

St. Petersburg University
Graduate School of Management

Master in Corporate Finance Program

PRIVATE EQUITY IN RUSSIA: APPLICATION OF ACCOUNTING-BASED
VALUATION MODEL FOR NON-TRADED COMPANIES

Master's Thesis by the 2nd year student

Concentration — Corporate Finance

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St. Petersburg

2016

ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ
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«Private equity in Russia: application of accounting-based valuation model for non-traded companies»,

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АННОТАЦИЯ

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Факультет	Менеджмент
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Год	2016
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Ключевые слова	фундаментальная оценка, неторгуемые компании, частный капитал, остаточная прибыль, методы оценки, рыночная капитализация, первоначальное публичное предложение

ABSTRACT

Master Student's Name	Rulevskiy Evgeniy
Master Thesis Title	Private equity in Russia: application of accounting-based valuation model for non-traded companies
Faculty	Management
Main field of study	Corporate Finance
Year	2016
Academic Advisor's Name	Alexander V. Bukhvalov
Description of the goal, tasks and main results	The goal of the research paper is to test reliability accounting-based valuation model. In order to meet the research goal Residual Earnings model was applied to non-traded companies.
Keywords	fundamental valuation, non-traded companies, private equity, residual income, valuation techniques, market capitalization, IPO

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INTRODUCTION

The problem of corporate valuation and estimation of fundamental value of a firm remains unresolved in finance literature. Although there are many valuation techniques that can be effectively applied to companies on developed markets, valuation of the companies operating on developing markets can be challenging. Most of the valuation methods require well-developed financial market and large number of traded companies with comparable characteristics. Valuation process of private equity deals and non-traded companies on developing markets can be even more complicated. Even though many of the valuation techniques applicable to public companies can be used to value private companies as well, estimating the true intrinsic value of a private company can be a challenging task.

The topic of the research paper is: “Private equity in Russia: application of accounting-based valuation model for non-traded companies”. The relevance of the research topic is determined by specifics of Russian private equity market and organizational structure of non-public companies. According to the information reflected in the Unified State Register of Legal Entities there are approximately 151 000 stock companies in Russia. At the same time, only 300 Russian joint-stock companies are listed on the stock exchange and about 50 of them are traded on a regular basis. Thus, most of the Russian joint-stock companies are non-traded ones and it is very difficult to evaluate fair market value for these companies. Regarding facts mentioned above, accounting-based valuation approach can serve as simple and effective valuation method applicable for private equity deals and non-traded companies.

The goal of this research paper is to test reliability of valuation model based on accounting data. In order to achieve stated goal two major tasks should be done. Firstly, it is necessary to test whether accounting information is relevant to market values of Russian companies. Secondly, it is important to define whether accounting-based valuation model can be used for implementing unified valuation approach for non-traded companies in Russia.

The object of the research – Russian companies that performed IPOs. The subject of this research paper is applicability of accounting-based valuation method for assessing values of non-traded companies in Russia.

The practical research questions: 1) Do the value of residual earnings and equity book value have explanatory power over real market values of the Russian companies? 2) Does the IFRS-based Residual Earnings model is more effective in estimating market capitalization of the

companies than the RAS-based model? 3) Does the accounting-based valuation approach can be used for estimating IPO prices?

Objectives of the research:

- to provide description and formalization of the valuation model;
- to conduct regression analysis;
- to execute analysis of the regression descriptive statistics;
- to apply regression coefficients for valuation of Russian companies;
- to compare results derived from the application of the model to actual values;
- to make conclusions about efficiency and applicability of the model.

The research paper is structured as follows. The first chapter is devoted to the critical overview of corporate valuation theory and applicability of different valuation techniques for valuation of private equity deals and non-traded companies in Russia. The emphasis is put on accounting-based valuation methods, Residual Income model in particular. The second chapter defines methodology of a current study and elaborates further on the research goal, objectives, questions, hypotheses. Empirical results of application of Residual Earnings model are presented and discussed in the third chapter. The summary of key findings, as well as research limitations and further directions, are outlined in the conclusion section.

