# SOCIAL EFFECTS OF INDEX BETA USE IN INVESTMENT AS RISK PREDICTION FOR ENTERPRISE SUSTAINABILITY

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**ABSTRACT**

*The Beta index is a tool that provides the level of risk that is to select a portfolio of investment on a basis of reference can be the cetes yields since these are investment securities which do not represent risks for the investor in Mexico and to compare the variance and the covariance of returns of selected titles to invest you can get the BETA index, and insofar as this index is lower the deviation with the reference index will be smaller, which means a lower risk of obtaining the expected yields, in this work were selected 20 investment options in 4 different company different portfolios listed in Mexico that belong to different economic sectors of the country and the results indicate that 2 portfolios show negative results and 1 of them have results positive very low what represents an option of portfolio with high possibilities of achieve the results expected and for the portfolio with results negative, it means that the results will be inverse to the movement of the reference index, serving this empirical evidence of reference for potential investors in the companies analyzed in empirical cases displayed in this work, and this work could help on the enterprise sustainability, since the beta index used in this analysis avoid the risk of loses or could make gain profits from the base of beta analysis results assuring the enterprise sustainability, which represents a positive social impact, since it makes possible to make the enterprise to have more possibilities of permanence in the market.*

## INTRODUCTION

The purpose of all investor and administrator of funds is get the maximum profitability to the lowest risk possible, and for this is important measure to this last. One of the indicators more popular of risk in the market of values is a measured statistic known as beta. The betas measured the volatility of the stocks in relation to the market, or rather an index representative of this as the S & P 500. By the definition, the market has a beta equal to 1, while a company's shares will show a beta according to its deviation from the market. For example, if the price of a stock experiences fluctuations higher than the market, its beta will be greater than 1, and if it does, the beta will be less than 1. While higher is the beta, higher will be the risk of the investment. But at the same time there will be a higher potential to obtain higher profits. If the shares of a company have a beta of 2, that wants to say that the volatility is the double to it of the market. These stocks will have a greater risk, but the gains may be the double of what would give the market.

### Importance in Investments

All investor has a risk tolerance, since in every investment always there will be the fear to lose the capital that has cost so much work to gather. If you're a beginner investor, the most certainty is that your risk tolerance is low and look to put your money in shares of low volatility. While those investors more experienced will seek a risk higher for obtain greater profits.

It is here when the betas are very helpful, since through these you can select them investments according to your tolerance of risk.

If your risk tolerance is high, you won´t have problems in adding to your portfolio those stocks whose betas are high. The Betas will help you compare the level of risk between different stocks.

## Explanation of Results

Negative beta: A beta less than 0 indicates an inverse relationship to the market. For example, if the market rises, stocks with a negative beta tend to go down and vice versa.

Beta equal to zero: means that the asset has no risk whatsoever, and in this category cash comes in since, unless there is inflation, the value will remain the same regardless of market movement.

Beta between 0 and 1: They have a lower volatility than the market.

Beta 1: represents the volatility of a representative market index, which as noted is the S & P 500 index. If a stock has a beta equal to 1, the fluctuation in the price will be directly correlated with the movement of the index S & P 500, in direction and amount.

Beta higher than 1: It reflects higher volatility than the market.

## Limitations of the Betas

One of the limitations of the betas is that do not include all the information of the companies. For example, a company that is relatively new in the quote in bag, not will have sufficient information in your price historical as to establish a measure reliable. Another factor to be considered is that they cannot be used as instrument of forecast of prices future, since betas are based on past price fluctuations, which are not necessarily reflected in the future.

The betas measuring the market risk, but do not measure other risks faced by company itself as political, credit, foreign exchange risk, etc.

Because betas tend to fluctuate constantly, this measure of little serves for investors in the long term, so it is necessary to complement the analysis with the other fundamentals of the company.

## LITERARY REVIEW

Stay (2006) Refers a story as follows; when you were a child, did you fear to the dark? Me, yes. I hid under the sheets, because I could not stop looking at the shadows cast on the bedroom wall. When I could not take it anymore, I liked to call my mother. All I had to do was turn on the light, show me where the shadows usually came from the palms outside to my window, and she use to told me to get into bed. When the lights went out again, the shadows were still there, but already understood where they came from. I was no longer afraid.

