St.Petersburg University
Graduate School of Management
Master in Corporate Finance

ANALYSIS OF FACTORS OF PREMIUM FOR COMPANY SPECIFIC RISKS IN RUSSIAN STEEL AND MINING INDUSTRY

Master's thesis by the 2nd year student
Concentration- Corporate Finance
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St. Petersburg
2017

ЗАЯВЛ ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

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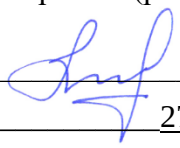

_____(Student's signature)

27.05.2017 (Date)

АННОТАЦИЯ

Автор	Гаврилова Алена Александровна
Название магистерской диссертации	Анализ факторов премии за специфические риски компаний в российской горнодобывающей и металлургической промышленности
Факультет	Высшая Школа Менеджмента
Направление подготовки	Корпоративные Финансы
Год	2017
Научный руководитель	Окулов Виталий Леонидович
Описание цели, задач и основных результатов	В данной работе основное внимание уделяется анализу премии за специфические рынки в горнодобывающих и металлургических компания России. До сих пор менеджеры, инвесторы, аналитики и владельцы испытывают трудности при определении премии за специфические риски компаний при оценки бизнеса для разных целей. Специфические риски являются уникальными рисками, свойственные только для определенной, анализируемой компании, а также это те риски, которые не могут быть дифференцируемы инвестором в силу своей уникальности. Премия за специфические риски- это количественное выражение специфических рисков. Основными целями работы мы обозначили нахождение факторов, которые влияют на премию за специфические риски, а также определение размеров премии за факторы, которые являются специфическими рисками для компаний, оперирующих в металлургической и горнодобывающей отрасли России. Основные задачи могут быть представлены следующим образом: 1) Обзор методов для оценки бизнеса, техник для подсчета премии за специфические риски публичных компаний, и факторов, которые являются специфическими рисками для компаний и, в свою очередь влияют на премию за них. 2) Подсчет волатильности операционной прибыли, относительного уровня специфического риска для каждой компании в нашей выборке, а также премии за специфические риски.

	3) Сбор финансовой информации из отчетов компаний про все публичные компании из горнодобывающей и металлургической отрасли России информация о которых доступна в открытом доступе базы данных SKRIN, SPARK, Thomson Reuters 4) Определить факторы, которые являются значительными для премии за специфические риски в металлургической. и горнодобывающей отрасли России. 5) Определить отраслевой размер премии за специфические риски, который менеджеры, инвесторы, аналитики и владельцы могут использовать при оценки бизнеса. Основными результатами является выявление финансовых факторов, специфичных для металлургической и горнодобывающей отрасли России, премии за которые оценщики бизнеса могут добавлять/убавлять к ставкам дисконтирования при оценки фирм, а также размер премий. Такими образом, за истинно специфические риски оценщикам бизнеса следует брать: прибыльность, ликвидность и оборот оборотного капитала. За отклонение прибыльности компании от среднего показателя по отрасли оценщикам следует рассматривать премию в 0.3%, за ликвидность- 1%, за оборот оборотного капитала стоит взять во внимание премию в размере 0.2%. В ходе исследования было выявлено, что левердж является как фактором рыночного риска, так и специфического. Применив две разные беты (бета с долговой нагрузкой и без) для подсчета премии за специфические риски и подсчитав разницу между полученными размерами премий, было выявлено, что премия в размере 1.8% является оптимальной для долгосрочного долга к активам компании, и 2 % за другой показатель левереджа, рассматриваемый в данной работе- долг к капиталу компании.
Ключевые слова	Специфический риск, Премия за специфический риск, Ставка дисконтирования, Оценка бизнеса, CAPM

ABSTRACT

Master Student's Name	Alena Gavrilova
Master Thesis Title	Analysis of factors of premium for company specific risks in Russian steel and mining industry
Faculty	Graduate School of Management
Main field of study	Corporate Finance
Year	2017
Academic Advisor's Name	Vitaliy L., Okulov
Description of the goal, tasks and main results	In this research, we point our attention to analyze of premium for specific risks in Russian steel& mining industry. Until now appraisers confused about this indicator while valuing companies for different purpose. Specific risk can be determined as unique risks that are specific for certain company. Moreover, specific risk can be risk that investors can not diversified away. Specific risk premium is a quantitative representation of such risks. The main goals of this paper is to find factors and determine the size of specific risk premium for valuation of companies in Russian steel and mining industry. The objective can be formulated as follow: 1) Analyze of techniques to value business, overview of existing theoretical and empirical studies of models to calculate companies specific risk premiums and factors, which affect the company specific risk premium. 2) Calculating the volatility of operational profit and relative level of specific risk for every company in our sample, determine the specific risk premium for every company in our sample. 3) To choose a sample of all public companies in Russian steel and mining industry, information about which is available in SKRIN, SPARK and Thomson Reuters databases, collect financial data of companies from financial statements. 4) Identify the factors that influence specific risk premiums in Russian steel and mining industry. 5) Determine the size of premiums managers, owners and investors should consider while valuing business. As a result, we identify the main financial factors that specific for Russian steel and mining industry, premium for which can be

	added/subtracted in discount rates while valuing the business. In addition, the size of premiums was detected. Thus, as factors of specific risk appraisers should consider the following financial factors: liquidity ratio- current ratio, profitability ratio determined as EBITDA/Asset and ratio showed operational performance of the company- working capital turnover ratio. For deviation of current ratio or liquidity of the company the size of 1 % premium may be taken in account, for deviation of profitability – 0.3%. As we include two leverage ratios which are widely use in practice and knowing that such ratios absorbs not only company's specific risk but also market risk, we calculate premium for specific risk with help of two betas: levered and unlevered. The different between premium obtained in these two cases – the premium for specific risk due to deviation of leverage ratios. For long-term debt equity- 1.8% and for debt/equity- 2%.
Keywords	Specific risk, Premium for specific risk, Discount rates, Business Valuation, CAPM

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INTRODUCTION

Specific risks are inherent part of the overall risk of the company. Generally, they are taken into account as a premium for specific risks in the required yield on equity of the company, which is key component in valuation of company, investments or project. The company specific risks represent uncommon characteristics that induce investors to see the company's risk from the different side from another companies they can be compared to. While assessing the company specific factors and their related risks, when added to the adjusted CAPM, often translate into a greater or lower discount rate. When applied to the expected cash flows in a discounted cash flow model ones get a result of a lower or greater amount. This causes investors to ask more or less return to compensate form taking the extra risk they exposed to. The goal of company specific risks is to take into account a firm's non-diversifiable risks that are clearly different from others.

According to the assumption of behavioral hypothesis and using the formula, which connect the magnitude of specific risks of the investments with the premium to the expected return that the rational owners of capital require from the investment, we are going to find a specific risk premium for Russian companies in steel and mining industry.

Frequently, managers in doubts about the appropriate factors, which affect the value of company specific risk premiums. This is not surprising since researchers and scientists cannot come up with universal method to measure specific risks premium for long time. Some propose to use rating system while assessing the company performance; others suggest applying discounts, which reduce the overall specific risk. The issue about the nature of factors, as we found out, is still in place.

The main goal of this paper is to find factors and determine the size of specific risk premium for valuation of companies in Russian steel and mining industry.

Thus, the research questions of the paper are:

1) "What is the main factors that affect company specific risk premium in Russian steel and mining industry, which appraisers should take into account?"
2) "What is the size of the premium managers, investors should add while valuing business?"

The objectives:

1) To analyze techniques to value business and overview existing theoretical and empirical studies of models to calculate companies specific risk premiums and factors, which affect the company specific risk premium.

2) To calculate the volatility of operational profit and relative level of specific risk for every company in our sample, determine the specific risk premium for every company in our sample.
3) To choose a sample of all public companies in Russian steel and mining industry, information about which is available in SKRIN, SPARK and Thomson Reuters databases, collect financial data of companies from financial statements.
4) To identify the factors that influence specific risk premiums in Russian steel and mining industry.
5) To determine the size of premiums managers, owners and investors should consider while valuing business.

There is no major research in this field for Russian market, steel and mining industry. In addition, the analysis of specific risk premium and conclusion based on the research can be extremely useful for managers, investors and owners who will be able to have concrete factors and the size of premiums to take into account while doing the valuation of the firm in Russian steel and mining industry. As the owners, managers, investors confused with main orients in abundance of factors, highlighting the most important ones to particular industry may help to be more accurate while using the most common models and formulas to calculate the value of business. Therefore, the same usefulness are applicable for investors or analysts in term of considering companies to invest their money. Managers, appraisers, analysts and owners of the company often have to orient themselves on industry average indicators. This can happen for many reasons, such as the short history of the company or hidden data. The average data can be useful in this term since the information, the big sample of companies on which they are based, made them a good indicators to navigate.

CHAPTER 1. OVERVIEW OF BUSINESS VALUATION

1.1 Methods to value business

It has been always crucial for managers as well for analysts, owners to value business, assets and projects in a clear manner, using the appropriate methods and values for different indicators that represent particular situations within the structure they analyze.

There are many components in valuing business calculation in which managers should be precise. Therefore, they should take into account every detail, every specific feature of business, assets or project. In this paper, we devote attention to estimating the specific risk premium – an integral part of cost of equity.

Many ways exist to value the firms depending of the managers priorities of what to put in the center of valuation. We are going to look at the most fundamental techniques to value firms that base on cash flows and discount rates, as our main interest lies in right choice of factors, which influence discount rate.

Discounted cash flow valuation (DCF) method present the Income approach valuation. Income approach of valuation can be applied through the Discounted Cash Flows method, Capitalized Cash Flows method, Excess Cash Flow method. Discount rate that absorb uncertainty and riskiness of the business. The principle DCF lies in calculating the value of assets by discounting the expected cash flows at the rate representing the asset's riskiness. Formula for DCF valuation can be presented as follow:

$$Value\ of\ Asset = \sum_{t=1}^{t=\infty} \frac{E(Cash\ Flow_t)}{(1+r)^t} \quad (1)$$

where,

r - discount rate that presents the riskiness of the cash flows and mix of finance used to get the asset as well;

$E(Cash\ Flow_t)$- expected cash flows at period t;

t- time period;

If to convert this formula to company valuation, we can base our assessment on equity stake (value of equity) or on entire firm including other claimholders (value of firm). The value of the firms we can find using the formula above:

$$Value\ of\ the\ firm = \sum_{t=1}^{t=\infty} \frac{CF\ to\ firm_t}{(1+WACC)^t} \quad (2)$$

where,

$CF\ to\ firm_t$ – expected firm's cash flow at period t;
$WACC$- weighted average cost of capital;
t- time period;

Value of equity is estimated by discounting expected cash flows to equity (CF to equity) at cost of equity rate (Ke).

$$Value\ of\ the\ equity\ = \sum_{t=1}^{t=\infty} \frac{CF\ to\ equity_t}{(1+Ke)^t} \quad (3)$$

where,
$CF\ to\ equity_t$- expected equity's cash flow at period t;
Ke- cost of equity;
t- time period;

Dividends discounts models (Gordon's model, Two and Three stages dividend discount models, Fuller's and Hais's H model for valuing growth) suggest to use expected dividends and cost of equity (Ke) as an inputs.