1. LITERATURE REVIEW

1.1 Valuation theory

Nowadays a number of research papers in finance field are devoted to an important topic of company valuation. Different approaches and methods for corporate valuation as well as theories standing behind those methods will be discussed in this research paper. Since this master thesis is focused on the application of accounting-based valuation methods for Russian companies the theoretical overview of different valuation methods and relevance of annual financial statements to the fundamental value of a company will be conducted. The purpose of this literature review is to formulate theoretical and empirical ground for the research that is focused on determining value relevance of accounting information to fundamental value of a firm.

Prior to assessing different valuation methods and techniques, it is necessary to give a definition to the concept of a fundamental value of a firm. In the simplest terms, fundamental value of a firm can be assessed based on the stream of projected earnings associated with that firm. Fundamental value can thus differ drastically both from current market value of a firm (the value at which deals are conducted) and book value of a firm (the value reflected in financial statements) (Volkov, 2008).

The process of assessing fundamental value of a firm is not a straightforward one and there are many valuation models and methods than can be used. However, all of the valuation approaches depend significantly on assumptions underlying them. The element of subjective judgment exists in every valuation model. It is not possible to estimate precisely such factors as a discount rate, asset beta, future growth rate, etc. That is why the reliability of valuation methods can be questioned regarding the quality of assumptions made for the purpose of valuation (Piotroski, 2000).

To overcome the problem of assumptions uncertainty in (Benninga, Sarig, 1997) it is suggested to apply more than one valuation method for estimating value of the company. In case, when different valuation models give similar results it is possible to conclude that estimated value obtained by using model is close to real fundamental value of the company. Many analysts prefer to use a mix of valuation methods for estimating firm's value, especially for medium-size and small companies. These methods can be also adjusted regarding the purpose of valuation, special characteristics of the target company, etc (Luehrman, 1997). However, in some cases, it

is not possible to use multiple valuation approaches especially on developing markets. For example, comparables valuation approach which will be discussed in further subsections is not applicable for the majority of Russian companies because there are a few comparable firms and deals.

As it was mentioned before, many authors use wide range of valuation methods with different assumption underlying them. In order to understand better applicability, advantages and disadvantages of different valuation methods it is necessary to apply proper classification.

According to (Damodaran, 1996) all valuation methods can be divided into three major groups. These groups are:

- discounted cash flow valuation;
- relative valuation;
- contingent claim valuation.

The first group of valuation techniques assumes forecasting of firm's cash flows and discounting them at appropriate rate of return. The second group of methods, the relative valuation, assumes estimating the firm's value by using comparable variables (cash flows, earnings, book value, revenues, etc). The third category, the contingent claim valuation involves option pricing models for estimating company's value. All these valuation methods can give different results depending on estimations and assumption used.

In the subsequent research paper on the topic of valuation approaches and metrics (Damodaran,2006) reviews his classification and distinguishes four major groups of methods:

- discounted cash flow valuation;
- relative valuation;
- contingent claim valuation;
- liquidation and accounting valuation.

Whereas the essence of the first three methods remains unchanged, the author has added another technique to the classification, namely liquidation and accounting valuation. This approach is built around valuing a firm using accounting and financial information. Usually, book value of assets is used as a starting point for valuation. Since this research paper is focused on application of accounting-based valuation methods these methods will be discussed in detail in following subsections.

According to another classification by (Volkov, 2008), there can be distinguished two major approaches to estimating fundamental value: operating approach and capital approach. The operating approach implies that fundamental value of equity can be estimated by projecting inflows from the respective assets, discounting them at an appropriate rate and subtracting fundamental value of debt (discounted cash outflows associated with debt liabilities). Capital approach differs in that fundamental value of equity is determined as projected inflows to equity holders, discounted at an appropriate required rate of return. Having distinguished these two approaches, Volkov further investigates different notions of inflows that determine the fundamental value. In particular, he differentiates between cash flows and residual income flows associated with the valuation target. As a result, the author derives two major valuation models – discounted cash flow model and residual income model, with both of these models having alternative variations.

