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.007206472	0.00720647	62.5664339	8.29846E-15
Residual	822	0.094678882	0.00011518		
Total	823	0.101885354			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	-0.00025002	0.000374874	-0.66694038	0.50499738	-0.000985841
Ec	0.67049178	0.084766209	7.90989468	8.2985E-15	0.504108081

Source: Author’s calculations

The regression is statistically significant even at the 0.01% significance level.

Appendix 3. Regression summary output CF to MSCI

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.0582432
R Square	0.00339227
Adjusted R Square	0.00217985
Standard Error	0.0111143
Observations	824

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.00034562	0.00034562	2.79793711	0.09476619
Residual	822	0.10153973	0.00012353		
Total	823	0.10188535			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	1.4203E-05	0.00038825	0.0365837	0.97082582	-0.00074787
EMBI	-0.09749299	0.05828468	-1.67270353	0.09476619	-0.21189732

Source: Author’s calculations

The regression is statistically significant at the 10% significance level.

Appendix 4. Regression summary output Ec to SP

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.065120214
R Square	0.004240642
Adjusted R Square	0.003029256
Standard Error	0.004406656
Observations	824

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	6.79778E-05	6.79778E-05	3.500652967	0.061699705
Residual	822	0.015962106	1.94186E-05		
Total	823	0.016030083			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.000347647	0.000154101	2.255974671	0.024334297	4.51701E-05
SP	-0.039266108	0.02098666	-1.871003198	0.061699705	-0.08045986

Source: Author’s calculations

The regression is statistically significant at the 10% significance level.

Appendix 5. Regression summary output WM to SP

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.41239535
R Square	0.17006993
Adjusted R Square	0.16906028
Standard Error	0.00812547
Observations	824

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.01112129	0.01112129	168.44489	3.5693E-35
Residual	822	0.05427119	6.6023E-05		
Total	823	0.06539248			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.00011919	0.00028415	0.4194731	0.67498001	-0.00043855
SP	0.5022406	0.0386975	12.9786321	3.5693E-35	0.42628305

Source: Author’s calculations

The regression is statistically significant even at the 0.01% significance level.

Appendix 6. Relation of oil prices and Ecuador's GDP growth

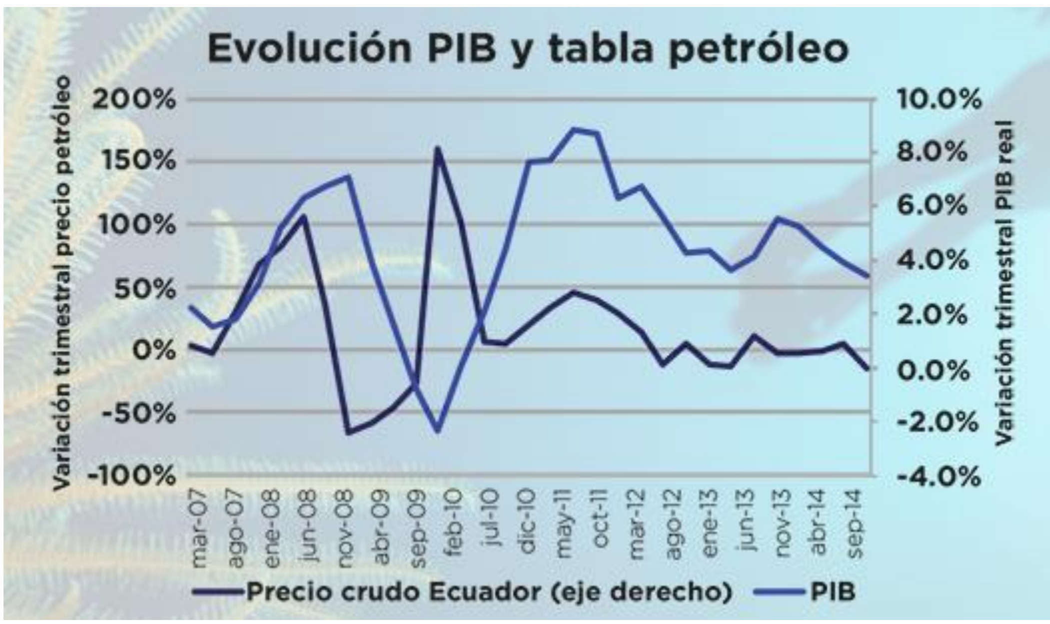


Figure 6. Trimestral relation between oil prices and Ecuador's GDP growth rate
Source: (Ponce 2015)

where

PIB: Producto Interno Bruto is Gross Domestic Product in English.