Usually in attempt to value companies in the context of acquisition, financial performance methods, known as Net Present Value (NPV), Internal Rate of Return (IRR), are used to calculate previous efficiency of the company and forecast company's future performance. Traditional approach called NPV [Brealey, Myers, Allen, 2011], which is widely used in corporate finance, bases on matching the investment with the value of the projected cash flow of profit on the project. NPV method is widely used in appraiser's estimation while assessing company in pre-acquisition valuation, which matches present value of deal's profit and cost. If NPV has a positive sign, then benefits from deal greater are than cost and the decision to have a deal should be made and vice versa. Zero NPV means that profit from the deal is equal to its cost, this signals that deal is neutral and value of the buyer will not change. As for internal rate of return (IRR) model, it makes the price and expected profits for the deal being equal using the discount rate. Moreover, it compares the outcome from investing money in transaction and investing the same amount of money in bank account, for instance. To value the seller's business, appraiser estimates IRR and then compare this indicator with required rate of return. Suggested deals should be discarded when IRR is lower than the required rate of return.

There is another approach along with income and asset approaches – market-based approach, where analysts use the comparables to come up with the equity value. Asset approach valuation is more appropriate than companies consist of assets mainly, where focus only on balance sheet and analysts use the book company's value to determine the fair value of the assets and the liabilities to determine a net value for the company.

Now, we take a closer look on the components of discount rates to identify the problems associated with them.

1.2 Types of discount rates

One of the component of discounted cash flow (DCF) method is Weighted Average Cost of Capital (WACC), which depicts an average cost of financing a company's debt and equity, weighted to its corresponding apply. The WACC can be calculated with the following formula:

$$WACC = \frac{D}{D+E} * K_d + \frac{E}{D+E} * K_e \quad (4)$$

Where

E- total equity;

D- total debt;

K_e-cost of equity;

K_d- cost of debt.

Evidently, the one of the element of WACC is cost of debt (Ke). Ke can be described as the rate of return that investors require to make equity investments in a firm. Four main approaches to estimate this indicator exist:

1) Capital Asset Pricing model
2) Arbitrage Pricing model
3) Multi-factor model
4) Proxy model

According to theory, Arbitrage pricing model (APM) view the risk as non-diversifiable but Ke is measured by sensitivity of many economic factors and thus measures beta coefficient for every source of risk for investor. Managers or analysts do not use so frequently proxy model and multi-

factor model. In multi-factor model, market risk equals to risk exposures of any asset to macro-economic factors, while in proxy model; risk is seized by proxy variables.

Capital Asset Pricing Model (CAPM) provides for investor an opportunity to put money in an alternative, safe market portfolio with no risk and measure risk as comparative to a single market factor. CAPM model was developed in 1960's by several researches independently. Among them were: Jack Trainor (1962) John Lintner (1965), William Sharpe (1964) and Jan Mossin(1966).

In Corporate Finance, the definition of CAPM is:

"*Capital Asset Pricing Model is an equilibrium asset pricing theory that shows that equilibrium rates of expected return on all risky assets are function of their covariance with the market portfolio*"[1].

In Investment theory CAPM is defined as follow:

"*The CAPM is an equilibrium model of asset pricing that states that the expected return on a security is a positive linear function of the security's sensitivity to changes in the market portfolio's return*"[2].

The important assumptions for CAPM model can be formulated as follows:

1) There are many investors; wealth of each is smaller than the wealth of all investors.
2) There is one identical holding period for investors.
3) Investments can be made in traded financial assets, such as stocks and bonds. Moreover, investments are limited to risk-free borrowing or lending agreement.
4) There are no taxes on returns gained and transaction costs on trades in securities.
5) All investors use the Markowitz portfolio selection model.

The obtained CAPM formula is as follows:

$$R_p = R_f + \frac{\sigma_p * \rho_{p;m}}{\sigma_m} * (R_m - R_f) \quad (5)$$

where,

R_f- risk-free rate;

[1] Westerfield R.W, Ross S.A, Jaffe J.L. 2011. Corporate Finance3rd edition- McGraw-Hill/Irwin.

[2] Sharpe W., Alexander G.J., Bailey J.V. 1999. Investments. New Jersey, USA: Prentice Hall

σ_p, σ_m – standard deviation of portfolio and market yield;

$\rho_{p;m}$ – correlation coefficient of portfolio and market returns;

R_m- market premium.

The indicator of market risk is determined by coefficient, which equals to:

$$\beta = \frac{\sigma_p * \rho_{p;m}}{\sigma_m} \quad (6)$$

It is called beta coefficient and is determined as volatility or in other words, systematic risk of company, portfolio. Beta coefficient shows stock's market risk as compared with market itself. Moreover, beta coefficient can be determined as a degree of leverage in the firm. An increase in financial leverage of the firm makes equity beta coefficient increase due to the fact that high Debt/Equity ratios makes investments to the firm more riskier.

There are two types of betas: unlevered and levered. Unlevered beta shows risk of firm without any debt. Levered beta is corrected to firm's leverage (Debt/Equity). Nowadays, there are seven theories on levered betas exist that are valid for growing perpetuity (table 1.1). In other words, we are able to calculate the market risks due to financial leverage.

Table 1.1 Methods to calculate levered beta

THEORIES	FORMULA
FERNANDEZ	$\beta_L = \beta_u + (\beta_u - \beta_d) D(1-T)/E$
DAMODARAN	$\beta_L = \beta_u + \left(\frac{D}{E}\right)\beta_u(1-T)$
MYERS	$\beta_L = \beta_u + \left(\frac{D}{E}\right)(\beta_u - \beta_d)\frac{1 - T\,K_d}{K_d - g}$
MILES-EZZELL	$\beta_L = \beta_u + \left(\frac{D}{E}\right)(\beta_u - \beta_d)\frac{1 - T\,K_d}{1 + K_d}$
MODIGLIANI, MILLER	$\beta_L = \beta_u + \frac{D}{E} * \frac{\beta_u - \beta_d + \frac{T\,K_d}{P_m} - VTS(K_u - g)}{D\,P_m}$
HARRIS-PRINGLE	$\beta_L = \beta_u + \left(\frac{D}{E}\right)(\beta_u - \beta_d)$
PRACTIONERS	$\beta_L = \beta_u(1 + \frac{D}{E})$

Source: Fernandez P. 2003. Unlevered and Levered betas. Working paper. IESE Business School.

It is worth to mention that traditional CAPM does not compensate the investor for total risk, which consists of unsystematic risk and systematic risks. The main weak point of CAPM is that as every economic and mathematic model this model is derived in limited assumptions.

The risk premium is certainly a considerable component of capital asset pricing models. In general, it can be determined as the extra return owners of capital would like to get while putting money in risky project instead of safe riskless investments they can afford.

When investing in company's particular risky project, owners of capital have to be sure, that rate of return of this investment is greater than rate of return of another alternative option- market portfolio with the same risk level.

Summary of Chapter 1

For managers, investors, analysts it has been always crucial to value business, assets and projects in a clear manner, using the appropriate methods and values for different indicators that represent particular situations within the structure they analyze.

To value business, assets, entities there are many methods that can be used (DCF, NPV, DD, etc.) most of them use discount rate, which includes cost of equity. The most common method to assess cost of equity is to use Capital Pricing Assets Model (CAPM) that has indicators analysts are doubt to estimate. One of such element is specific risk, which can be determined as the risk dependent on the nature of the company and obtained by comparing with peer, which is close to this company in some sense.

In the next chapter, we will take a closer look to company specific risk premium, company specific risk, methods to calculate it, factor that affect this premium and nowadays practice to assess specific risk premium.

CHAPTER 2. OVERVIEW OF SPECIFIC RISKS AND PREMIUM FOR SPECIFIC RISKS

Reilley [Reilley, 2007] in his paper determined the specific risk as the risk dependent on the nature of the company and obtained by comparing with peer, which is close to this company in some sense. Total company investment risk consists of two parts: systematic risk and unsystematic. By using the term specific risk, we assume unsystematic risk – the risk, which can be referred specifically to one particular company.

Thus, company specific risk premium:

- Part of total risk, which is specific to a certain security that can be avoided by diversifying portfolio;
- Component of total risk, which makes the investment unique;
- Uncertainty of expected returns arising from factors other than the market itself.

In its turn, premium for specific risk is a quantitative representation of specific risk. The number that managers add to discount rates while calculating cost of equity.

2.1 Methods to calculate company specific risk premiums

Researchers and scientists in order to calculate company specific risk have proposed various methods, which are based on different assumptions. The issue of finding the appropriate quantitative model to find a specific risk premium is still in place. This question takes the mind of many researches.

As we have already mentioned, CAPM does not compensate investors for total risk. Total risk obviously incorporates company specific risk, which is important to the valuation of publicly companies [Goyal, Santa-Clara, 2001]. Authors of this paper have found that specific risk presents a big portion of total risk that drives the stock price variation. Researchers still try to explain such phenomenon. For instance, Benartzi and Thaler [Benartzi, Thaler, 2000] suggested that even employees in their pension funds held a disproportionate amount of particular company stocks that investors hold in undiversified portfolios. Mutual funds also held of company specific risk premium as Falkenstein [Falkenstein, 1996] suggested. Huberman was sure that investors are afraid to invest in new stocks, so they concentrate mainly on familiar ones, thus leading to undiversified portfolio [Huberman, 2001]. All these ideas led Butler and Pinkerton to create formula to detect premium for specific risk for publicity traded stocks or for public companies.

Butler and Pinkerton [Butler, Pinkerton, 2006] proposed another method to detect the company specific risk premium for public companies. This model is known as Butler-Pinkerton model and evaluates the indicator of company specific risk premium without detecting specific for every company risks to which they are exposed. Researchers do not share the viewpoint of previous scientists who believed that capital markets could fully assess the specific risks. According to their research, Total Beta measures the specific extra returns for public companies. The bases of Total beta was the indicator proposed by Aswath Damodaran [Damodaran, 2002] in his approach to evaluate the private companies, which measures the total all risk and equals to:

$$Total\ beta = \frac{Market\ Beta}{Portion\ of\ the\ total\ risk\ that\ is\ market\ risk} \quad (7)$$

Believing that investors could evaluate the unique risks of public companies on capital markets and that evaluation will be displayed in higher returns of stocks, researchees offered the formula for company specific risk premium evaluation as following:

$$CAPM: Ri = Rf + \beta i * market\ risk\ premium + size\ premium + company\ specific\ risk\ premium, \quad (8)$$

Where

Ri- rate of return on the equity of a company;

Rf- risk-free rate;

βi- market risk.

Because this formula does not include company specific risk premium, researchers tried to solve this issue by incorporate Total Beta.

$$Butler - Pinkerton\ Model: Ri = Rf + Total\ Beta * market\ risk\ premium \quad (9)$$

$$Modified\ CAPM = Butler - Pinkerton\ Model \quad (10)$$

$$Company\ specific\ risk\ premium\ i = (Total\ Beta\ i - \beta i) * market\ risk\ premium - size\ premium, \quad (11)$$

For private companies, Butler and Pinkerton, suggested firstly to use all values of comparable public company and then, according to analyst's opinion, add premium for specific risk of private company. Butler-Pinkerton Model (BPM) for private companies:

$$Ri = Rf + Total\ Beta * market\ risk\ premium + \Delta RPprivate, \quad (11)$$

Where,

$\Delta RPprivate$- company specific risk premium for private company.

BPM model helps to assess the company specific risk as well as rates of return for different public and private companies. Though, method to assess private companies is more subjective in the way which comparable to choose and how much premium for specific risk should be included. Butler and Pinkerton concluded that even large worldwide companies exhibit specific risk, which is greater than 0% that means that there is no diversification in capital market and thus, research, which stressed that market can fully describe the specific risk premium may be mistaken and their conclusions can mislead. The important inference follows from this model – the required rate of return undervalued due to incorrect calculation of specific risk premium that include subjective view on specific company's risk of analysts, who still doesn't have any clear rules or instructions how to assess those indicators. Scientists think company specific risk premium should be included in calculation of discount rates and make it solely for the capital market of analyzed company.