Table 1 Classification of fundametantal valuation approaches

		Operating approach	Capital approach
Flows creating the value	Cash flows	Discounted Cash Flows Models — DCFM	
		Discounted Free Cash Flows Model — DFCFM	Dividend Discount Model — DDM
	Residual income flows	Residual Income Models — RIM	
		Residual Operating Income Model — ReOIM	Residual Earnings Model — REM

Source (Volkov, 2008)

Although there is no unified approach to the classification of valuation methods, some of the models are extensively quoted in the literature. For the purpose of this master thesis, we will take a closer look at discounted cash flow, relative and residual income models. In the subsections below you will find a brief summary of each of the mentioned methods, alongside

with the short description of their benefits and limitations according to the empirical works of different authors.

The most theoretically efficient and acceptable valuation approach is discounted cash flow method. This valuation approach assumes discounting the future cash flows (dividends, earnings, and terminal values) that the firm will bring to the investor in the foreseeable future back to present values (Abarbanell, Bushee, 1997). Authors state that correctly calculated discount rate incorporates all sources of risk faced by the company and thus reflects fair estimation of the cost of the capital. Risk premiums can be estimated with model such as the capital asset pricing model, dividend growth model, or using a suitable surrogate (Abarbanell, Bushee, 1997).

Different assumptions can be used for discounted cash flow valuation method. In (Miller, Modigliani, 1961) authors regarded company as a single entity, while in (Cooper, Argyris, et al., 1998) company assumed to be a number of investment projects. For estimating fair value of a company future cash flows of all projects in the firm's operations should be identified (Penman, 2010). It is important to underline that different proxies can be used for estimating company's cash flows. Dividends, accounting earnings, free cash flow can serve as a proxy for cash flow calculation (Koller et. al, 2005). Discounted cash flow valuation methods with same underlying assumptions and different proxies for cash flows should result in similar estimates for value of a firm. However, in the paper (Torrez et al., 2006) authors provided empirical evidence that different proxies for cash flows lead to different estimates of the company's values.

There are two possible approaches of the discounted cash flow analysis: The first one is to value the company as if it was only equity financed (the equity valuation). The second approach means enterprise valuation thus valuing the whole company including all its claimholders (Damodaran, 1996).

One of the main advantages of discounted cash flow method over other valuation approaches is simplicity. This method is focused on cash flows, which is a "real" measure of company's performance and it can be observed in financial statements (Morris, 1994). Also discounted cash flow approach works regardless of accounting principles adopted by a firm (Penman, 2010). Many authors argue that this approach should be considered as the most simple and efficient but only if company stays profitable in the long run (Russell, 2007).

Although discounted cash flow method can be considered as attractive valuation techniques from the theoretical perspective it does have a number of limitations. The most important limitation is associated with the reliability of forecasting future cash flows and terminal value (Correia, Flynn, Uliana, and Wormald, 2003). This limitation is crucial for medium and small-size companies when it is difficult to forecast future earnings and assess growth perspectives of the firm without publicly available and transparent financial information. Furthermore, discounted cash flow approach is very dependable on weighted average cost of capital. Even small changes in discount factor can have a significant impact on company's value.

Thus, this valuation method can be used by analysts for achieving needed values and manipulation (Steiger, 2010; Copeland et al., 2000). Stated above limitations is very hard to overcome on developing markets where there is a lack of financial information. Limitations of discounted cash flow method are particularly difficult to overcome during the valuation of minority interests share in the company, when the process of obtaining of the information is usually difficult and expensive (Brealey, Myers, 2003).

Another type of discounted cash flow method that is worth separate mentioning is dividend discount model. In a nutshell, dividend discount model is based on predicting dividends and using them as a proxy for future cash flows which are then discounted to their present value. Obviously, this model can be much more complex with different variations. In theory, dividend discount model should yield results that are similar to discounted cash flow model, although there might be significant discrepancies caused mainly by various approaches to estimating terminal value (Penman, 1998).

