

## **Corporate Systematic Risk and Capital Assets Pricing Model Analysis: Evidence from Istanbul Stock Exchange**

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### **Abstract**

*The current study intends to examine validity of Capital Asset Pricing Model in Istanbul Stock Exchange with special orientation to the cement industry and the power and distribution sector. The present paper presents the background of the research area and analyses the prior academic research and analysis conducted on examination of the validity of the Capital Asset Pricing Model in particularly the Istanbul Stock Exchange. The paper also clearly expounds the aims and objectives of studying the concept and comprehending the nature of association between the stock beta and profit. Furthermore, the study also explicates illustratively the importance of inspecting the compatibility for utilizing Capital Asset Pricing Model. The study therefore intends to select two different sectors under the Istanbul Stock Exchange and examine the implementation of the model for relating different risk return association in the industry. Again, the learner intends to associate diverse segments and perform regression analysis founded on data on both cement sector as well as the power generation and distribution industry.*

**Keywords:** CAPM, Systematic risk, Profitability, Istanbul Stock Exchange.

JEL-codes: G1, G12, N25.

### **1. Introduction**

This research paper mainly focus on analyzing for Capital Asset Pricing Model especially in Istanbul Stock Exchange. In this particular research paper, there shows linear relationship between stock beta as well as profit. This linear relationship helps in measuring the level of systematic risk after exposure of assets (Barberis *et al.* 2015). It is better to have higher beta of an assets aligning with higher return. Hence, this particular research paper investigates the relationship in gaining produced mixed results as well as indicated validity of CAPM changes in accordance )with data methodology.

This research paper analyzes similar tests leading to beta coefficient ability for measuring risk. If there is higher systematic risk in developing markets, it understands the role of beta coefficient. In this particular study, CAPM time series method shows model can be statistically evaluated for explaining the changes in the rate of profits. Therefore, this research paper shows the relationship between beta coefficient as well as profit that is not positive in nature. Emerging markets majorly creates advantageous speculation opportunities for contribution higher return as well as low correlation particularly in urbanized markets used for diversification (Da *et al.* 2012). In other words, higher return comes with greater volatility especially in stock markets caused from particular factors. Individuals investing in countries expected from greater return after exposed to risk factor. By comparing other asset pricing models, it has been observed that Capital Asset Pricing Model used as popular asset pricing models especially in developed as well as emerging markets. Therefore, success of the model depends upon produced mixed results as used by analysis.

Use of Capital Asset Pricing Model especially emerging markets used in inherent dynamics of emerging markets (Zabarankin *et al.* 2014). In this particular study, it has to be attempted for analyzing compatibility of Capital Asset Pricing Model in the emerging market known as Istanbul Stock Market. It requires achieving weekly data ranging from years testing as time series. This asset-pricing model indicates parameters after supporting validity of the model (Sharbatoghlie and Sepehri 2015). Using of cross sectional analysis help in understanding betas as well as average return gaining no linear relationship.

### **Aim and objectives of the study**

#### **Aim of the study**

The main aim of the study is to validate the concept of Capital Asset Pricing Model in Istanbul Stock Exchange. The main prospects of the study are to understand the relationship between stock beta and profit. This particular study aims at investigating the compatibility after using Capital Asset Pricing Model. This asset-pricing model will go through using simple time series regression on weekly data taken from Turkish Stock Market.

#### **Objectives of the study**

- ✚ To understand the linear relationship between stock beta and profit depending on the concept of Capital Asset Pricing Model
- ✚ To analyze systematic risk and beta of an asset depending upon the concept for Capital Asset Pricing Model
- ✚ To test the applicability of CAPM model by describing risk-return relationships in Cement sector as well as Power generation in Turkey
- ✚ To compare sectors by using regression analysis ranging for a specified period

#### **Significance of the study**

The main significance of the study is to understand the cross sectional model indicating relationship after construction of Capital Asset Pricing Model. In other words, the study investigated aspects of Capital Asset Pricing Model mainly in Turkey based by taking sources of information from Istanbul Stock Exchange. This has been emphasized upon cement sector as well as power generation and distribution sector. This paper shows importance of relationship between Coefficients Beta as well as Capital Asset Pricing Model of cement sector. This can be done by conducting regression analysis of Coefficient Beta as well as CAPM in cement sector.

#### **Research Questions**

1. Explain the linear relationship between stock beta and profit.
2. What is the validity of sourced information found from Istanbul Stock Exchange after using Capital Asset Pricing Model?
3. What is the relationship between Coefficient Beta and CAPM in Cement sector?