Shepeleva [Shepeleva, 2015] created her own approach on getting deeper in emerging markets specific risk assessment. Researcher pointed out that the differences in assessing risk for different markets lie in the levels of risks for each risk factor. In paper, the step-by-step procedure of new approach to analyze risk premium is analyzed. Firstly, to sort companies by industries, sorting companies according to the size effect (market capitalization, revenue, total assets, number of employees). After these two steps, calculation of company specific risk premium using Butler Pinkerton model is carried out, sorting companies according to financial or operational values. However, there are still open place to research on different approaches in emerging markets.

Malkiel in his research devoted to idiosyncratic risk and security returns [Malkiel, Xu, 2002] rejected the assumption of pure CAPM model about market risk as is the only one indicator of risk in attempt to assess the return and predicted the volatilities of idiosyncratic risk will have a positive effect on expected returns due to under diversification. Chen and Wang [Chen, Wang, 2015] according to the same logic of imperfection of capital markets and not well-diversified investors saw a positive relation between idiosyncratic risk and stock returns that investors' incentive to diversify varies over time. Brockman, Schutte, Wu [Brockman, Scgutte, Wu, 2009] in their paper shed the light on finding idiosyncratic risk by exploring the relation between expected returns and idiosyncratic risk in a broad way with numerous markets and as a result, the positive and significant relation between expected returns and idiosyncratic volatility for the majority of countries was found. At the same time, Ang, Hodrick, Xing, and Zhang and other researches [Ang, Hodrick, Xing, Zhang 2006 and 2009] detected the negative relations between idiosyncratic risk and expected return. The empirical research made by all scientist is founded on regression model, which consists of:

$$TCOE = Rf + \beta_1 * RP_m + \beta_2 * RP_s + \beta_3 * RP_{B-to-M} + RP_u \quad (12)$$

where,

TCOE (total cost of equity) - rate of return;

Rf - risk-free rate;

RP_m- market risk premium;

RP_s- company's size premium;

RP_{B-to-M}- book-to-market value premium;

β_i- beta coefficient for particular risk of company;

RP_u- specific risk premium;

The formula above was derived adding the additional factor to Fama and French [Fama, French, 1992] model. In their research, devoted to Capital Asset Pricing Model, found that two variables: size, book-to-market equity explain a lot of average stock returns. For instance, size which is set as the market equity and equal to the price of stock times the number of stocks. Researchers suggest that this size and book value of equity divided by market value of equity explains the variance of stock returns because these variables accounts for underlying risk of stocks. These variables represent by two portfolios named small minus big (SMB) and high minus low (HMS), which together with market return constitute the three factor model. Those variables are risk factors, which catch non-diversifiable variance of stocks.

$$TCOE = Rf + \beta_1 * RP_m + \beta_2 * RP_s + \beta_3 * RP_{B-to-M}, \quad (13)$$

where,

TCOE (total cost of equity) - rate of return;

Rf - risk-free rate;

RP_m- market risk premium;

RP_s- company's size premium;

RP_{B-to-M}- book-to-market value premium;

β_i- beta coefficient for particular risk of company.

Several researchers tackle the problem of finding appropriate premium head on others market imperfections. For instance, Rajgopal and Venkatachalam [Rajgopal, Venkatachalam, 2011] point out the informativeness of financial statement, lack of transparency in financial information and as a result, the uncertainty on market, which cause the stock return volatility and consequently increase in idiosyncratic risks. Hugonnier and Berrada [Hugonnier, Berrada 2009] in their paper found that company specific risk might exist due to the imperfection of capital market, especially in terms of available information. They propose that the idiosyncratic shocks perceived by investors are a combination of the true idiosyncratic shocks and forecast errors that cannot be unravel with information given. Reinganum [Reinganum, 1981] in his research suggest that small firms have underwent rates of return in average greater than those of big firms with the same beta risk, and that these abnormal returns have continued for at least two years from the formation of portfolio. Blum M., Stambaugh R., Brown P., Kleidon A., Marsh T., Barinov A., [Blum, Stambaugh, 1983, Brown, Kleidon, Marsh, 1982, Barinov, 2009] have shown that premium for specific company risk can arise because of:

- Liquidity
- Turnover
- Seasonality

Vitaliy L. Okulov [Vitaliy L.Okulov, 2017] proposed method to calculate premium specific risk according to the finance behavior theory. When shareholders determine the interest in making investment in company's project or in company itself (case we are concentrated on), he should be sure that return on such action will get the more utility than alternative investment, he want to get more return. Thus, the decision is making according to the rule, which quite similar to NPV:

$$-Inv + \sum_{t=1}^{T} \frac{\overline{CF_t}}{(1+\bar{R}_c+\Delta R_s)^t} \geq 0 \qquad (14)$$

where,

$\overline{CF_t}$- projected values of cash flows;

T- time period;

Inv- investments made;

$\bar{R}_c$- discount rate;

ΔR_s- premiums added.

In attempt to connect the amount of ΔR_s with the level of the specific risk, Vitaliy L. Okulov proposed model with help of which the premium specific risk will be derived for each of the companies in steel and mining Russian industry.

Investor when considering project or company always has two possibilities to invest money. Invest, for instance, in market portfolio or put money in bank account with uncertain future gain. According to theory, he agrees with any outcome and his minimum return can be presented as:

$$VaR_{\alpha}[R_p] = \bar{R}_p * T + z_{1-\alpha} * \beta_p * \sigma_m * \sqrt{T}, \quad (15)$$

where

$VaR_{\alpha}[R]$- minimum expected return;

$\bar{R}_p$- expected return;

T- time period;

$z_{1-\alpha}$- confidence level;

β_p- market risk;

σ_m- standard deviation of return;

Investor invests money to company. Behavioral theory and risk tolerance, we will get the return on money investor put his money in:

$$VaR_{\alpha}[R^{**}] = R^* * T + z_{1-\alpha} * \sigma_c * \sqrt{T} \quad (16)$$

Where σ_c- standard deviation of return from investments in company, which can be present as a following: the sum of market risk and specific risk.

$$\sigma_c^2 = \beta^2 * \sigma_m^2 + \sigma_s^2 = \beta^2 * \sigma_m^2 * (1+g^2), \quad (17)$$

Where

σ_c - standard deviation of company's return;

σ_m- standard deviation of return connected with company specific risks;

β- market risk;

g- relative level of company specific risk.

As a result, the following formula will be derived:

$$\Delta Rs = R^* - \bar{R}_p = \beta_c \cdot R_m \cdot (\sqrt{1+g^2} - 1), \quad (18)$$

Where

ΔRs - indicator of specific risk premium;

R_m- market risk premium;

g- relative level of company specific risk;

β_c- company market risk.

2.2 Factors that affect company risk premium

The choice of factors to evaluate the specific risks based on the selection among the bunch of indicators the most important ones. Afterwards, analysts assess them using for instance rating scale and finally sum of all premiums of all chosen specific risks.

Several researches – Warren Miller, Gary Trugman, Black and Green [Warren, 2000, Trugman, 2002, Black, Green, 1994] decided to establish more or less concrete factors of specific risk of companies. Using different methods of classification, they highlighted three major groups of factors of specific risk such as Industrial, Macro-Environmental and Internal.

Trugman in his research "Understanding Business Valuation" presents an analysis of the factors that valuation analysts may consider in selecting the company specific risk premium. Valuation analysts may consider each of these quantitative and qualitative factors in judgmentally selecting the appropriate company specific risk premium. Trugman's factors to calculate company specific risk premium are as follow:

- Economic conditions
- Location of business
- Depth of management
- Barriers to entry into market
- Industry conditions
- Competition
- Quality of management
- The bottom line

For proper estimation of the company specific risk, the competitive advantage/strategic analysis appeared. This technique assumes the approach that was created by Michael E. Porter [Porter M. E., 2008], known as SWOT analysis, which assumes division of company specific risk premium into groups according to strengths, weaknesses, opportunities, and threats.

Michael Porter's SWOT analysis regards environmental conditions, where company exists, such as Demographic, Political, Economic, etc. Furthermore, threats of new entrance, bargaining

power of supplier, customers, etc. and finally, the combinations of factors that influence the operation of particular company.

In order to assess company specific risk premium Warren decided to include the factors from six following categories:

1. competition
2. financial strength
3. management ability and depth
4. profitability and stability of earnings
5. national economic effects
6. local economic effects

In working paper "The Specific Company Risk Premium: New Approach" analysts from Highlang Global LLC. [Highland Global LLC., 2004] are trying to explain premium using factor analysis. They stress the attention on the needs of quantifiable to find the appropriate figure of company specific risk. In their opinion, the method of choosing the company specific risk premium is about choosing the most influential factors among Business Risk, Operational Risk, Market Risk, Economic Risk, Industry Risk, Revenue Growth, Competition, Diversification, Employee Relation and so on, that affect company performance and making the rating starting from zero to ten, according to impact upon the risk premium.

Revenue growth: There is an inverse relationship between revenue growth and the appropriate specific company risk premium.

Financial Risk: There is the direct relationship between the financial risk of the company and the specific risk premium. In measuring financial risk, researchers select the Debt/Equity ratio of the firm. Increasing leverage of the company indicates that the threat of the bankruptcy increases as well.

Operational risk: Operating risk is the ratio of fixed cost to sales. It is a clear indicator of risk of not meeting the fixed cost with decline in sales. There is the direct relationship between those two indicators.

Profitability risk: measure in Net Profit Margin, the more profitable the company, the less risk is present.

Industry risk: A firm performance relative to the industry performance is an indicator of industry risk associated with a firm.

Economic risk: If the firm has low ROA relative to economic growth (as the indicator of economic risk of the company), the company specific risk increases.

Customer concentration: if the firm derives a large percentage of sales from the few customers, the risk to the firm increases, because it may lose profit if loose just a few clients.

Mercer [Mercer, 1989] suggested evaluating the premium for specific risk of companies based on six main factors. Main factors of specific risks :

1) key figures and company management;
2) the size of the company;
3) financial structure;
4) product diversification;
5) geographical diversification;
5) diversification of customers.

According to the opinion and working experience of analyst who is doing calculations, the value from 0% to 5% is assigned to every factor of risk. As a result, the value of premium is the sum of all calculated premiums for every factor included. Illustration of Mercer's model presents in the table below (table 2.1).

Table 2.1 Mercer's approach for specific risk premium

SPECIFIC RISK	**PREMIUM RANGE**
Key figures and company management	0%-5%
Size of company	0%-5%
Financial structure	0%-5%
Product/geographical diversification	0%-5%
Customer diversification	0%-5%
Earnings: margins and historical predictability	0%-5%
Other specific factors	0%-5%

Mercer Z.Ch. 1989.The Adjusted Capital Asset Pricing Model for Developing Capitalization Rates: An Extension of Previous "Build-Up" Methodologies Based Upon the Capital Asset Pricing Model. *Business Valuation Review* 4: 147-156

Evans [Evans, 1999] offered his own approach to detect premiums, which is similar to Mercer's logic, but the difference lies in the expansion of the list of factors. Moreover, Evans proposed special discounts that reduce the number of total premium to find the required rate of return.

Nowadays, consulting firms proposed to use quantitative methods of assessing the premium for specific risk. Duff & Phelps issues an annual Risk Premium Report [Duff & Phelps, 2013] where stated that valuators can be used to take into account company-specific information in estimating a discount rate. The annual study identifies the correlation between realized equity returns and company-specific risk as defined through historical company accounting information. In particular, the study measures risk stemming directly from the subject company including the following metrics: operating margin, the volatility of operating margin (the coefficient of variation in operating margin), and the volatility of return on equity (the coefficient of variation of return on book value of equity). Thus, financial factors mostly included in determination of size of the risk premium.