Fear also plays an important role in the investment. Most investors fear the risk of losing their initial investment due to market volatility. However, volatility, like the shadows on the wall of my room, has to be understood rather than torn. Once an investor understands how the risk and volatility work, they can be used as a tool to evaluate any given investment.

We all have a different tolerance for risk. What can be completely acceptable that you may feel uncomfortable for me and that you stop having a good night´s sleep. But how is the level of risk measured in an investment? We do it when you see the beta.

Beta? "That is Greek". Beta is the second letter of the Greek alphabet. However, in the investment, beta has a special meaning. It represents a statistical measure of price changes in the past of a stock and how these ups and downs compare with the general market price change.

The beta version of the S & P 500 index has been given a score of 1. You don't have to find out how this fact came to be. All you need to remember is that if you have an investment with a beta of 1, which means that in the last 36 months it has gone up or down in the same proportion as the general market - and when we say "general market," we are talking about of the Standard & Poors 500 index. Therefore, a stock sways more violently than the market will have a beta greater than 1, and a stock with a lower volatility will show a beta lower than 1.

Why bother with the beta? When you are choosing between two stocks of the same caliber, but one has a higher beta than the other, collecting the smaller beta will expose you to lower risk. However, it

is also giving you the potential of the greater riches.

A stock with a beta above or below 1 indicates to what extent the investors of a stock has strayed from the market as a whole. For example, a beta of a stock is 1.5, it has gone up or down as much as one and average more than the market. If the beta is 0.5, the stock price has moved up or down half. Technology stocks tend to have betas greater than 1. Utilities fall under because their prices have historically been more stable.

Let's say that you have thought about buying a stock with a beta of 2. You know it could go up or down twice as much as the market. If the market, as measured by the variation of the S & P 500 index has gone up percent, then its stock could rise double up, or 10 percent. If the S & P 500 percent, then your stock could fall by as much as in percentage.

More aggressive investors would like this stock, they do not mind taking the risks because the reward can be sweeter.

A stock with a beta below 1 – that is , below-market - means that it is expected to swing less violently than the market.

**This is a beta low of values**

And summed up saying: The higher the beta, greater is the risk and the promise of rewards. The lower the beta, less will be the risk, but could be less rewards also.

I'm not saying that a higher-beta existence is only for players and that you should aim for a beta lower than 1. Higher-beta could get a higher profitability. But if you are faced with two good candidates, the lower beta will probably allow you to sleep better at night. If you decide to have a high beta of value, keep a close surveillance on it and be ready to sell quickly-as the tide could turn sharply and suddenly.

Do not be too quick to buy a stock with a beta of 2 and higher. Studies have found that less than 5 percent of the best shares led to this level of volatility. Therefore, do not take more risks than you can comfortably tolerate. Historically, the best actions have had an average beta of 1.14. Therefore, the next time your agent calls with a purchase recommendation, make sure you ask him what the beta version of that investment is, turn on the light and see where those shadows come from before you settle down to sleep well by it night.

Cavallari et to the (2009), commented that according to the existing literature, accounting information represents an important predictor of the company´s future cash flow and serves to evaluate the risk of stock investments. Because such information reflects the economic and financial reality of an enterprise over a given period, this information is related with the systematic risk of an investment, which justifies the use of the information for decisions related to the composition of a portfolio of values.

In this context, the present study has by object present empirical evidence on the relationship between the accounting information and systematic risk in the Brazilian market. More specifically, the objective is to analyze the relationship between accounting betas and market betas of companies in Brazil. For this analysis, 97 companies from 15 economic sectors were selected from the securities, movables and future of São Paulo (São Paulo Stock Exchange, Commodities and Futures Exchange - BM & FBOVESPA) from the first quarter of 1995 to the third quarter of 2009. A total of 468 accounting variables were used.

To implement the relationship between the variables, a regression model with panel data was used. On the one hand, the results show that some accounting betas can explain the market beta and do so in advance and that these accounting betas are able to improve the prediction of the beta market when used in conjunction with the historical beta on the market. On the other hand, the majority of the beta versions of accounting shows a rather insignificant or even non-existent relationship.

Bukvik et al (2009), indicate that the quantification of the risk level of the project is a technique that is

very important for the decision-making process of investors, but rarely is used in cases of the projects that present new business activity by its author or the projects of the company set in motion, due to the difficulties arising in the calculation process.