There is no consent in the literature with regard to the reliability of using discounted future dividends to assess firm's value. One of the major issues with this model is that dividends are often positively priced regardless of the firm's financial performance (Hand and Landsman 2005). As such, dividend price tends to reflect frequently misleading analyst expectations and often fails to capture the real ability of a firm to produce earnings. This opinion is contradicted by two other studies (Fama, French 1998; Akbar, Stark 2003) which prove that dividends incorporate information about expected cash flows and therefore provide a reliable estimate of a firm's value.

Another important piece of critics with regard to dividend discount model is that dividends are often subjectively determined and can easily be manipulated. In particular, (Miller, Modigliani 1961) point out that in case of an acquisition one cannot estimate a firm's

value based on dividends, because the investor is free to set any level of dividends. They argue that projected earnings and investment opportunities provide much better proxies for a firm's value in that sense.

In general, there is much criticism as to the reliability of using dividend projections to estimate firm's value. Considering the fact that many private companies do not regularly pay out dividends, the applicability of dividend discount model is limited.

As it was mentioned before, discounted cash flow methods are often complemented by relative valuation methods (Benninga, Sarig, 1997) to mitigate the uncertainty of the underlying assumptions and cross-check the results. Out of relative valuation methods, multiples method is the most widespread due to its simplicity (Yoo, 2006). This method is based on calculating different ratios for a firm in question and comparing them to the multiples of similar companies. According to (Damodaran, 1994), multiples can be estimated either from a firm's fundamentals, such as earnings growth rate, or from comparable firms.

The major advantage of multiples method is that it can be easily applied in many circumstances based on the publicly available information. That is why the majority of investors and analysts use it as a starting point to understand whether a firm is undervalued or overvalued. However, there are certain limitations associated with this method as well.

One of the much-debated issues concerns the choice of multiples, as it is often difficult to determine the primary drivers of a firm's value. (Lie, Lie 2002) conducted a study of over 8500 firms to compare the efficiency of ten different multiples and concluded that price-to-book ratio produces the most accurate results, far better than the widely used price-to-earnings ratio. (Koller, et al 2005) sustains the view that price-to-earnings ratio can often be biased, since it is impacted by a firm's capital structure and non-operating costs and revenues.

Another difficulty associated with multiples method is the choice of comparable firms. According to (Alford, 1992), the most accurate valuation results are achieved when one compares firms that operate in the same industry, have similar risk levels and earnings growth rates. However, it often proves impossible to select comparable firms that satisfy all the three criteria, in which case Alford suggests choosing firms based on their industry. Nevertheless, oftentimes there is a lack of a sufficient number of comparable firms and private equity deals on the market that are priced correctly (Damodaran, 1994) which can substantially undermine the

validity of this method and provide ground for manipulation. As a result, multiples valuation method is rarely used on a standalone basis.

Unlike discounted cash flow and relative valuation models, residual income model is based on accounting information rather than financial. Almost all of the metrics for calculations, including operating income, book value of equity and book value of net assets, can be obtained from a firm's financial statements (Ohlson 1995, Skogsvik 2002). The residual income can be calculated as a sum of a firm's book value and discounted future abnormal earnings. In an essence, residual income is a measure of an economic value added for the shareholder (Ohlson,1995).

One of the major advantages of residual income method is that it is based on book value and earnings information from financial statements. According to (Bernard, 1995) and (Penman,2007), residual income model is superior to dividend discount model because it takes into account the abnormal earnings rather than dividends, which necessitates a profound understanding of a firm's operations and key factors driving its financial performance. (Xiaoquan, Bon-Soo, 2005) support this view and additionally point out that, unlike dividend discount model, residual income model can be applied to companies that are not paying dividends regularly.

Nevertheless, there are several pitfalls associated with residual income model. One of the issues is the extent of reliability of accounting information. (Penman 2007) expresses the opinion that accounting numbers can be manipulated and therefore can disrupt the results of valuation. (Rees 1997), too, points out the importance of careful assessment of the accounting figures before using them for valuation purposes. Another issue relates to the required rate of return on equity. According to (Skogsvik 2002), required rate of return will be different depending on a capital structure of a firm, although an attempt to account for changing rates of return can significantly overcomplicate the residual income model.

Since this research paper is focused on application of accounting-based valuation model it is necessary to overview the relevance of accounting data in estimating the company's fundamental value.