Ibbotson Association (owned by Morningstar now) [Ibbotson SBBI, 2013] creates databases that provide analysts with information on small stock risk premiums. Creators assign value of risk premium according to the size of entity. Academics still cannot decide on a relation between size and risk premium, although they assume that smaller entities have higher risk premiums. Even though this database widely used nowadays, practitioners and analysts still questioned whether such firm's size division is valid [Pratt J., Shannon P., Roger J. Grabowski, 2008]. In addition, by publishing reports of specific risk premium calculation, firm did not provide clear estimation. Thus, using such indicator and putting in the valuation model is ambiguous. The last invention of Morningstar company is the database with assessment of specific risk premium according to the industry and specific for the company. For instance, knowing the industry of the company, analyst can use the mean of industry risk for correct the valuation estimation.

According to Deloitte & Touche conclusion, the specific risk premium value, which managers assign in practice, fluctuates in the range between 0%-10%. Company analysts created their own technique to assess specific risk premium based on range method[3].

The specific risk factors, practitioners have chosen are as follows:

1. Business development prospects

[3] Deloitte & Touche LLP. Risk Assessment in Practice.
URL: https://www2.deloitte.com/content/dam/Deloitte/us/Documents/risk/us-grc-coso-riskassessment-102312.pdf

2. Dependence on key suppliers
3. Corporate governance
4. Dependence on key employers
5. Price level
6. Financial stability of business

Many researches include financial risk factors such as Debt/Equity ratios, Total Debt ratios as factors of specific risk. However, it is important to highlight that leverage ratios are factor of market risk as well.

2.3 NERA Methodology as a specific risk factor model

The idea of NERA Consulting Company is to construct and implement an appropriate measure of cash-flow-at-risk for non-financial firms. Researches [Stein J., Usher S., LaGattututa D., Youngen J., 2001] who worked on this problem can define cash flow at risk as a probability of distribution a company's operating cashflow. These probability distributions can be used to generate a variety of summary statistics such as five-percent or one-percent "worst-case" outcomes, thereby providing corporate CFOs with answers to question about the degree of decline of operating profit if the company tempts the recession that turns out to be a ten-percent tail event. In some way, cash flow at risk is the same measure as value at risk indicator, which is mainly used by banks.

As for the VAR, analysts begin by enumerating assets of banks and the risk exposures of each assets then quantified these risks. Finally, the risk are aggregated across all portfolio. This technique works well when companies can identify each of its main source of risk and suits better to evaluate the risks of liquids instruments. Some consultants in attempt to assess individual or in other words specific risk somehow are trying to implement a bottom-up VAR model analogue and simply skip probably the most important source for that particular company, maybe mismeasure others. That can drive to wrong measure of overall cash flow at risk, to do a mistake while measuring the whole company's indicators as well [RiskMetrics, 2009].

For all non-financial companies, which are primary interested in detecting the specific risks to operating cashflows or operating profit, there are unreliable methods to calculate them. Stein, Usher, LaGattututa and Youngen in their research devoted to development of the model to measure the cash flow at risk for non-financial firms proposed approach, which summarizes the combined effect of all the risks facing particular company, in this way avoiding necessity to build a detailed model of the business from the ground up.

The idea of this approach is to apply the comparable-based approach, which consists of gathering in group non-financial companies that are similar to each other in some way to gain an information of operating cash flow of better quality in terms of information. Basic measure of operating cashflow is the earnings before interests, taxes, depreciation and amortization, but earnings before interests and taxes are also applicable. After prediction of how operating cash flow deviates from expectation, the formers of model determine these cash flows and constructed the subsamples based on four characteristics: EBITDA/Assets - the main indicator of company's profitability, Market Capitalization - as the indicator of company's size, Industry cashflow risk and stock price volatility. These factors are applicable if we analyzed companies from different industries. Single-industry factors, proposed by authors of methodology are as follow:

- Market Capitalization;
- EBITDA/Assets;
- Stock-price volatility.

After dividing companies into matrix with 9 subsamples, researchers put the operating cash flow's volatility percentage in every box. As a result, while observing companies classified in box and marked by percentage of operating cash-flow volatility, we can be sure that total risk, specific risk is significantly different, that factors we put to classify groups of companies determine the risk.

Thus, the factors NERA have chosen to analysis can be assumed to consider as specific risk factors for companies. They focused on operating profit volatility as the risk indicator and by dividing companies in subsamples gained peers companies with the same specific risk, which is special for these companies. Comparable-based approach have never been considered as qualitative model to assess premium for specific risk premium.

Summary of Chapter 2

There are many qualitative and quantitative methods to detect the size of that specific risk premium. For instance, model known as Butler-Pinkerton proposes to evaluate the indicator of company specific risk premium without detecting specific for every company risks to which they are exposed. Researchers do not share the viewpoint of previous scientist who believed that capital markets could fully assess the specific risks. According to their research, Total Beta measure the specific extra returns for public companies. Black and Green are trying to explain premium using factor analysis. In their opinion, the method of choosing the company specific risk premium is about choosing the most influential factors among Business Risk, Operational Risk, Market Risk,

Economic Risk, Industry Risk, Revenue Growth, Competition, Diversification, Employee Relation and so on, that affect company performance and making the rating starting from zero to ten, according to impact upon the risk premium.

As for practitioners, Morningstar (Ibbotson Association previously), Delloite & Touche, Duff & Phelps base their practices and recommendations to use analysts experience while calculating premium for specific risk. Delloite & Touche concluded, that the ranking of specific company premium is ranging between 0-10%. Morningstar analysts are trying to create databases where they associated entities' size and premium. NERA Consulting Company created Comparable-based-approach to subdivide companies by financial factors in categories according to volatility of operating profit, which absorbs the whole risk of the company. As we can observe, question about appropriate method to use is still in place.

In the next chapter on the example of Russian Steel & Mining companies, we will try to calculate the specific risk premium and make regression analysis using financial factors to detect the relations and significance of factors to company specific risk premium. Moreover, as it is stated in our goal, we will find the premium for these factors.

CHAPTER 3. EMPERICAL RESEARCH ON SPECIFIC RISK PREMIUM AND FACTORS AFFECTING IT

3.1 Research design

The goal of this chapter is to describe research design of our paper. After we reviewed theory on our topic, and recent analyst's approaches to appraise the specific risk premium we are going to calculate premium for specific risks and develop hypotheses. Then, we will describe our methodology and establish model to test previously stated hypotheses. Moreover, we will choose the variables that in our opinion are the most appropriate ones and justify that choice. The next step is to summarize our data and present the descriptive statistic.

The research design of this paper is constructed as following:

1) We will *calculate the premium for specific risk* in Russian Steel & Mining industry.
2) We will *make regression analysis* to assess the factors that influence the specific risk premium.

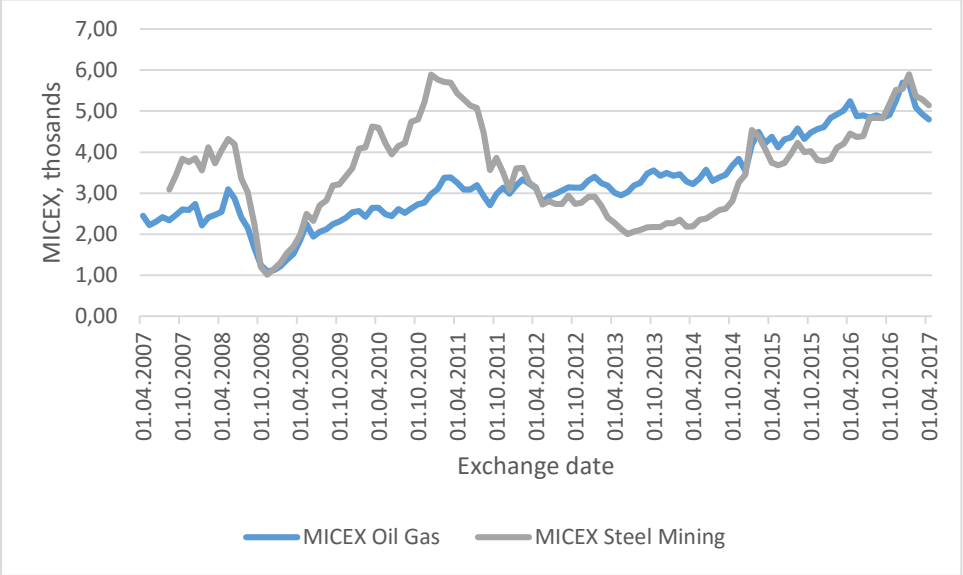
In order to analyze the factors of specific risk premium, we have chosen emerging markets due to weak research in this field. Shepeleva A. [Shepeleva A., 2015] points on incorrect application of existing research and models, which primarily were created for emerging markets, to developed markets.

Moreover, Russian Steel & Mining Industry was chosen because steel and mining industry is one of the core business economic growth of Russian driven by. It was found that industry performance during 10 years was volatile, shown unpredictable and worse performance than another significant for Russian market industry - oil and gas. Russia has the largest mineral reserves in the world and settle down in the third place in terms of world production of mineral commodities as gold, platinum and iron ore[4]. This core Russian industry continues to grow in terms of export as well as domestic production in spite of the harsh economic situation in Russian market during the last few years. The graph below (Pic. 3.1) represent the behavior of historic quotes for MICEX Oil & Gas and MICEX Steel & Mining. We can see the overall volatility and sharp decreases during periods. Although, Oil & Gas industry (production and exploration) has a beta equal to 1.38[5], higher

[4]JSC KPMG. Metal and mining in Russia: Industry overview and investment opportunities. URL: https://assets.kpmg.com/content/dam/kpmg/ru/pdf/2016/10/ru-en-metals-mining-sector-overview-september-2016.pdf (assessed at 07.03.17)
[5]Damodaran A. Betas by Sector (US). URL: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html (accessed at 10.03.2017).

than Metal& Mining, which are equal to 1.3[6], the behavior of index is more volatile. Thus, we can assume some specific features make index behave unpredictably.

Pic. 3.1. MICEX Oil & Gas, MICEX Steel & Mining prices during 10 years (2007-2017)



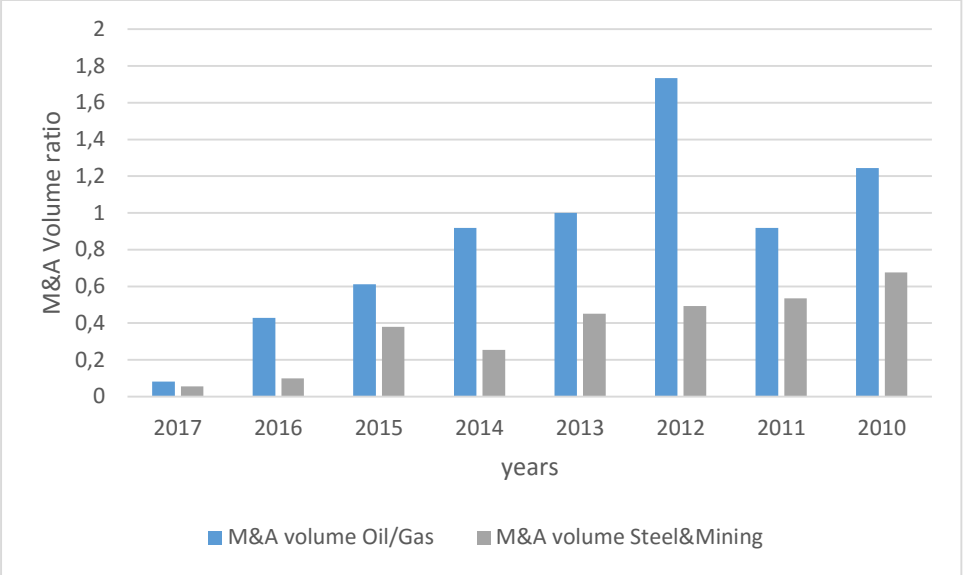
Source: Thomson Reuters

The number of deals divided to number of companies or M&A volume ratio from 2010 to 2017 if to compare two core industries for Russian economy shows that there is much to be desired in merge and acquisition term for Russian steel and mining industry, this is clearly observable from the graph presented below.