This work presents the alternative approach to the traditional beta calculation techniques that proposes the optimization and the combination of the available beta calculation methods. Beta coefficient measures the volatility of expected outcomes of certain investments in relation to the global efficiency of the capital markets.

This paper describes techniques, depending on the nature of the project case, analyst can overcome the difficulties in the calculation process and arrive at more accurate results of analysis so that improves the decision-making process and increases the probability of achieving the best results for the investors.

Ferent & Armean (2014), In 2010 the European Commission presented the Europe 2020 strategy with a focus on smart, sustainable and inclusive growth. Linking one of the agenda's main targets, i.e. increasing the employment rate among the European Union's countries, with the current policy liberalization debate, the study referred, analyses the business environment and labor market policies for 30 European countries and provides an empirical classification of the two based on 2013 indicators. The most commonly approached labor market output is the unemployment rate. Thus a first section of this paper introduces the reader into the previous researches conducted on its evolution in the liberalization policy context, i.e. the impact of the labor market and business environment factors on the unemployment rate's series. Further on, it presents a classical classification of the European labor market regimes as proposed by the literature. Grounded on a quantitative research paradigm and a positivist philosophy, the paper follows the existing literature and extends the current classification frameworks, proposing two country groupings based on business and labor market related factors. The analysis is conducted through exclusive clustering methods. As such, six clustering methodologies are applied (Ward, Exact Maximum Likelihood, Flexible-Beta Method, McQuitty's Similarity Analysis, Single Linkage and K-means). Three country-clusters are emphasized for both analyses performed (business environment and labor market). No cluster emphasized purely liberalized policies, neither purely tight ones, but rather different mixtures of the two. The clustering aims at providing a common framework for analyzing different market's outputs and assessing the strengths and weaknesses of different policy models. An exemplification of its utility is provided in this paper by analyzing the cross-country differences in two highly traced outputs, i.e. unemployment rate and job vacancy rate. The regime-based cross-country comparison tests for the existence of a preferred model by searching for a model that systematically outperforms the others.

New label some old funds (2014), The authors comments that sometimes you really do need to look beyond the branding. Case in point: Fundamentally weighted index funds have been around for nearly a decade but never caught fire with retail buyers. Then about two years ago, the fund industry, with help from consulting firm Towers Watson, came up with the snappier "smart beta." Now the funds are surging in popularity.

Given that, it's important to understand what you're being sold, and how—and whether—you ought to be buying.

**What is smart beta?**

"Beta" is an academic term that refers to gains attributable to your exposure to the market, not stock picking. So off the bat, this sounds advanced. As for "smart," that implies other strategies are dumb. Which option would you choose?

The trick worked: From 2004 through 2011, these funds pulled in about $25 billion a year. In 2012, when "smart beta" became a buzz phrase, that jumped to $43 billion, and then to $81 billion in 2013. Nearly $1 out of $3 invested in exchange-traded funds last year went to a smart beta ETF, according to Cogent Research.

Yet the products didn't change. They remain index like funds built in unconventional ways. Take SPDR S&P Dividend ETF (SDY), which doesn't track a broad market like the S&P 500, but a smaller group of

stocks that have raised dividends for at least 20 years. While traditional indexes hold stocks based on market value, these funds hold shares in proportion to other measures, such as profits, valuations, or—as in SDY's case—dividend yields.

A smart way to invest

Purists say this is a marketing gimmick in more ways than one. They argue that these funds aren't passive index strategies; they're active bets on market slices such as small stocks or dividend-paying shares. "It's an active strategy that's been repackaged in index form," says Joel Dickson, Vanguard's global head of investment research.

As far as active funds go, though, many of these offerings are cheap because their index like structure limits their trading costs. Power-Shares FTSE RAFI U.S. 1000 (PRF), in our MONEY 50 recommended list, charges 0.39% a year, nearly a percentage point less than its peers.

So be smart: Forget the labels and use these funds for that small bit of your portfolio devoted to active funds.   For instance, you may tilt your portfolio to dividend stocks for income and stability, but cap your exposure to a fund like SDY to 10%.

Save the bulk of your portfolio for traditional index funds that are even cheaper than smart beta. The dumbest thing you can do, after all, is overpay for investments.