The relevance of annual financial reports to share price and fundamental value of a company has been questioned in recent time because of accounting information limitations. The discrepancy between book values reflected in financial statements of a company and observable

market prices for shares has been increasing. Many authors attempted to test different valuation models in order to answer the question whether accounting information can serve as a reliable tool for assessing company's fundamental value.

In (Flegm, 1989) limitations of different accounting standards and frameworks were discussed. Author came to the conclusion that it is not possible to value a firm or forecast its future performance precisely by using annual financial statements. Two major reasons for that are non-recognition of internally generated goodwill and historical costs accounting approach. In addition, financial statements represent past events and have a little explanatory power over future performance and prospects of the company. Even though this paper can be considered as outdated because a lot of changes occurred in accounting standards, the general conclusions are still relevant. The limitations of accounting data have not been overcome yet.

Further research focused on defining the usefulness of financial statements for estimating firm's value was made in (Lev, Sougiannis, 1999). Authors stated that increasing gap between book and market values decreases the usefulness of accounting information and remains unresolved in modern literature. In (Lev, Sougiannis, 1999) three possible explanations of discrepancy between market to book ratio were discussed. The first possible explanation provided in (Lakonishok, Schleifer, Vishny, 1994) associate gap between book to market ratios to mispricing of growth companies. Such companies with the high book to market ratio usually do not pay dividends and reinvest retained earnings in capital projects. As a result, growth companies expected to grow above the average of market and they are usually overvalued. The second explanation provided in (Fama, French, 1995) associated high book to market ratio to the risk premium for certain firms with high possibility of financial distress. In (Kothari,Shanken,1995) authors provide third possible explanation and associate discrepancy between book and market values with selection bias in empirical tests. Finally, in (Frankel, Lee, 1995) authors associated this phenomenon with incorrect market expectations about future earnings and growth perspectives of the firm. In (Lev, Sougiannis, 1999) authors concluded that stated above explanations provide interesting insights on the topic. However, these explanations do not provide satisfactory results and cannot be considered as efficient.

Another important aspect concerning relevance of financial statements to fundamental value of a company was discussed in (Akerlof, 1970). In this paper author introduces problem of asymmetry of information. Management usually has more information about financial perspectives of the company than majority of shareholders. Thus, outside investors cannot estimate the fair value of a company with publicly available financial information represented in

annual reports. The asymmetry information problem is more topical for companies with knowledge intensive intangible assets that are not reflected properly in the balance sheet (Holland, 1998). Therefore, the reliability of accounting-based valuation models can be questioned because of the issues discussed above. This further proves the importance and relevance of the research topic of this thesis.

1.2 Private equity industry in Russia

Before analyzing the recent trends and peculiarities of the private equity industry in Russia it is necessary to overview the recent studies of private equity and its main characteristics. Private equity had become a common investment discipline in many countries with well-developed financial markets. Such asset class as private equity appears to be an important component of investment portfolios of many institutional investors.

First of all, it is necessary to provide the definition of private equity. Different authors in their research papers use variety of definitions for private equity. The meaning of the private equity term depends on the nature of the study. In general, private equity is an asset class that is not traded publicly and thus is not quoted on the exchange.

Private equity can be regarded as a source of capital for investing and acquiring equity ownership in non-companies provided by institutions and wealthy individuals. The main characteristics of private equity are long-term nature of investments, high level of risk and returns. From that perspective, private equity can be viewed as a “patient” capital since it is aimed for acquiring capital gains from long-term investments.

At the same time, some authors argue that term private equity can be referred to various subcategories of investments. In (Conroy, Harris, 2007) authors stated that private equity refers to investments in non-traded companies at all stages of company’ life. Later in this chapter we will discuss in detail stages of company’s life the usage of private equity at them. Apart from the previous work, in (Leeds, Sunderland, 2003) authors stated that private equity term can refer only to the financing of privately-held companies at early stages provided by investors focused on high-risk high-return investments. Also, authors mentioned that such investments should be illiquid.