### **2. Risk in CAPM Framework**

CAPM classifies the risk as attached with securities based on diversification. This is mainly classified into two broad categories:

#### **Systematic Risk and role of Beta**

It is important to consider the fact that Systematic risk occurs when firms operates in a country or exposure of market conditions. This depends upon the kind of risk used after eliminating diversification process as well as investor compensating regarding bearing that risk (Moosa 2013). In that case, it involves country specific issues relating to political as well as economic history for posing systematic risk. Some of the main sources of systematic risk include interest rate risk as well as exchange rate risk and inflation risk. Therefore, it is safe to suppose that for a particular business unit to be exposed to a definite type of systematic risk in a particular nation, the business unit needs to operate in that nation (Guermat 2014). Given the nature as well as characteristics of functionalities, any average business unit needs to manufacture, sell or else finance its business activities in the nation say, X in order to be fully exposed to specific systematic risk in nation X. However, the model of CAPM mentions that the systematic risk can be enumerated by essentially the beta coefficient. Nevertheless, the operations of a corporation are necessarily vulnerable to different macroeconomic variables in a particular nation in which the company carries out its operations (Guermat 2014).

### Non-Systematic or Firm Specific Risk

It is important to consider the fact that non-systematic risk arises in case for understanding dynamics of a company as well as its operational aspects. It widely varies from one company to other as it affects company operational aspects that need to be eliminated after diversification. In other words, low correlation help in creation of advantageous ways for diversification after eliminating non-systematic risk. It regards with increased number of assets in a portfolio for diversifying into non-systematic risk. This means closing the market portfolio in accordance with base theory of Capital Asset Pricing Model (Bornholt 2013). Therefore, bearing the risk cannot be even rewarded in that case because of extra return after eliminating through use of diversification. At large, it can be argued that even though the non-systematic risks are identical to both emerging as well as developed markets different factors of systematic risk vary widely. As rightly mentioned by Smith and Walsh (2013), the systematic risk cannot be regulated by business concerns and these systematic risks are necessarily affected differently in diverse markets. Significant sources of the systematic risk are essentially the rate of exchange, rate of inflation and political instability among many others. These factors are essentially consistent and are necessarily subject to different sudden alterations in different developed markets. However, CAPM can be developed in a manner that can help in taking into account different sources of risk. The model essentially supposes that the non-systematic risk needs to be recompensed but on the contrary different systematic risk require additional return. Smith and Walsh (2013) argue that the model of CAPM cannot be tested as it is essentially difficult to constitute factual market portfolio for testing the model. Therefore, the index return from the Istanbul Stock Exchange can be treated as a substitution of market portfolio. As rightly indicated by Maio (2013), the applicability of model of CAPM can be regarded as a very elegant model that can help in enhancing the investing policy of different financiers by being a reference point at the time of comparing different financial assets with regard to both risk as well as return.

### 3. Literature Review

As rightly put forward by Campbellet *al.* (2015), classical Capital Asset Pricing Model proposes asset pricing literature as referred from its implications. In other words, relevant literature questions regarding reviewing at the ability of CAPM model for pricing adequately based on financial securities (Maio2013). This literature review focus mainly on data as developed from emerging markets like USA and UK for use of established stock beta as well as excess return relationship.

Smith and Walsh (2013) test the model by using data from Greek stock market as well as accepted in the emerging markets. In other words, there is no linear relationship between beta as well as excessive stock return. This results in documenting figures by using data from India Stock Market in recent times. One of the other markets named as Romanian stock market used for testing and finding out proposed relationship between stock beta and profits Blitz, D., (Falkenstein *et al.* 2013). It is argued that results will be documented at particular time. It requires using data belonging to a period of financial crisis whereby data are little representative in nature.

Baillie and Cho (2016) tests Capital Asset Pricing Model by making use of data from Croatian Stock Market data as well as finding out the applicability in the same stock market. Recent study concerns with data by using daily data for given period. It requires finding out Liquidity Capital Asset Pricing Model by performing better for explaining stock returns in comparison with standard Capital Asset Pricing Model (Bornholt2013). In other words, it requires examining applicability of Capital Asset Pricing Model for establishing relationship between risks to return of a group of stocks as traded in the Ghanaian Stock Market. Therefore, it requires examining the applicability of Capital Asset Pricing Model by using data from 213 companies listed in Indonesian Stock Market. As opined by Baliand Engle (2014), the literature review focus mainly on Capital Asset Pricing Model studies for Turkey for gaining understanding of significant results in regard with validity of model. On the contrary, this involves analyzing the Turkish stock market data by making use of weekly returns for specified time. On analysis, it has been found out that there is no relationship between beta as well as return (Guermat2014). This study explains the relationship between insignificant beta and return relation aligning for Istanbul Stock Exchange.