Precio crudo Ecuador (eje derecho): Oild prices Ecuador (right axis).

Appendix 7. Scenarios implications and forecasting for Goldman-Sachs model

	Current Discount Rate	Implied Discount Rate	Long-Term Discount Rate	Based on Global Scenarios: Optimistic Scenario	Based on Global Scenarios: Pessimistic Scenario	Based on Global Scenarios: Current Forecasts	Market Upside Based on: Implied Rate	Market Upside Based on: Long-Term Rate	Market Upside Based on Global Scenarios: Optimistic Scenario	Market Upside Based on Global Scenarios: Pessimistic Scenario	Market Upside Based on Global Scenarios: GS Forecasts
Emerging Markets	14.6	14.3	14.9	11.5	17.0	13.2	5	-3	54	-27	16
Latin America	15.2	15.0	15.5	11.4	17.9	13.6	2	-3	71	-28	22
Argentina	16.4	14.6	14.5	10.8	17.2	12.9	24	26	79	-26	26
Brazil	18.1	16.5	16.5	12.8	19.3	15.0	20	19	63	-25	20
Chile	12.0	13.7	13.1	10.0	16.5	12.2	-23	-16	86	-30	26
Colombia	14.7	14.0	13.8	10.3	16.8	12.5	10	13	81	-29	24
Mexico	14.2	14.7	16.0	11.2	17.7	13.4	-7	-21	70	-29	20
Peru	16.6	15.3	16.0	11.7	18.2	13.9	17	7	68	-28	20
Venezuela	19.1	16.4	17.8	12.6	19.1	14.8	29	13	58	-22	20
Asia (inc. HK and Sing)	12.7	11.6	12.5	10.4	13.7	11.3	20	3	23	-27	5
Hong Kong	11.5	10.4	11.7	9.4	12.8	10.2	22	-3	22	-33	4
Singapore	10.7	10.4	11.2	9.4	11.2	10.2	5	-10	22	-13	4
Emerging Asia	13.9	12.5	13.2	11.2	14.7	12.1	23	10	24	-25	6
China	14.5	13.1	13.1	12.1	15.1	12.9	20	20	16	-23	3
India	13.6	12.1	12.7	9.4	15.1	10.8	24	14	64	-34	25
Indonesia	21.3	21.5	18.1	18.0	24.5	20.2	-2	33	37	-20	12
Korea	15.0	12.9	14.3	11.9	15.2	12.7	33	9	17	-27	3
Malaysia	14.9	12.4	14.1	11.4	15.3	12.2	41	10	18	-32	4
Philippines	14.3	15.0	16.8	11.5	18.0	13.7	-9	-26	65	-28	19
Taiwan	11.7	10.7	11.2	9.7	12.3	10.5	19	10	21	-23	4
Thailand	14.3	13.1	15.3	11.3	16.3	12.1	19	-11	32	-34	16
EMEA	14.6	15.0	15.6	11.7	17.9	13.6	-4	-12	60	-29	19
Israel	12.1	11.1	11.1	9.4	14.1	10.2	18	18	38	-37	18
South Africa	12.9	14.8	14.9	11.2	17.7	13.4	-22	-23	69	-28	20
Hungary	12.1	11.7	15.0	9.4	14.9	10.6	7	-33	54	-36	22
Poland	11.2	13.7	16.8	10.3	16.7	12.4	-32	-54	74	-31	20
Russia	35.1	19.7	22.2	16.2	22.7	18.4	161	112	42	-22	13
Turkey	16.4	18.6	18.5	15.0	21.4	17.1	-21	-19	49	-22	16

Source: (Mariscal and Hargis 1999, 22)