In contrast to the research papers mentioned above, in (Moon, 2006) author states that private equity is a later-stage investments with are which are typically focused on control-oriented transactions with mature companies. Private equity firms can be regarded as active investors since they are focused on acquiring voting power in the board of directors of the target company. In addition, they use variety of tools for corporate governance such as contractual restrictions and detailed reporting requirements.

In (Prowse, 1995) author has characterized private equity organizations as financial sponsors aimed for buying large ownership stakes and taking an active role in monitoring and advising portfolio companies.

The main types of private equity investments can be in form of venture capital, leveraged buyouts (LBOs), management buyouts (MBOs) (Gompers, Lerner, 2000). Venture capital can be regarded as high-risk investments into private companies and it is very important for economy growth. LBOs transactions can be characterized as purchase of well established mature firms with positive cash flows by using debt financing as a mean of acquisition payment. A management buyout transaction is a type of acquisition when a company's management acquires a significant part or all company from the private owners or the parent company.

In addition to venture capital investments, LBOs and MBOs private equity industry includes private issuance of defaulted debt, mezzanine (junior debt), funds-of-funds, and secondary purchases.

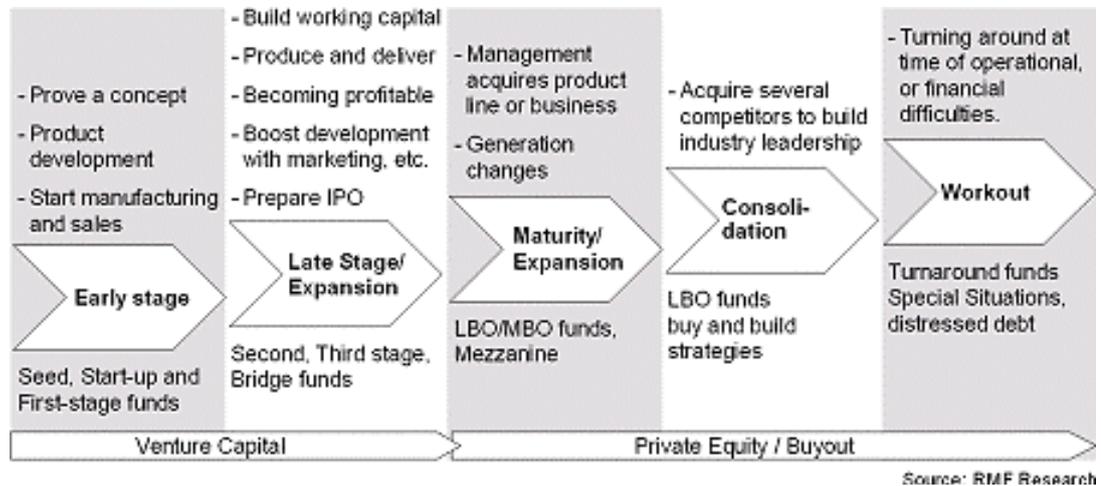
In well-developed economies private equity industry plays an important role throughout the life cycle of any company (Kaplan, Schoar, 2005). The life cycle of company can be divided into 5 stages:

- early-stage development;
- late-stage development;
- expansion and maturation;
- consolidation;
- turnarounds.

Figure 1 illustrates stages of the company's lifecycle and the role of private equity in it.