The ratios of number of deals to number of companies existing for this period (M&A Volume ratio) , which give us the more representative view of M&A activity, are presented in the graph below (Pic. 3.2).

[6]Damodaran A. Betas by sector (US). URL: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html (accessed at 10.03.2017).

Pic. 3.2. M & A Steel & Mining, M & A Oil & Gas Volumes during 7 years (2010-2017)



Source: Thomson Reuters

Although, there are numbers of reason why Steel & Mining sector showed such result, among all of them, we can assume the difficulties of appraiser's valuation of companies.

In order to find factors that affect company specific risk premium, firstly we will *calculate the company specific risk premium* using the formula, which is based on financial behavioral theory, which never been tested before. Researchers are still in doubts what formula can be applicable for emerging markets, it is a still open question, and new approaches are crucial [Shepeleva A., 2015]. We will use formula (18) to calculate premium for specific risk.

As we are looking for the specific risk premium for companies to find g coefficient firstly, we detect the volatility of operating profit for every company($volat_i$), calculate correlation between operating profit volatility and Metals & Mining Sectoral Index of Moscow Exchange ($\rho i, m$).

To find volatility of operating profit, we will take profit mean as a proxy of level of company's operating profit that is achievable and company wants to obtain and mark as a goal profit. In our opinion, due to limited data of financial indicators and small number of periods, this method will be an appropriate one. As for correlation between Metal & Mining Sectoral Index and volatility of operating profit, we determine it according to the movements of both indicators. We took as a rule to track the operating profit features, to match with market index, and to reduce the estimates of correlation when it does not balance.

Afterwards, we will calculate the percentage of target profit level obtained in every year for companies in our sample:

$$PR_i = \frac{EBIT_i}{TargetEBIT_i} - 1 \quad (19)$$

Where

PR- percentage of target profit to profit obtained;

$EBIT$- operating profit in every year;

$\overline{TargetEBIT_i}$ – mean of target profits;

Further, standard deviation or volatility of operating profit should be obtained. The formula is as follow:

$$volat_i = \sqrt{\frac{\sum_{i=1}^{n}(PR_i - \overline{PR_i})^2}{n-1}} \quad (20)$$

where,

PR- percentage of target profit to profit obtained;

$\overline{PR_i}$- mean of percentages of target profit to profit obtained;

n -number of periods;

These calculations allowed us to compute σ_i – deviation of operational return of companies correlated with Index.

$$\sigma_i = volat_i * \rho_{i,m} \quad (21)$$

Thus, standard deviation of return, correlated with specific risks of the company:

$$\sigma_s^2 = volat_i^2 - \sigma_i^2 \quad (22)$$

After calculations of coefficients we can find g:

$$g = \frac{\sigma_s}{volat_i} \quad (23)$$

Coefficient g in the formula above signify the relative level of company specific risk.

In our *regression analysis* to assess the factor that affect the premium for specific risk we are going to use the following financial factors:

- Total assets;
- Revenue growth;
- Debt/Equity ratio;
- Long-term debt/Asset ratio;

- Current ratio;
- EBITDA/Asset ratio;
- Working capital turnover ratio.

We have chosen these ratios to analyze company specific risk premium from different sides of company financial performance. We will establish calculated premium as dependent variable.

As we strongly believe that debt is the main risk in Steel & Mining Russian industry, we decided to include four solvency ratios: Debt/Equity, Debt/Capital, Asset/Equity and Long-term debt/equity. To clear our sample from correlation between indicators; we did a variable inflation factor test and excluded two ratios, which showed strongly connection between variables: Debt/Capital and Asset/Equity.

Moreover, after studying beta coefficient - the market risk of particular stock, we have noticed that beta encompass market risk as well as specific. For instance, beta depends on financial leverage ratios, on business they perform, industry they operate and on operating leverage.

As bunch of researches include Debt/Equity ratios in their analysis of financial risk as the determinant of specific risk, we decided to analyze the portion of specific risk that leverage ratios absorb. For that reason, we will use two types of betas: levered and unlevered. Both will be substitute in formula to calculate premium for specific risk (19).

The unlevered beta will be found from Damodaran tables of betas, which is calculated by the formula [Damodaran, 2002], which is presented below:

$$\beta_U = \frac{\beta_L}{(1+(1-t)(\frac{D}{E}))} \quad (24)$$

where,

β_L – levered beta

β_U -unlevered beta

t - marginal tax rate

$\frac{D}{E}$ - Debt/Equity Ratio

We present independent and dependent variable with description and name in statistical software Stata in the table below (table 3.1)

Table 3.1. Variables for regression model

Type	Measure	Variable	Name is Stata
Independent	Company growth	Revenue growth	RG
	Company size	Total assets	TA
	Financial risk	Debt/Equity	DE
		Long-term debt/Asset	LTD/A
	Operational performance	Working capital turnover ratio	WCT
	Liquidity	Current ratio	CR
	Profitability	EBITDA/Total Assets	EA
Dependent	Company's specific risk	Specific risk premium	RS

3.2 Sample selection

We have chosen 47 public companies, which operate in Russian steel and mining industry and data on which was available in SKIN, SPARK and Thomson Reuters databases. To make analysis more representative (it may influence on our profitability ratio), we eliminate companies that make great merge and acquisition deals. In order to calculate premium for specific risk in steel and mining companies, we are going not pay attention to industry. In order to do it we took operating profit mainly from metal activities.

We found the volatility of operating cash flow using the formula (20) for the period of 5 years during 10 years for each companies that makes our data the panel data. The first year in our sample is 2005 and last – 2015, due to the fact that for most of the companies the data on 2016 was unavailable and database presented the results only for 10-year period. To find deviation of operational return (21) we took the Metal and Mining Sectoral Index form Thomson Reuters database. In order to detect premium for specific risk for companies in our sample using formula (18) we took β coefficients for metal and mining industry from Aswath Damodaran's table of industries betas. Thus, in our calculations β (levered) equals to 1.3[7].

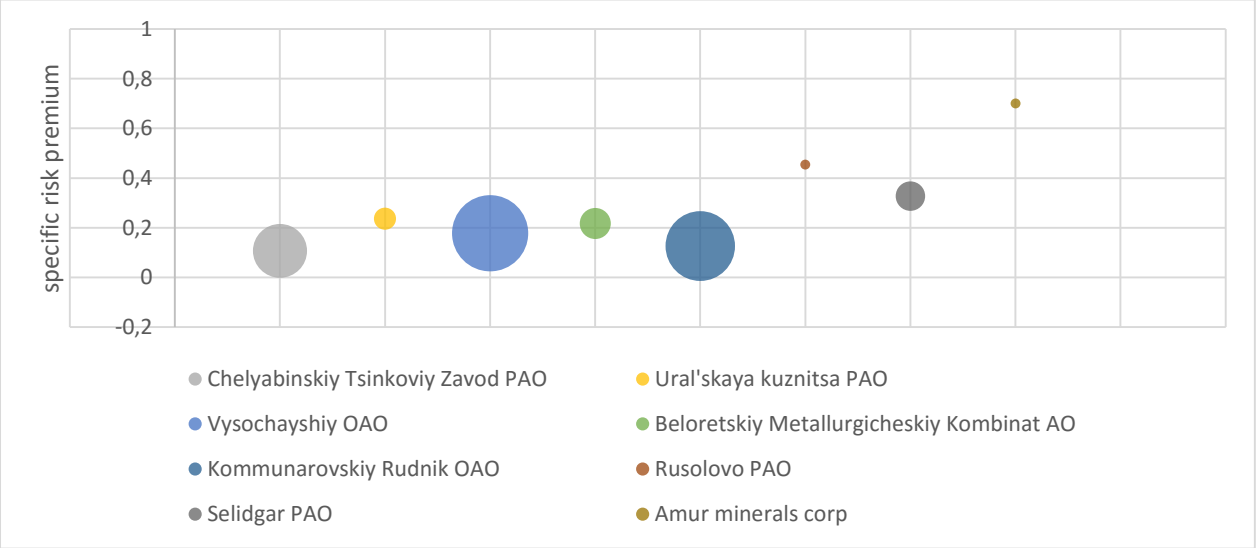
[7] Damodaran A. Betas by Sector (US). URL: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html (accessed at 10.03.2017).

Unlevered β equals to 0.89[8]. The constant term (Rm), which represented by risk-free rate and market premium, equals to 7.4%- Treasury 10-year bond as risk-free rate and 4.7% as market premium. All information on these coefficients were obtained in Bloomberg database.

3.3 Hypothesis development

We found the specific risk premium for the Russian companies in steel & mining industry, and discovered that NERA methodology's financial factors are applicable to analyze the specific risk premium. Then we matched premium for specific risk we have calculated with profitability of company, which we determine as EBITDA/Asset in 2015 to see any relations of that financial indicator and specific risk of companies (Pic. 3.3). To make graphs we took companies form group with highest (more than 20% of specific risk), middle (20%-10% specific risk) and lowest (less than 10% specific risk). The higher the profitability ratio, the lower the premium for specific risk.

Pic. 3.3. Relationship between EBITDA/Assets and company specific risk premium

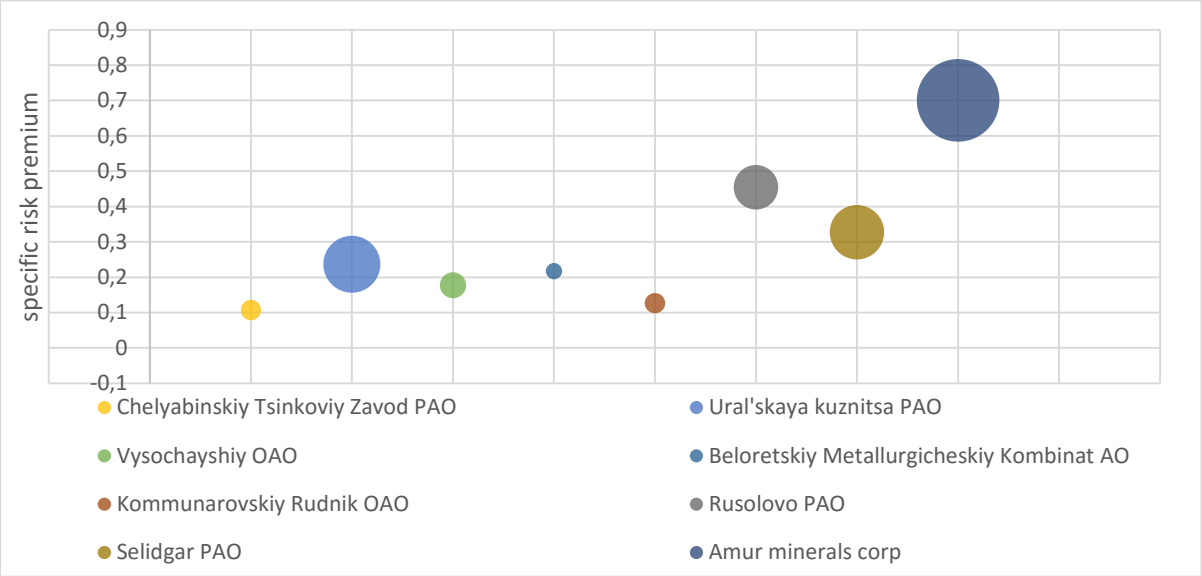


Source: Thomson Reuters, author's calculations

In the graph below (Pic. 3.4), we projected Debt/Equity ratio from three categories of companies. As we can observe, the higher the amount of debt in company, the higher the specific risk premium.