As .rightly, put forward by Pesaran and Yamagata (2012), study focus majorly on Turkish firms after operating in cement sector. This requires using of data for establishing no significant relationship. This successfully manages with the model of Capital Asset Pricing Model emerging in the developed economy. In other words, this study suggests ways for testing the model on Capital Asset Pricing Model. It requires producing the modest results in given developed markets as well as failed in case of emerging markets (Moosa2013).

Therefore, in order to conduct sound analysis of Capital Asset Pricing Model, it is essential to maintain and visit main variables affecting the research methodology after evaluating the model on Capital Asset Pricing Model.

As opined by Maio(2013), Capital Asset Pricing Model explains the model of portfolio choice. As mentioned in Markowitz model, an investor mainly selects portfolio for time  $t$  and stochastic return. This particular model introduced by Sharpe and used attitude for making comparative asset evaluation. CAPM theory forecasts on the expected return on an assets after risk-free rates in aligning with non-diversifiable risk for measuring covariance of asset return (Caiet *et al.* 2013). This is in aligning with portfolio composed of all the given standing assets named as market portfolio.

Baiet *al.* (2015) argues that CAPM model assumes investors should be risk averse for selecting among the portfolios. It should be taken care of by understanding the difference between mean as well as variance on behalf of investment return. This results a situation whereby investors selects from given mean-efficient portfolios. This majorly takes into consideration minimizing the risk of portfolio return as per the expected return as well as maximizing the expected return as per the given risk (Chocholaet *al.* 2014). Therefore, Markowitz approach is also known as Mean-Variance Model. This particular model provides an arithmetical condition on an asset weighing in mean-variance efficient portfolios.

As rightly put forward by Evstigneev *et al.* (2015), investors demand a higher expected return especially in case of investing riskier projects or securities by using different models. In other words, investors expect risk of basic securities by using capital asset pricing models. Finance managers as well as investors for finding risk of investment mainly use this particular model. This particular model takes into consideration certain assumptions for calculation purpose. Unsystematic risk can be avoided especially in case of portfolio diversification as well as investors satisfies for understanding the systematic risk (Levyand Roll2012). It is aligning with securities that cannot be exceeded, as higher systematic risk will be in accordance with return of the investors. It requires examining whether there is positive linear relationship between average returns as well as beta (Beaulieuet *al.* 2012). This requires examining whether the squared value of beta as well as uncertainty of asset returns. This means understanding the outstanding in average returns in and across assets that cannot be explained by beta all alone in any case.

#### **4. Data, methodology and empirical results**

The current segment sheds light on the systematic as well as theoretical process of evaluation of the methods implemented to this particular field of research. As such, the current section involves different principles that include exemplar, theoretical model, diverse phases as well as qualitative and quantitative mechanisms (Mackey and Gass2015).

**Quantitative research method:** The learner has conducted the quantitative methods for the present study in order to emphasize different objectives and manipulate pre-existing statistical data by utilizing computational procedures (Mackey and Gass2015). Quantitative research can be regarded as a justified research method as it helps in systematic investigation of different observable phenomena through the use of statistical tools, mathematical and at the same time computational mechanisms (Flick2015).

**Capital Asset Pricing Model (CAPM)-** The current study applies the CAPM model. This model helps in connecting different diversifiable risk as return of different sectors. Firstly, the current section illustrates beta coefficient ( $\beta$ ) and this helps in enumeration of diverse non-diversifiable risk (Guidolin and Rinaldi 2013). Thereafter, the second segment expounds illustratively the equation of this particular model. The CAPM model can be regarded as a commonly utilized method of asset pricing and this model is also a major section of the finance courses because of different intuitive theory as well as simple use. The CAPM model was essentially developed by William Sharpe during the year 1964. As such, this particular model suggests that there exists linear association between the risk as well as return. Therefore, financiers need to be rewarded with additional return for carrying one additional unit of extra risk and this indicates towards systematic risk owing to un-diversifiable nature (Alpand Bilir2015). As per the model, the return from a stock can be essentially formulized and presented as an equation.