 Narasimhan, M. S., & Kalra, S. (2012). Examines the impact of changes in aggregate market liquidity on stocks in which derivative trading is allowed. Though the liquidity of the market declines after the introduction of derivative trading, the impact of changes in market liquidity on stocks is critical in asset pricing. We find that the negative value of liquidity beta has increased after the introduction of derivative trading, thus increasing the sensitivity of liquidity shocks on asset prices. Data for measuring poverty are frequently available in a summary form that describes the proportion of income or expenditure for each of a number of population proportions.

Chotikapanich, et al, (2013). While various discrete poverty measures can be applied directly to data in this limited form, they typically require an arbitrary approach to within-group interpolation. This problem can be overcome by fitting either a parametric income distribution or a Lorenz curve to the grouped data and computing the required quantities from estimated parameters. The Lorenz curve approach is widely used by the World Bank, but can encounter problems. As an alternative, in this article we show how to calculate several poverty measures from parameters of the generalized beta income distribution, and its popular special cases. An analysis of poverty changes in countries from South and Southeast Asia is used to illustrate the methodology.

Fan et al, (2015), Traditional beta is only a linear measure of overall market risk and places equal emphasis on upside and downside risks, but actually the latter is always much stronger probably due to the trading mechanism like short-sale constraints. Therefore, this paper employs the nonlinear measure, tail dependence, to measure the extreme downside risks that individual stocks crash together with the whole market and investigates whether such tail dependence risks will affect stock returns. Our empirical evidence based on Shanghai A shares confirms that most stocks display non negligible tail dependence with the whole market, and, more importantly, such tail dependence risks can indeed provide additional information beyond beta and other factors for asset pricing. In cross-sectional regression, it is proved that this tail dependence does help to explain monthly returns on Shanghai A shares, whereas the time-series regression further indicates that mimicking portfolio returns for tail dependence can capture strong common variation of Shanghai A stock returns.

The study of  Shomir & Jeong-gil, (2011), looks into the relationship between the variability of individual stock betas and large portfolio betas. The study also compares the variability of the betas of small capitalization stocks with large capitalization stocks. It discovers the difficulty of minimizing portfolio beta variability  by  selecting stocks.  It  also  finds  that betas of  portfolios  of  small capitalization stocks are higher than large capitalization stocks.

It is set out this study to examine the asymmetry in beta responses using the dynamic conditional correlation threshold generalized autoregressive conditional heteroskedasticity (DCC-GJR-GARCH)

model.

Liau, Y. (2016). The empirical results reveal that asymmetry is discernible in both volatility and betas in the global stock markets. Furthermore, when leverage is linked with the price-to-book ratio, the results indicate that the beta asymmetry is attributable to the leverage effect. The results of this study also reveal that the declines in the price-to-book ratio following the subprime mortgage crisis have led to an overall increase in betas.

Based on the information cited, above it can be released that for the sustainability of the enterprise, the correct managing of the investments risk could contribute to obtain profits and making a very good enterprise performance with funds enough for affronting the competence, the market changes, the technology advance, and one strategy for making an enterprise sustainable is applying the beta measurement strategy for to make the enterprise investments portfolio, taking care of the level of risk that the enterprise wants affront.

**RESEARCH DEVLOPMENT**

Objective.

The objective of the present study, is to identify the usefulness of the Beta index through the application of the Beta coefficient in different virtual investments, in order to determine the level of risk of different investment portfolio in some empirical cases and take this exercise as reference for future investors and to have the opportunity to measure the risk degree that the investor want to take with the purpose of making the enterprise sustainable.

**Methodology**

The methodology used in the present work is the empirical research and non-experimental, through the development of practical cases of determination of the Beta index of diverse alternatives of virtual investment in different investment options using the methodology of Beta determination without changing or altering any data.

**Social Beta effect**

A topic of recent interest is risk management in equity investments from emerging markets. One traditional measure for systematic risk of an asset is beta, which is constructed through ordinary least squares (OLS) regression between historical returns on an individual asset and an index representing the overall market. OLS regression assumes all the error lies within the asset returns. Tofallis (Eur J Oper Res 187(3):1358-1367, ) made the case for constructing a systematic risk measure through symmetric regression, where error is assumed to be present in the returns of both the asset and the index. In their paper, they construct a systematic risk measure using symmetric regression for the case of the Johannesburg Stock Exchange (JSE). That paper makes the case that the so-called 'total beta' parameter provides a more realistic and stable estimator for market-related risk and return. The total beta estimate, explicitly allowing for error in both variables, is less likely to underestimate the magnitude of the beta parameter, Laird Smith &Meyer (2016).