[8] Damodaran A. Betas by Sector (US). URL: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html (accessed at 10.03.2017).

Pic. 3.4. Relationship between Debt/Equity ratio and specific risk premium



Source: Thomson Reuters, author's calculation

These relations make it possible to assume that financial factors are among the most influential for steel and mining industry in Russia and NERA's approach, which consist in sorting company by financial factors are useful for our research [Stein J., Usher S., LaGatutta D., Youngen J, 2001].

Firstly, we are going to choose factors that NERA Consulting Company proposed in their methodology. The first factor is the size of a company. The developers of NERA methodology include market capitalization, in our research the size of the company will be presented as the number of *total assets.* After sorting companies by subsamples, the companies with higher size got the lower volatility of operational profit [Stein J., Usher S., LaGatutta D., Youngen J. 2001].

Company size H_1: Total assets have significant effect in describing company specific risk premium; there is negative relation between company size and premium for specific risk

The profitability measure is defined as EBITDA/Assets. Company's profitability ratio, which measures company's profit generated in comparison to total assets. Clearly, the more the indicator of EBITDA/Assets in particular company, the less risk belongs to the company and consequently, the less specific risk premiums will be, the less value of risk managers should add while calculating companies premiums. Thus, the second hypothesis define company from profitability side:

$Profitability$ H_2: EBITDA/Assets has significant effect in describing company specific risk premium; there is negative relation between EBITDA/Assets and premium for specific risk.

The next two financial ratios we took from Higland Global LLC report: Debt/Equity ratio and Revenue Growth. Analysts from Highland Global LLC highlighted the importance of including this ratio when analyzing the premium specific risk [Highland Global, 2004].

$\frac{Debt}{Equity}$ *ratio* is a debt ratio, which shows how much debt company use to finance its assets comparative to the amount of money, owner of capital invest in company.

The formula to calculate debt-equity ratio can be presenting in the following way:

$$\frac{Debt}{Equity}\ ratio = \frac{Total\ liabilities}{Shareholders' equity} \quad (25)$$

Analyzing data from financial statement of companies, it was obvious that capital rising is still an issue in steel and mining sector. There was a sharp decline in loan finance to the sector and most loans were used for refinancing existing facilities. It is reasonable to assume that this leverage ratio may influence the specific risk premium as if the more debt company has, the more risky company is. Managers may consider this leverage ratio as a factor to add while calculating return on equity. Highland Global company used Debt/Equity ratio as a financial risk indicator and stated the direct relationships between this ratio and company specific risk [Highland Global LLC., 2004]. Thus, the third hypothesis is:

$\underline{Financial\ risk}$ H_{2a}: Debt/Equity ratios have significant effect in describing company specific risk premium; the lower financial risk of the company, the higher the specific risk premium.

With the growth of company's *revenue growth*, the risk typically reduces as the result of greater plans in increasing earning or dividends. The researcher suggests using the compound annual revenue growth. The formula to calculate revenue growth is presented above.

$$Revenue\ Growth_t = \frac{Revenue_{\ t}}{Revenue_{t-k}} * \left(\frac{1}{k}\right) - 1 \quad (26)$$

where t and k are time periods. Typically, this formula shows increase or decrease in sales during some period. It is mostly used to measure how fast a business is expanding and useful for investors who are interested in revenue trends over time. Thus, our forth hypothesis is:

$\underline{Company\ growth}$ H_3: Revenue growth has significant effect in describing company specific risk premium; there is negative relation between the amount of total and premium for specific risk.

We strongly believe that financial risks associated with debt are the main risk in Russian steel and mining industry and in our research we include long-term debt ratio. *Long-term debt/Assets ratio*- indicator, which also, as debt/equity ratio, shows how much debt company use to finance its

growth, but this ratio stress the mature of debt. The formula that is used to calculate long-term debt/equity ratio is the following:

$$\frac{Long-term\ deb}{Asset}\ ratio = \frac{Long-term\ liabilities}{Total\ Assets} \quad (27)$$

It was noticed that in statement of financial position, the amount of long-term liabilities fluctuate a lot and the number of these liabilities was huge if to compare with others components of debt. We assume that this ratio can affect company specific risk premium, because having great number of debt limits ability to build up a safety net of cash savings to cover unexpected costs of doing business as well as limits ability to be maneuverable in business. In addition, with big number of debt possibility of going into distress of bankruptcy is increasing.

$\underline{Financial\ risk}$ H_{2b}: Long-term debt/Asset ratio has significant effect in describing company specific risk premium; there is positive relation between these variables.

To analyze the financial factors from the whole spectrum, we include two more, that relevant for steel mining companies: current ratio as an indicator of liquidity and working capital turnover as an indicator of operational performance.

Shepeleva [Shepeleva A., 2015] while analyzing factors, which affect premium for specific risk in BRICS countries, pointed out the importance of liquidity ratios. As the proxy for such performance, researcher took *current ratio*. This ratio helps to understand whether a company has an ability to cover short-term liabilities using short-term assets. Current ratio is essentially crucial for steel and mining industry because of the considerable capital expenditures and great amount of financing needs for mining operations. Formula to calculate current ratio is as follow:

$$Current\ ratio = \frac{Current\ Assets}{Current\ Liabilities} \quad (28)$$

Our assumption is that the higher the liquidity of the company, the lower the risk premium managers and analysts should include while calculating the discounts rates. Our hypothesis for liquidity is as follow:

$\underline{Liquidity}$ H_4: Current ratio has a significant effect in describing company specific risk premium; there is negative relation between current ratio and specific risk premium.

To analyze company from operational point of view, we include working capital turnover. Researches from Highland Company determine the operational risk ratio as Fixed cost/Sales [Highland Global LLC., 2004], but we decided to take working capital turnover. There are many

ratios that can describe operational performance of the particular company, but the main features of steel and mining companies is constant improving of inventories and funding operations, analysis of working capital that companies use in order to improve production activity that as an end reflects in sales. Calculation of working capital turnover can be presented as follow:

$$Working\ capital\ turnover = \frac{Sales}{Working\ capital} \quad (29)$$

Clearly, the more efficient is the company in terms of working capital turnover, the less specific risk are assumed. Our hypothesis for working capital turnover is as follow:

$\underline{Operational\ performance}$ H_5: Working capital turnover ratio has a significant effect in describing company specific risk premium; there is the negative relation between specific risk premium and working capital turnover ratio

3.4 Model specification

After we have chosen appropriate measures of financial indicators to test our hypotheses and stating the hypotheses, we can specify regression models that we are going to estimate in statistical software Stata. Our model is as follow:

$$RS_{it} = \beta_{0i} + \beta_1 * RG_{it} + \beta_2 * E/A_{it} + \beta_3 * \mathrm{D/E}_{it} + \beta_4 * LTD/A_{it} + \beta_5 * WCT_{it} + \beta_6 * C_{it} + \varepsilon_{it},$$

where,

RS- company specific risk premium;

RG- revenue growth;

E/A- EBITDA/Asset ratio;

D/E- Debt/Equity ratio;

LTD/A- Long-term debt/Asset ratio;

WCT- Working capital turnover ratio;

C- Current ratio.

The first step of the econometric study is to decide on panel data model. For that reason, we need to understand the main features of models and the difference between them. In fact, panel data

give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. [9] The short description of models is presented above.

Random effects model:

This model suggests different intercepts for each entity type, which is constant over the period analyzed. The random effect model can be presented as follows:

$$y_{it} = \beta x_{it} + \alpha + \omega_{it}, \omega_{it} = \varepsilon_{it} + v_{it}$$

The random effects model is suitable model to choose if we are selecting number companies randomly from a large list. The individual effect of particular companies is described as random with zero mean and equal variances. Unlike the fixed effect model, no dummy variables are introduced to seize the variation in the cross-sectional dimension, but ω_{it} represent the effect of variables, which are omitted in model.

Although, there is great advantage of random model effect in comparison to fixed effect model in terms of more efficient estimation since fewer parameters to estimate with saved degrees of freedom, it is works only if ω_{it} , thus ϵ_i and v_{it}, is uncorrelated with all independent variables. Thus, any unobserved omitted variables are uncorrelated with independent variables we included.

Fixed effects model:

$$y_{it} = \alpha_i + \beta_1 x_{it} + v_{it},$$

where μ_i comprise variables that affect dependent variable cross-sectionally but do not vary gradually. In case of fixed effect model- μ_i is considering as being fixed parameter to be calculated. The remainder error terms stochastic with independent and identically distributed. The x_{it} is expected to be independent of the v_{it} for all i and t.

Fixed effects model is suitable if one focuses on unique set of firms and the derivation limited to behavior of firms chosen for sample. There also drawbacks in using this model since it is not feasible to recognize coefficients appropriate to independent variables that are stable for particular period for objects in our sample and difficulty in using OLS procedure in this case.

[9] Baltaga A. 2005. *Econometric Analysis of Panel Data*. New York: John Wiley & Sons

Pooled regression model

$$y_{it} = \alpha + \beta_0 + \beta x_{it} + \varepsilon_{it},$$

To run pooled regression model ones should be aware of risk of estimation to be biased if coefficients will be correlated with the disturbance ε_{it}. The main requirement to make the estimation in appropriate way consist in constancy of all omitted variables for all groups of panel data at each period.

To decide which model we are going to consider and choose in our research, we run three different tests:

1) *Hausman test*
2) *F test*
3) *Breusch-Pagan Lagrange multiplier (LM) test*

The results, main hypothesizes are depicted below (table 3.2).

Table 3.2 Tests for pooled, fixed, random effect models

Test conducted	**Main hypothesis/Alternative hypothesis**	**Result**
Hausman test	H0: $\rho_{v;X} = 0$ Random effect model H1: $\rho_{v;X} \neq 0$ Fixed effect model	P-value less than significance level; accept the alternative hypothesis.
F test	H0:$v_i = 0$ Pooled regression model H1: $v_i \neq 0$ Fixed effect model	P-value less than significance level; accept the alternative hypothesis.
Breusch-Pagan Lagrange multiplier (LM) test	H0:$V(v_i) = 0$ Pooled regression model H1: $V(v_i) \neq 0$ Random regression model	P-value less than significance level; accept the alternative hypothesis.

Source: Greene W. H. 2003. *Econometric analysis.* India: Pearson Education

For the factors that we have chosen it is important our data to be uncorrelated, for that reason we conducted variance inflation factor (VIF) test to check for multicollinearity. Multicollinearity is an issue to avoid because when the sign of that phenomena is observed, the estimates for a regression model cannot be uniquely computed. Our results of VIF test- VIF value is 1.06- lies under the critical level of 10 (which is clear sign of multicollinearity).

To conclude, from tests conducted on choosing the appropriate model, we preferred fixed effect model. We focus our attention exclusively on Russian companies in steel and mining industry, so our data fall into category of one industry and one country. Moreover, we believe that within each of group explanatory variables are correlated. In addition, fixed effect model allow for different intercept for each company and this effect should be significantly correlated with explanatory variables.