**Equation:** The equation of the CAPM model includes:

$$\text{CAPM} = R_f + \beta(R_m - R_f)$$

$R_f$  = Risk free rate of return which is approx. 10%

$B$  = Coefficient Beta (Index of the non-diversifiable risk)

$R_m$  = Return on the market portfolio of asset which is 13.5%

The CAPM model have the need for a linear association between the risk as well as return and each unit of risks that cannot be eradicated by means of diversification needs to rewarded additional return (Ozturk and Yilmaz 2015). Consequently, in fact it is assumed that  $\epsilon_{it} = 0$  as it leads to the fact that generation of a market portfolio refers to diversification of product that can eradicate different business unit specific risk. However, the beta coefficient reflects the way a particular stock can be affected by systematic risk. Again, the model also supposes that financiers need to borrow at a rate that is essentially free of risk and diversify the portfolio (Ceylan *et al.* 2015). This process also makes sense when one holds index portfolio as they have different asset groups from diverse segments of stock market. This also becomes vulnerable to different systematic risk as well as beta coefficient of the portfolio logically becomes better than beta of the market portfolio.

**Beta Coefficient ( $\beta$ )-** The beta coefficient explicates diverse diversifiable risk and it is essentially the index of the degree of movement of return of a particular asset in response to alterations in the rate of return of the market (Al-Qaisi 2011). Particularly, the historical returns of assets are necessarily utilized for finding the beta coefficient of a particular asset. Again, the return from the market is essentially the return earned from the market portfolio and of different traded securities (Shah *et al.* 2014).

**Data:** The learner has adopted the secondary research method that essentially involves utilization of information that are already available. The secondary research method makes use of secondary data that is easily accessible that is also easily quick and involves low cost (Mackey and Gass 2015). The secondary method of research is justified in this case as this helps in guiding the overall focus of any subsequent primary research. Again, the secondary research might also be available source of important sections of information. Furthermore, this secondary research technique is also justified as this helps in gaining easy access, low cost as well as acquirement of knowledge, clarification of diverse research questions. This technique also helps in aligning the main stress of the primary research in a very large scale and can aid the process of identification of the answers.

However, there are essentially two different types of secondary research namely, internal secondary data and external secondary data. As rightly put forward by Mackey and Gass (2015), the internal secondary data comprises of information acquired within a particular research corporation. Again, the external secondary data comprises of information acquired outside of the particular research corporation. In the present case, the learner intends to adopt the external secondary data that refers to acquirement of data from different external sources such as the reports from the Istanbul Stock Exchange as well as many other media sources and web sites among many others.

**Description of the data:** The current study has investigated the capital asset pricing model founded on the sources of information gathered from the ISTANBUL STOCK EXCHANGE stressing solely on the cement industry as well as the power generation and at the same time distribution segment. The learner has selected the data that ranges two years between 2012 to 2013. There are in all 50 companies in particularly the cement industry listed as well as unlisted corporations in the Istanbul Stock Exchange. However, the learner has utilized the data on only 10 fortune corporations in the cement sector for the present research. Again, there are in all 40 corporations in the power generation as well as distribution sector that is listed in the Istanbul Stock Exchange. The learner intends to use only 10 corporations out of the 40 corporations of the power generation as well as distribution sector.

**Companies:**

The table below presents the name of the company in the **cement industry listed in the Istanbul Stock Exchange** along with the codes that will be used for conducting the present study:

Company Name	Code
AS CEMENT INDUSTRY	AACL
BASTAS CEMENT INDUSTRY	ACPL
BURSA CEMENT INDUSTRY	BWCL
LAFARGE CEMENT INDUSTRY	CHCC
DENIZIL CEMENT INDUSTRY	DGKC
GOLTAS CEMENT INDUSTRY	DBYC
KOYNA CEMENT INDUSTRY	DNCC
NUH CEMENT INDUSTRY	DCL
ASKALE CEMENT INDUSTRY	FCCL
AKCANS A CEMENT INDUSTRY	FCL

**Figure 1 Company Name**

(Source: Tradingeconomics.com 2016)

The table below presents **the 10 corporations that are selected out of the 40 corporations in the power generation as well as distribution sector listed in the Istanbul Stock Exchange:**