**Practical and Proved cases**

Use of as a point of reference to determine the betas, in all the cases, CETES's (Certificates of treasury in Mexico). Performance 28 days for being an instrument of stable investment and with zero risks.

**CASE STUDY NO. 1**

Table No. 1
Índex Reference

| 2015 | Performance Cetes |
|---|---|
| January | 2.67% |
| February | 2.81% |
| March | 3.03% |
| April | 2.96% |
| May | 2.98% |
| June | 2.97% |
| July | 2.99% |
| August | 3.04% |
| September | 3.08% |
| October | 3.02% |
| November | 3.02% |
| December | 3.22% |

Table No. 2 Performance of Group Femsa

| Date | Latest | Open | | Maximum | Minimum | Performance Femsa | |
|---|---|---|---|---|---|---|---|
| 30/01/2015 | 125,190 | 127,000 | | 127,900 | 124,270 | | |
| 27/02/2015 | 142,730 | 142,800 | | 144,450 | 140,640 | 14% | |
| 31/03/2015 | 143,110 | 142,610 | | 44,200 | 140,410 | 0% | |
| 30/04/2015 | 139,080 | 141,010 | | 141,010 | 138,510 | -3% | |
| 29/05/2015 | 137,030 | 138,610 | | 140,000 | 136,190 | -1% | |
| 30/06/2015 | 139,970 | 140,140 | | 140,700 | 137,770 | 2% | |
| 31/07/2015 | 146,100 | 146,290 | | 147,740 | 145,000 | 4% | |
| 31/08/2015 | 149,350 | 146,900 | | 150,100 | 144,930 | 2% | |
| 30/09/2015 | 151,270 | 150,500 | | 152,130 | 150,300 | 1% | |
| 30/10/2015 | 163,170 | 166,650 | | 166,650 | 161,850 | 8% | |
| 30/11/2015 | 160,430 | 168,000 | | 168,000 | 159,700 | -2% | |
| 31/12/2015 | 161,630 | 159,500 | | 162,080 | 158,000 | 1% | |

Variance:      0236058%
Covariance:    -0.00221%
Beta:          -0.93738%

Table No.3

Performance of FINANCE GROUP BANORTE 2015

| Date | Latest | Opening | Maximum | Minimum | Performance BANORTE |
|---|---|---|---|---|---|
| 30/01/2015 | 76,070 | 78,530 | 78,810 | 75,810 | - |

| 27/02/2015 | 81,190 | 80,210 | 81,900 | 80,210 | 7% |
|---|---|---|---|---|---|
| 31/03/2015 | 88,520 | 87,800 | 88,750 | 87,750 | 9% |
| 30/04/2015 | 87,480 | 87,400 | 88,100 | 85,750 | -1% |
| 29/05/2015 | 86,930 | 86,700 | 87,320 | 86,330 | -1% |
| 30/06/2015 | 86,240 | 84,110 | 86,800 | 84,010 | -1% |
| 31/07/2015 | 84,800 | 85,870 | 86,400 | 84,640 | -2% |
| 31/08/2015 | 80,410 | 79,050 | 80,740 | 78,700 | -5% |
| 30/09/2015 | 82,800 | 80,920 | 83,180 | 80,510 | 3% |
| 30/10/2015 | 88,950 | 91,000 | 91,150 | 88,310 | 7% |
| 30/11/2015 | 89,490 | 90,690 | 90,690 | 88,560 | 1% |
| 31/12/2015 | 94,990 | 93,610 | 95,390 | 93,610 | 6% |