3.5 Descriptive statistic and correlation matrix

The researcher describes the financial indicators (table 3.3) that presumably influence to determination of company specific risk premium.

Table 3.3 Descriptive statistics

Variable	Mean	Std. Dev	Min	Median	Max
RS(levered beta)	.299	.189	.064	.311	.911
RS(unlevered beta)	.197	.125	.039	.198	.595
TA	19.817	1.780	14.951	18.921	23.471
RG	.252	.218	.006	.155	.965
LTDA	.372	.419	.001	.345	.827
DE	2.527	2.502	.012	1.367	5.085
CR	1.089	1.822	.001	1.014	2.641
WCT	.033	.558	-.451	.041	1.066
EA	.141	.126	.001	.132	.241

Source: Stata regression, author's calculation

As we calculate premium for specific risk for both unlevered beta and levered betas, summary statistic for both of betas are presented in the table above.

Starting from measures of company size, we took the logarithm of total asset. We can observe that minimum value is 14.951 and maximum is 23.471. Mean of total assets (19.817) higher than standard deviation (1.780) - the signal of volatile data.

As for financial risk and two ratios that represent it, the minimum value of long-term debt/asset ratio is 0.001 that indicates approximately absence of long-term debt included in capital structure of some Russian company that operate in steel and mining industry. Minimum for debt/equity ratio is 0.012, there is evidence of absence of liabilities to equity.

Current ratio show variability from one firm to another with maximum of 2.64 to minimum indicator of 0.001. From the minimum indicator we can state that some companies in Russian steel & mining industry not effective in term of liquidity, its ability to cover short-term debts by short-term assets not evident. However, the mean of 1.089 signalize that in average, steel and mining industry have ratio more than minimum value analysts and creditors prefer.

As for profitability ratio, which presented in our research as EBITDA/ Assets – standard deviation of 0.126 or 12.6% with mean of 0.141 or 14.1%. The indicator of maximum profitability of 24% indicates that the most profitable companies generate 24% of earnings before interest, taxes and depreciation using its total assets. Working capital turnover and revenue growth show signs of volatility.

In our research, before we move to statements of result, it may be useful to look at correlation matrix (table 3.4) to see approximately our future results.

Table 3.4 Correlation matrix

	RS	**TA**	**WC**	**CR**	**DE**	**LTDA**	**EA**	**RG**
RS	1.000	-	-	-	-	-	-	-
TA	0.0265	1.000	-	-	-	-	-	-
WC	-0.2803	-0.0584	1.000	-	-	-	-	-
CR	-0.0808	-0.0813	0.0335	1.000	-	-	-	-
DE	0.3892	0.0656	-0.0989	-0.3231	1.000	-	-	-
LTDA	0.4171	0.1281	-0.1253	-0.1994	0.2870	1.000	-	-
EA	-0.2852	0.1598	0.1509	0.1317	-0.1845	-0.0987	1.000	-
RG	-0.1991	0.0808	0.0118	0.0469	-0.2269	-0.2269	0.1591	1.000

Source: Stata regression, author's calculation

From the table presented above, we can observe the negative relation among: the working capital ratio, current ratio, EBITDA/Assets, Revenue growth and premium for company specific risk. Long-term debt/asset ratio, total asset and debt/equity ratio show positive relations. In addition, that is important we did not see correlation between long-term debt/asset and debt/equity ratios. However, to observe the whole picture of relations we need to regress our fixed effect model in Stata software.

Summary of Chapter 3

Third chapter was devoted to research design, hypothesizes development, model specification and descriptive statistic.

In the beginning, we justify the choice of industry we have chosen due to volatility of sectoral index MICEX if to compare with another core Russian industry-oil and gas. Then, we calculated the relative level of specific risk, based on operating profit volatility. After, with use of formula to detect premium for specific risk, we find the specific risk premium for every company in our sample. For research purpose, we took 47 public companies, information on which was available. Moreover, we decided to concentrate only on financial factors, as NERA Consulting company proposed and as the graph where relationships between premium for specific risk and financial ratios such as Debt/Equity and EBITDA/Asset represented.

After formulating hypothesis about significant impact of factors to calculated premium for specific risk, we presented detailed description of our sample and decided on fixed effect model as specific tests and our data suggested. Moreover, correlation matrix showed us preliminary relationships between independent and dependent variables.

In the next chapter, we will describe the model findings, discuss the results and show managerial implication of our research paper.

CHAPTER 4. RESEARCH FINDINGS

4.1 Model findings

In the last chapter, the former of the paper will describe the main finding. As it was previously stated in hypothesis development section, we formulated hypothesis, which from our point of view are right. If our null hypotheses according to t-statistic will be rejected, we will accept alternative ones that our factors do not have any explanatory power in describing dependent variable.

The tested hypotheses can be presented as follow (if we will not accept the null, the alternative hypotheses about insignificance should be accepted):

$\boldsymbol{H_1}$*: There is significant negative relation between total assets and premium for specific risk*
$\boldsymbol{H_2}$: *There is significant negative relation between revenue growth and premium for specific risk.*
$\boldsymbol{H_3}$*: There is significant negative relation between EBITDA/Assets and premium for specific risk.*
$\boldsymbol{H_4}$*: There is significant negative relation between current ratio and premium for specific risk.*
$\boldsymbol{H_5}$***:*** *There is significant negative relation between working capital turnover ratio and premium for specific risk.*
$\boldsymbol{H_{6a}}$: *There is significant positive relation between Long-term debt/Asset and premium for specific risk.*
$\boldsymbol{H_{6b}}$: *There is significant positive relation between Debt/Equity and premium for specific risk.*

After include all variables in the model and regress it using fixed effect model, the following results were obtained (table 4.1):

Table 4.1 Statement of results

	CONST	**TA**	**RG**	**LTDA**	**DE**	**CR**	**WCT**	**EA**
Standard error	.186	.009	.019	.043	.007	.009	.006	.014
t-statistic	1.23	-.02	-.34	3.16	2.75	-1.91	-2.01	-1.95
P-value	.223	.988	.737	.002*[10]	.007*	.056***[11]	.048**[12]	.054***
Coefficient	.229	-.001	-.007	.137	.021	-.010	-.062	-.023

Source: Stata regression, author's calculation

[10] * - significant at 1% confidence level
[11] ***- significant at 10% confidence level
[12] **- significant at 5% confidence level

As we can observe from the table, which summarize the research findings, there are two ratios, which have significant effect in explaining company specific risk premium on 10%, 5% and 1% confidence level respectively: *long-term debt/asset ratio* and *debt/equity ratio*. Thus, we accept $\boldsymbol{H_{6a}}$, $\boldsymbol{H_{6b}}$hypotheses. The coefficients have positive signs that shows positive relationship between premium for specific risk and leverage ratios. If long-term debt/asset ratio increase by 1 unit, premium for specific risk increase by 0.137 on average or 13.7% , all other factors being stable. If debt/equity ratio increase by 1 unit, premium for specific risk increase by 0.021 or 2.1% on average, all other factors being unchangeable.

As for hypotheses for company size and company growth, t-statistics do not allow us to state that *total assets* and *revenue growth* influence premium for specific risk. Thus, as these coefficients are not significant, we will not analyze them and reject $\boldsymbol{H_1, H_2}$ hypotheses. Ibbotson Consulting LLC's approach to take company size as the main factor determining the specific risk premium in case of Russian steel & mining companies is wrong.

Our constant coefficient is insignificant that signalize of stability of premium for risk without including factors we have chosen. We will not interpret the insignificant coefficients, since they do not have any explanatory power in describing premium for specific risk.

Moving to profitability ratio, *EBITDA/Asset*- we accept the null hypothesis $\boldsymbol{H_3}$ about significant impact of company's profitability to premium for specific risk at 10% level. Moreover, we see the negative relation between profitability and premium for specific risk. If EBITDA/Asset increase by 1 unit, premium for specific risk decrease by 0.023 on average, all other factors being stable. Thus, our model support the view of consulting company NERA to take this ratio as an indicator of profitability.

Moreover, we accept $\boldsymbol{H_4}$ hypothesis at 10% confidence level and $\boldsymbol{H_5}$ hypothesis at 5% confidence level**.** If current ratio will increase by 1 unit, premium for specific risk will decrease by 0.01, all other factors being stable. If working capital turnover ratio will increase by 1 unit, premium for specific risk will decrease by 0.062, all other factors remain stable.

4.2 Specific risk for leverage ratios

As we stated previously, beta coefficient absorbs market and specific risk as well, or systematic that can be diversified away and unsystematic that cannot. In the model, we specified we include two leverage ratios, one proposed by practitioners from Highland LLC- Debt/Equity ratio and Long-term debt/Asset ratio as we assumed the big influence of long-term debt in steel & mining

industry and reviewed them as a factors of specific risk. However, leverage is a factor of market risk as well. In our calculations, we include levered beta for metal & mining industry, which incorporate Debt/Equity ratio and suggest that for market risk, degree of financial leverage is important.

To separate market risk from specific risk in leverage ratios, we substituted unlevered beta in calculation of premium for specific risk. Afterwards, run the regression analysis (table 4.2) of data obtained. The model specification remain unchangeable. The results are as follow:

Table 4.2 Statement of results

	CONST	**DE**	**LTDA**
Standard error	.133	.005	.028
t-statistic	1.23	2.50	3.45
P-value	.207	.012**[13]	.001*[14]
Coefficient	.168	.012	.097

Source: Stata regression, author's calculation

We sign of variables are positive as in regression analysis with levered beta. However, the can observe difference in coefficient size and therefore, premiums will be different. Constant term insignificant while our leverage ratios are significant.

4.2 Results and discussion

Now we would like to discuss some results obtained previously.

EBITDA/Asset has a mean indicator or industry average in Russian market 0.141. The coefficient obtained is equal to -0.023. Thus, for the firm with mean industry indicator of 0.141, analysts should deduct (0.141*0.023) 0.3% as a premium for EBITDA/Asset risk. If the firm deviates from the mean, for instance, EBITDA/Asset ratio equal to 0.28, these analysts should deduct 0.6%. In other words, if analysts orient themselves on average industry values (steel & mining industry in our case) and taking into account the specificity of the firm, they should deduct the difference between these two percentage values-0.3%. Thus, every deviation EBITDA/Asset, for instance, if firm has no profit, we should add specific risk premium 0.3%, if the firm has the

[13] **- significant at 5% confidence level.
[14] *-significant at 1% confidence level.

highest indicator(0.241) of EBITDA/Asset, analysts, managers, analysts, owners, should deduct 0.3%.

Current ratio has a coefficient of -0.01. The industry mean average of this indicator of liquidity is 1.089. Thus, for the firm with mean indicator of 1.09 analyst should deduct approximately (0.01*1.089) 1% as premium for Current ratio. If the firm deviates from the mean, for instance, this ratio is equal to 2.18, then analyst would deduct 2%. If appraiser orient on average with specificity of firm in the mind, they should deduct the difference between the two percentage values of premiums we found-1%. Thus, when current ratio has the minimum value of 0.001, participants of business should add 1% or when ratio of company tells us that this is maximum value- 2.641, manager or other appraisers should deduct slightly over 1%.

Working capital ratio has an average industry indicator of 0.03; coefficient we obtained in the model is equal to 0.06. For the firm with mean indicator of 0.03, appraisers should deduct (0.03*0.06) 0.2% as a premium. If the firm deviate from the mean, for instance, now it is equal to 0.09, analysts would deduct 0.4%. If analysts orient themselves on average industry values, taking into account specificity of the firm, they should deduct the difference between those low values-0.2%. With minimum value, managers, investors or analysts should add premium for specific risk of such ratio deviation the amount of slightly over 0.2 or add when it is the maximum value.