Company Name	Code
ISTANBUL ANADOLU YAKASI DISTRIBUTION COMPANY	ALTN
AYDEM ELECTRICITY DISTRIBUTION COMPANY	GENP
ENERJISA BASKENT DISTRIBUTION COMPANY	HUBC
AKEDAS ELECTRICITY DISTRIBUTION COMPANY	IDEN
CALIK ELECTRICITY DISTRIBUTION COMPANY	JPGL
CORUH ELECTRICITY DISTRIBUTION COMPANY	KAPCO
BOGAZICI ELECTRICITY DISTRIBUTION COMPANY	KESC
TRAKAYA ELECTRICITY DISTRIBUTION COMPANY	KOHE
AKDENZI ELECTRICITY DISTRIBUTION COMPANY	KOHP
ARAS ELECTRICITY DISTRIBUTION COMPANY	SEL

**Figure 2: Company Name**

(Source: Tradingeconomics.com 2016)

### Size of the sample:

There are in all 50 corporations from the cement sector that is listed or else unlisted in the Istanbul Stock Exchange. However, the learner has adopted the data from only 10 companies operating in the cement sector listed only in the Istanbul Stock Exchange. In addition to this, the learner has also selected 10 corporations from the power generation as well as distribution sector listed in the Istanbul Stock Exchange. Therefore, the size of the sample selected for the present study includes 20 corporations.

### Empirical results

The learner can test the implementation of the model for describing different risk return association particularly in the cement industry in Turkey. The learner has compared different segments and carries out regression analysis based on data on both cement sector as well as the power generation and distribution industry. This process can help in the process of comparing different sectors and identify the sector that is relatively more attractive than the other. In case if the confidence level as well as bench mark rate is 5 percent that is essentially equivalent to 0.05, then the outcomes of the study can be considered to be significant. However, the rate over and above 5 percent reflects the fact that the results are insignificant (Flick 2015). The Confidence Level and Bench Mark Rate exactly equal to 5% refers to the fact that the results are statistically significant. Again, the rate above 5% (0.05) demonstrates results to be statistically In-significant.

### 5. Conclusion

The current study has examined capital asset pricing model based on different sources of information gathered from the Istanbul Stock Exchange emphasizing both the cement sector and the power generation as well as distribution sector. The data is collected for the duration of two years between 2012 to 12-2013.

In particular, there are in all 50 corporations that are both listed as well as unlisted in the Istanbul Stock Exchange in the cement sector. Out of this, 10 fortune firms are selected for the study. Again, out of the 40 corporations both listed as well as unlisted in the Istanbul Stock Exchange in the power generation as well as distribution sector, 10 have been selected for the study. The insignificance of the results reflect that the capital asset pricing model is not applicable in the sector and the significant result replicate that this model can be applied in a particular sector (Guidolin and Rinaldi 2013). The significant results can prove to be important for certain mentioned stocks for a certain number of years. The study can also help in the process of approximation of market beta of a specific stock and combine the same with the risk free rate of interest as well as the average risk premium for the market to generate an estimate. The expected outcomes of the study is that the analysis of the observations of the study can help in determining whether CAPM is a correct measure for enumeration of the risk and required rate of return. Therefore, the study can help in understanding if the financiers can keep trust on this particular model for the purpose of pricing of different basic securities in identified work framework. The prospective area of research comprises of testing of the Capital Assets Pricing Model (CAPM) for both the Cement Sector and Power Generation and Distribution Sector of the selected companies listed under the Istanbul Stock Exchange. The upcoming study can also be tested using different advanced educated tools such as Generalized Autoregressive Conditional Heteroscedasticity model or else Arbitrage Pricing Theory (Guidolin and Rinaldi 2013). The relatively educated tools are also identified as multifactor model that in turn can help in comprehending the pricing phenomena of the Istanbul stock exchange. The current study can also help in understanding the nature of association between the stock beta and the profit. Therefore, it can be said that the current study investigates whether the equation of the CAPM can facilitate the process of understanding the dynamics of the risk and the return of the selected companies for the specified period. The review of the literature that sheds light on the CAPM that in turn generates diverse outcomes not only because of the data but also because of the particular employed research methodology to conduct the specific test. The study can also help in understanding the way business units can get affected by different systematic risk in a specific nation. Again, the study also helps in understanding the reliance on the ability of the beta for measurement of the systematic risk might not be precise.

### ***Recommendation***

The study on the validity analysis of Capital Asset Pricing Model in Istanbul Stock Exchange needs can examine the existence of any kind of unconditional association between beta as well as returns of the 20 different corporations operating under two different sectors in this experiential study. With the intention and purpose of investigation of the nature of association between the two different sectors under the Istanbul Stock Exchange, the learner might perform regression analysis founded on data on both cement sector as well as the power generation and distribution industry. Analysis of the substantial association between beta and returns can also help in analyzing the validity of CAPM in the Istanbul Stock Exchange.

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