Table No. 4

Performance of MECHEM 2015

| Date | Latest | |
|---|---|---|
| 30/01/2015 | 41,560 | ---- |
| 27/02/2015 | 43,580 | 5% |
| 31/03/2015 | 39,840 | -9% |
| 30/04/2015 | 43,940 | 10% |
| 29/05/2015 | 46,660 | 6% |
| 30/06/2015 | 45,390 | -3% |
| 31/07/2015 | 47,190 | 4% |
| 31/08/2015 | 42,920 | -9% |
| 30/09/2015 | 41,510 | -3% |
| 30/10/2015 | 42,840 | 3% |
| 30/11/2015 | 41,040 | -4% |
| 31/12/2015 | 38,500 | -6% |
| | | |
| VARIANCE: 0.420762% | | |
| COVARIANCE: 0.00329% | | |
| BETA: - 0.78224% | | |
| | | |

VARIANCE: 0210881%

COVARIANCE: 0.00035%

BETA: -016364%

Table No. 5

Performance of Televisa Group 2015

| Date | Latest | |
|---|---|---|
| 30/01/2015 | 97,560 | - ---- |
| 27/02/2015 | 101,610 | 4% |
| 31/03/2015 | 100,800 | -1% |
| 30/04/2015 | 111,660 | 11% |
| 29/05/2015 | 116,440 | 4% |
| 30/06/2015 | 122,110 | 5% |
| 31/07/2015 | 112,420 | -8% |
| 31/08/2015 | 102,450 | -9% |
| 30/09/2015 | 88,200 | -14% |
| 30/10/2015 | 96,110 | 9% |
| 30/11/2015 | 93,350 | -3% |
| 31/12/2015 | 94,340 | 1% |
| | | |
| | VARIANCE: | 0.600864% |
| | COVARAIANCE: | -0.00228% |
| | BETA: | - 0.37902% |

Table No.6

Performance of KIMBERLY-KLARK
2015

| Date | Latest | |
|---|---|---|
| 30/01/2015 | 28,835 | ----- |
| 27/02/2015 | 30,173 | 5% |
| 31/03/2015 | 31,689 | 5% |
| 30/04/2015 | 33,720 | 6% |
| 29/05/2015 | 34,463 | 2% |
| 30/06/2015 | 33,611 | -2% |
| 31/07/2015 | 37,030 | 10% |
| 31/08/2015 | 37,208 | 0% |
| 30/09/2015 | 37,882 | 2% |
| 30/10/2015 | 39,497 | 4% |
| 30/11/2015 | 39,170 | -1% |
| 31/12/2015 | 40,370 | 3% |
| | | |
| VARIANCE: 0 124160% | | |
| COVARIANCE: - 0.00048% | | |

BETA:          -0.38905%
PORTFOLIO BETA: -2.32406.

The Beta Index of Case Study No. 1, is negative of -2.32406   including the enterprises,  Kimberly Clark, Televisa Group, Mechen, Banorte Group, and Femsa, that means that the movement of this portfolio, is inverse to the Cetes movements, which represents a high  risk in the portfolio investment.

## CASE STUDY NO. 2
Table No.7
Cetes Performance

| 2015 | PERFORMANCE CETES |
|---|---|
| JANUARY | 2.67% |
| FEBRUARY | 2.81% |
| MARCH | 3.03% |
| APRIL | 2.96% |
| MAY | 2.98% |
| JUNE | 2.97% |
| JULY | 2.99% |
| AUGUST | 3.04% |
| SEPTEMBER | 3.08% |
| OCTOBER | 3.02% |
| NOVEMBER | 3.02% |
| DECEMBER | 3.22% |

Table No.8

| GRUPO BIMBO | |
|---|---|
| COVARIANCE | 0.00049663 |
| VARIANCE | 0.001161822 |
| BETA | 0.427457681 |
| | |
| CEMEX | |
| COVARIANCE | -0.000125948 |
| VARIANCE | 0.001161822 |
| BETA | -0.108405483 |
| CHEDRAUI | |
| COVARIANCE | -7.47118E-05 |
| VARIANCE | 0.001161822 |
| BETA | -0.064305738 |

| LIVERPOOL | |
|---|---|
| COVARIANCE | 0.00023336 |
| VARIANCE | 0.001161822 |
| BETA | 0.2008577 |
| | |
| TELEVISA | |
| COVARIANCE | -0.00042504 |
| VARIANCE | 0.001161822 |
| BETA | -0.36584133 |

Performance of the companies selected for the case study.