Debt/Equity ratio and Long-term debt/Asset ratios even though have significant positive relations we proposed in our hypothesis in the first regression results, where we base our calculations on levered beta, the size of premium is 5% seems to be high. The reason why it may happen lies on the fact that in our research we used the levered beta, obtained in Damodaran table for betas. Leverage ratios encompass specific risk as well as market risk. Such high values in Debt/Equity and Long-term debt/Asset values can be associated with this reason.

In order to gain a portion of true specific risk, we calculate the premium for specific risk with unlevered beta and with levered beta. The difference between two percentages of specific premium size will be the amount of specific risk; managers may consider adding to discount rate to calculate the value of the firm.

Size of premium obtained using the levered beta due to increase or increase of Debt/ Equity ratio is 5%, for Long-term Debt/Asset ratio is 5 % as well. From the new premiums obtained, we have 3% for Debt/Equity ratio and 3,2% for Long-term debt/Asset ratio. Thus, the difference for Debt/Equity ratio is 2% and 1.8% for Long-term debt/Assets ratio. We can take those numbers as a premium for specific risk due to company's financial leverage changes.

The specific risks that for our point of view not depended on market risk are as follow: profitability ratio (EBITDA/Asset), liquidity ratio (Current ratio), operating performance ratio (Working capital turnover ratio), leverage ratios as the difference between calculation with two kinds of beta (Debt/Equity and Long-term debt/Assets). Thus, our managerial implication will be constructed according to these factors.

4.3 Managerial implications

Devoted our previous analysis to state the results of our tested model, this section we will devote to managerial implication of the results obtained. Moreover, we are going to view results obtained from the investors, managers and owners points of view.

Firstly, as it was stressed before, the importance of correctly valuing the company is the key issue in business practices. While making valuation, managers, owners, investors tends to rely on their experiences and judgments. The example of such indicator that can be assessed without any guidelines is specific risk premium. It is clear, that errors that managers or investors make while calculating the premium for specific risk have significant impact on assessing the value of the business.

Company specific risk premium is quantitative representation of specific risk. Company specific risk is the risk dependent on the nature of the company and obtained by comparing with peer, which is close to this company in some sense. Moreover, one can explain specific risk as a part of total risk, which is specific to a certain security that can be avoided by diversifying portfolio, component of total risk, which makes the investment unique and uncertainty of expected returns arising from factors other than the market itself. Company specific risk is important since it is compensate for risk that cannot be diversified away.

There are many methods, techniques, formulas to assess the value of business, the most common ones, for instance, income approach or market approach, construct in accordance to calculate cost of equity, using CAPM model, where add of specific company risk premium is implied or in modified CAPM (TCOE).

Managers, owners, investors, while calculating this indicator of specific risks for their particular company in certain industry often mislead which factors they should consider or which it is worth to avoid. In practice, participants of business do it randomly or use rating systems, the main idea of which is to rate factors that presumably affect their company from 0 to 10%, and the size of the company factor is essential part of such assessment.

We devoted our research to analyze the factors that affect the premium for specific risk in Russian steel and mining companies. After calculating premium for specific risk, we found out that these premiums depend on financial factors. Thus, we suggest that managers and investors, while calculating premiums for specific risk in Russian steel and mining industry should mostly pay attention to financial factors.

After we tested the hypothesis on significant effect of ratios that represent different sides of companies' financial performance, we found out that *financial risk factors* (Debt/Equity and Long-term debt/Asset ratios), *profitability factors* (EBITDA/Asset ratio), *operating factor* (Working capital turnover ratio) and *liquidity factor* (Current ratio) are the most powerful in explaining the specific risk premium. Company size, represented by total assets – should not be considered as factor, while calculating premium for risk, as many consulting companies propose nowadays. Thus, managers should not consider that factor while calculating the value of business, the cost of equity, WACC, or while choosing appropriate subject-specific pricing multiples from guideline companies, etc.

It is important to notice, that financial risk factors such as Debt/Equity and Long-term debt/ Asset, since we use levered beta to company specific risk, might be influenced by market risk because results we obtained (5% for ratios) are high from our point of view. Thus, the difference between calculation of betas with financial leverage risk and without we take as the base to calculate the true specific risk due to leverage ratios.

According to the coefficients we obtained from the model, firstly, we suggest the rating of factors to which they should pay attention to in the first place if analysts prefer to work according to their judgment or experience (table 4.3).

Table 4.3 Rating of financial factors for company specific risk premium in Russian steel and mining industry

FINANCIAL FACTOR	**RATING**
LONG-TERM DEBT/ASSET	1
WORKING CAPITAL TURNOVER RATIO	2
EBITDA/ASSET	3
DEBT/EQUITY	4
CURRENT RATIO	5

Source: Stata regression, author's calculation

Managers, appraisers, analysts and owners of the company often have to orient themselves on industry average indicators. This can happen for many reasons, such as the short history of the company or hidden data. The average data can be useful in this term since the information, the big sample of companies on which they are based, made them a good indicators to navigate.

If we are talking about the premium for specific risks, if appraisers see the deviation of indicators, or specificity of the firm, they may assess the indicator by deducting/adding the amount of premiums we determined for ratios we found significantly affect the premium for specific risks.

In order to illustrate our results we present the suggestion obtained during discussion of results we created table below. The information presented is valid for Russian steel and mining industry for companies with market capitalization more than 1 mln rub (table 4.4).

Table 4.4 Guide on premiums for specific risk for Russian steel and mining industry

FINANCIAL FACTOR	**RATING**	**INDUSTRY AVERAGE**	**PREMIUM FOR SPECIFIC RISK**
Long-term debt/asset	1	0.372	+1.8 if ratio 0.8 -1.8 if ratio is about 0.18
Working capital turnover ratio	2	0.031	+0.2% if ratio 0 -0.2% if ratio 0.06
EBITDA/asset	3	0.141	+0.3% if no profit -0.3% if profit is about 0.24
Debt/equity	4	2.527	+2% if ratio max (5) -2% if ratio is about 1.3
Current ratio	5	1.089	+1% if ratio 2.178 -1% if ratio close to 0

Source: Stata regression, author's calculation

4.4 Limitations and suggestions for further research

In this chapter, we would like to present possible limitation, which further researches can take in order to analyze and make research on specific risk premium deeper. Results, which we have obtained, have a managerial implication, however, there are number of limitations we would like to point out.

Firstly, we have analyzed only one industry in Russia for the certain period of time (2010-2015). It could be useful to identify other factors that are significantly affect premium and their size for specific risk in other industries, where specific risk movements will be detected.

Moreover, it could be useful to make an analysis not only with financial factors, but include others. As we showed in the theoretical background, there is a variety of other factors, which can be included to assess the risk premium. Thus, further research in this field can be devoted to analyze, for instance, macroeconomic factors, which companies, researches, analysts are proposed nowadays. In addition, focusing on financial factors, one can include other indicator of different company's performance indicators. For instance, ROA or ROE could be added to analyze profitability or to include other debt ratios that not correlate with each other.

In general, researchers are trying to find the most appropriate models to find specific risk premiums. In our research, we have chosen model based on financial behavior. To test as much methods as analysts propose nowadays to Russian markets would help to understand which model is the most suitable one.

Moreover, further research can be devoted not only to one industry, but also to the whole Russian market to make cross-industrial conclusions, though researchers need work to identify risk industry effect.

Summary of Chapter 4

In the fourth part of the paper, we provided the results of our research. Moreover, we interpreted our results in terms of managerial implication.

As we can observe, not all our factors were significant in explaining premium for specific risk in companies, which operate in Russian steel and mining industry. Size of the company that was determined as total assets surprisingly did not affect the premium for specific risk in our particular sample, though many researches highlight company size as the main indicator of specific risks.

In addition, out of our results we formulated managerial implication. Finally, we pointed out certain limitations, which further researchers can use to explore the premium for specific risk in Russia or emerging markets.

CONCLUSION

The research goal of the thesis was to find factors and the size of specific risk premium for valuation of the company in Russian steel and mining industry.

Firstly, reviewing the papers, researches and articles devoted to this topic, we found out that managers, investors, while valuing the companies using different approaches, sometimes are misled by which factors should they include as the premium for specific risk. Some researchers proposed to look only on leverage ratio, others paid attention to environment around the company, for instance, competitors or macroeconomic factors. In addition, in detecting premium for specific risk there is the field of new experiments: researchers making different assumptions trying to test new methods that can be applicable for emerging markets as well for developed ones.

As it was found that steel and mining industry shows volatile market performance if to compare with another core Russian industry- oil & gas, which has aproximately the same beta coefficient, the indicator of risk, in our paper we firstly found the relative level of specific risk for each company in our sample. Afterwards, the premium for specific risk for companies in Russian steel & mining companies were detected using different betas to calculate true specific risk of leverage ratios since these ratios absorbs market risk as well.

As a result, we found financial ratios that have a power to explain premium for specific risk in companies from our sample. As for managerial implication, we based our recommendations on the fact that appraisers of the company often have to orient themselves on industry average indicators. If analysts see the deviation of financial indicators we examined, or specificity of the firm, they may assess the indicator by deducting/adding the amount of premiums we determined for such ratios.

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APPENDICES

Appendix 1. List of companies

Severstal' PAO
KHK Metalloinvest AO
Chelyabinskiy Tsinkoviy Zavod PAO
Ural'skaya kuznitsa PAO
Vysochayshiy OAO
Beloretskiy Metallurgicheskiy Kombinat AO
VBM-group OAO
Pobedit OAO
Nytva OAO
Revdinskiy zavod po obrabotke tsvetnykh metallov OAO
Malyshevskoye Rudoupravleniye AO
Izhstal'OAO
Kommunarovskiy Rudnik OAO
Anzherskiy Mashinostroitel'nyi Zavod OAO
Rusolovo PAO
Magnitogorkiy metallurgicheskiy kombinat OAO
AK Alrosa PAO
Mechel PAO
Trubnaya metallyrgicheskaya kompaniya PAO
Chelyabinskiy Truboprokatniy Zavod PAO
Chelyabinskiy Metallurgicheskiy Kombinat PAO
Koks PAO
Severskiy Trubnyi Zavod PAO
Gayskiy GOK PAO
Selidgar PAO
Priargunskoye Proizvodstvennoye Gorno-Khimicheskoye Ob'yedineniye PAO
Motovilikhinskiye Zavod PAO
Ashinskiy Metzavod PAO
Nadezhdinskiy Metallurgicheskiy Zavod PAO
Kosogorskiy Metallurgicheskiy Zavod PAO
Susumanzoloto OAO
Volgaburmash OAO
Elektrotsink OAO
Klyuchevskiy Zavod Ferrosplavov PAO
Kirovskiy zavod po obrabotke tsvetnykh metallov OAO
Chelyabinskiy Zavod Profilirovaannogo stal'nogo nastila PAO
Kamensk-Ural'skiy zavod po obrabotke tsvetnykh metallov OAO
Muromskiy Strelochnyi Zavod AO
Buryatzoloto PAO
Novolipetskiy steel PAO
Sredneuralskaya medeplavil'nyi zavod OAO
Polyus PAO
Mikhaylovskiy Gok PAO
Korshunovskiy gorno-obagatilniy combinat OAO
Lenzoloto PAO

Kombinat Yuzhuralnikel' PAO
Amur Minerals Corp