| DATE | MARKET | COMPANY BIMBO | COMPANY CEMEX | COMPANY CHEDRAUI | COMPANY LIVERPOOL | COMPANY TELEVISA |
|---|---|---|---|---|---|---|
| 29/01/2015 | 0.00365 | - 0.02810 | - 0.08547 | - 0.01488 | 0.05870 | - 0.01073 |
| 26/02/2015 | 0.05455 | 0.08395 | 0.10781 | 0.09230 | 0.06209 | 0.03387 |
| 26/03/2015 | 0.05172 | - 0.00585 | - 0.07073 | - 0.01037 | 0.04085 | - 0.01932 |
| 30/04/2015 | - 0.06557 | - 0.03036 | 0.07488 | 0.00546 | - 0.02724 | 0.11682 |
| 28/05/2015 | 0.04912 | - 0.00534 | - 0.00743 | - 0.00456 | 0.03596 | 0.04550 |
| 25/06/2015 | - 0.00334 | 0.00976 | 0.00408 | - 0.02880 | 0.05344 | 0.05302 |
| 30/07/2015 | 0.01007 | 0.02682 | - 0.07593 | - 0.01303 | 0.00549 | - 0.09371 |
| 27/08/2015 | 0.03654 | - 0.00377 | - 0.05796 | - 0.06897 | 0.01795 | - 0.09003 |
| 24/09/2015 | - 0.03205 | - 0.01110 | - 0.06776 | 0.06284 | 0.12133 | - 0.09588 |
| 29/10/2015 | 0.00993 | 0.11347 | - 0.09774 | 0.07591 | 0.10214 | 0.06164 |
| 26/11/2015 | - 0.00656 | 0.01051 | - 0.03981 | 0.00599 | - 0.00645 | - 0.01233 |
| 31/12/2015 | 0.00660 | - 0.02442 | - 0.09065 | - 0.02359 | - 0.09102 | - 0.01842 |

PORTAFOLIO BETA: 0.0179525 Case No. 2

The beta of case No. 2, is 0.0179525, and this includes enterprises like Bimbo Group, Cemex, Liverpool,

Chedraui and Televisa, which are e very successful enterprises, and their beta is very close to cero, which means that this is the portfolio with less risk than the other cases studied.

| Date | Cetes 28 days | NETFLIX | CEMEX | ICA | SANTANDER | INBURSA |
|---|---|---|---|---|---|---|
| 26/02/2015 | 2.9 | 0.098444564 | 0.8849771 | -0.156679 | 0.0338558 | 0.0422046 |
| 26/03/2015 | 3.05 | -0.10517367 | 0.0962334 | -0.080681 | 0.0112189 | -0.08242 |
| 30/04/2015 | 2.85 | 0.381411232 | -0.044881 | 0.0966184 | -0.062669 | -0.049065 |
| 28/05/2015 | 2.99 | 0.113713237 | 0.022803 | -0.077746 | -0.081749 | -0.067109 |
| 25/06/2015 | 2.98 | -0.13466 | -0.052562 | -0.073473 | 0.0020704 | 0.012795 |
| 30/07/2015 | 3.01 | 0.256396838 | -0.000693 | -0.135364 | -0.020178 | 0.037142 |
| 27/08/2015 | 3.12 | 0.040358089 | -0.04187 | -0.345203 | -0.066476 | -0.023211 |
| 24/09/2015 | 3.02 | -0.1303638 | -0.036684 | 0.0740181 | -0.041348 | -0.011598 |
| 29/10/2015 | 3.02 | 0.003097617 | -0.102056 | -0.070323 | 0.2120607 | -0.049513 |
| 26/11/2015 | 3.03 | 0.135128669 | -0.111959 | -0.253857 | 0.0892797 | -0.060723 |
| 31/12/2015 | 3.05 | -0.04713297 | -0.026852 | -0.146635 | -0.043629 | -0.040716 |
| | | | | | | |
| VARIANCE | 0.00492397 | 0.024380217 | 0.07211335 | 0.01467194 | 0.0066519 | 0.00161234 |
| COVARIANCE | | -0.005937385 | -0.00815495 | -0.0051034 | 0.000275 | -0.00068443 |

| BETA | | -0.243532918 | -0.11308517 | -0.34783436 | 0.04134217 | -0.42449442 |
|---|---|---|---|---|---|---|
| | | | | | | |
| BETA PORTFOLIO | | **-0.217520939** | | | | |

| Date | Cetes 28 days | NETFLIX | CEMEX | ICA | SANTANDER | INBURSA |
|---|---|---|---|---|---|---|
| 26/02/2015 | 2.9 | 0.098444564 | 0.8849771 | -0.156679 | 0.0338558 | 0.0422046 |
| 26/03/2015 | 3.05 | -0.10517367 | 0.0962334 | -0.080681 | 0.0112189 | -0.08242 |
| 30/04/2015 | 2.85 | 0.381411232 | -0.044881 | 0.0966184 | -0.062669 | -0.049065 |
| 28/05/2015 | 2.99 | 0.113713237 | 0.022803 | -0.077746 | -0.081749 | -0.067109 |
| 25/06/2015 | 2.98 | -0.13466 | -0.052562 | -0.073473 | 0.0020704 | 0.012795 |
| 30/07/2015 | 3.01 | 0.256396838 | -0.000693 | -0.135364 | -0.020178 | 0.037142 |
| 27/08/2015 | 3.12 | 0.040358089 | -0.04187 | -0.345203 | -0.066476 | -0.023211 |
| 24/09/2015 | 3.02 | -0.1303638 | -0.036684 | 0.0740181 | -0.041348 | -0.011598 |
| 29/10/2015 | 3.02 | 0.003097617 | -0.102056 | -0.070323 | 0.2120607 | -0.049513 |
| 26/11/2015 | 3.03 | 0.135128669 | -0.111959 | -0.253857 | 0.0892797 | -0.060723 |
| 31/12/2015 | 3.05 | -0.04713297 | -0.026852 | -0.146635 | -0.043629 | -0.040716 |
| | | | | | | |
| VARIANCE | 0.00492397 | 0.024380217 | 0.07211335 | 0.01467194 | 0.0066519 | 0.00161234 |
| COVARIANCE | | -0.005937385 | -0.00815495 | -0.0051034 | 0.000275 | -0.00068443 |

| BETA | | -0.243532918 | -0.11308517 | -0.34783436 | 0.04134217 | -0.42449442 |
|---|---|---|---|---|---|---|
| | | | | | | |
| BETA PORTFOLIO | | **-0.217520939** | | | | |
| | | | | | | |

**CASE STUDY No. 3**
Table No.9
Enterprises Stock Performance
Beta results by Company

The beta index of Case No. 3, is -0.217520939, and includes enterprises like; Netflix, Cemex, Ica, Santander and Inbursa which is negative, so for this means that there is a risk investing in this portfolio due to the negative results and because their movement is in the inverse way to the cetes performance what represents major risk.

## CONCLUSIONS AND DISCUSSION

As a result of the practical realized cases, we can conclude the Beta index is a useful indicator that can guide the investor in his decisions of investment based on the risk that oneself wants to take as the case of the portfolio No.1 that it's include companies as the Grupo Televisa and the Grupo Kimebrly Clark that are very profitable companies, nevertheless, on his performances when combined by companies as Grupo FEMSA y Grupo Mechen, these companies are not so profitable, they generate a beta in relation to the performance of Cetes of -2.32406, which indicates that the performance of the portfolio will be inverse to the performance of the Cetes which represents a risk for the investors, and in case of Portfolio No. 2, that was considered companies as Group Bimbo, Group Cemex, Group Liverpool And Group Chedraui, it generates a positive beta of 0.0179525. This represents a substantially lower investment risk since the beta is positive and the portfolio performance will move in the same sense that the performance of the index of reference CETES 28 days. And the Portfolio Not. 3 that there involves companies as Grupo ICA, Grupo Santander, Grupo Inbursa, generates a Beta of     -0.217520939, it represents a risk, but very low for the investors of this portfolio, in view of the negative result, but below the unit; since it is possible to estimate these studies and practical cases indicate alter natives of investment that can ensue from usefulness for the investors and to be able to measure the degree of risk that they want to take.

This way our results with coincidental with those who mention Bukvik et al (2009), which indicate that the quantification of the level of risk of a project is a technology that is very important for  process the capture of decisions of the investors and across the coefficient thread measures the volatility of the results expected from certain investments in relation with the global efficiency of the capital markets and based on the results presented chose the best option with lower risk could help in becoming  in a sustainable enterprise

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