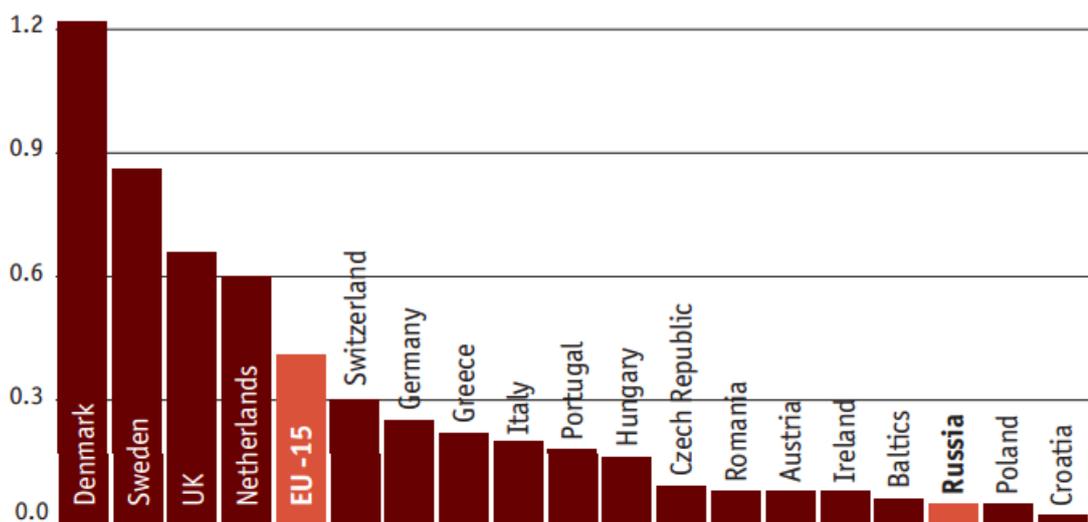
Private equity plays a role of risk capital for financing research and development of a new technology and new ideas. It facilitates the growth of companies that were created by family owners or incorporated and privatized by government. Private equity serves for creating more efficient and consolidated businesses environment when the market is fragmented and some particular industries are underdeveloped. In addition, in case of financial distress and in turnarounds situations when quick selling of assets can destruct the value, private equity provides the opportunity for the company to restructure

Figure 1 Private Equity in the life cycle of companies



Unlike in the United States, Russian private equity is less institutionalized with relatively unproven investment environment and a lot of uncertainties. Buyouts and other categories of private equity are rare in Russia compare to developed US and European markets. Figure 2 demonstrates the comparison of private equity market size of European countries and Russia for the year 2012.

Figure 2 Private equity market size, % of GDP



Source: EBRD

The development of a mature and transparent private equity market that will attract the largest institutional and other private equity investors to Russia will depend on many factors. Regarding the scope of this research paper, the study of valuation approaches applicable for non-traded companies can be beneficial for the development of Russian private equity.

2. RESEARCH METHODOLOGY AND DESIGN

2.1 Research problem: test of applicability of Residual Earnings Model for valuation of non-traded companies

Implementation of the unified and effective approach for valuation of the company is among the most topical problems in corporate finance. With the development of financial markets and increasing number of private companies the need for this approach is even increasing. A reliable estimate company's value is required for owner's decision-making process. It is crucial for determination of the effectiveness of the management, mergers and acquisitions, consolidation of the holdings, transactions with shares of non-traded companies and for private equity market development.

The number of stock companies in Russia continues to decline indicating that this kind of organizational structure is becoming less attractive for companies. According to the information reflected in the Unified State Register of Legal Entities, between the years 2012 and 2014 the number of joint stock companies in Russia decreased by 12% leaving approximately 151 000 stock companies. The reason for that might be changes in legislation analyzed in the first chapter of this research paper. Nevertheless, the number of stock companies in Russia is large even compared to other countries with well-developed financial markets. It is worth to mention that approximately 300 Russian public stock companies are listed and about 50 of stock companies are traded on a regular basis. Thus, most of the Russian stock companies stay illiquid and it is very difficult to evaluate fair market value for these companies.

Amendments to the Civil Code of the Russian Federation, which came into force on the 1 September 2014, designed to encourage companies to take a final decision about its organizational form. Closed and open joint-stock company (CJSC and OJSC) as well as additional liability companies will be transferred either to public or non-public companies. The main characteristic of the public company will be a free trade in the company's shares. All other stock companies and limited liability companies (LLC) will now be referred to as non-public.

It is necessary to underline that companies can change their organizational structure from private to public through IPO and from public to private through LBO. Such kind of restructuring can be carried out only through usage of financial markets and instruments. Thus regarding the a large number of stock companies in Russia that are not traded and possible transformation of private companies to public ones it is very important to implement a unified approach for valuation of private companies.

Therefore regarding particular features of the Russian financial markets and the fact that most of Russian companies are private stock companies the unified and simple mechanism for the valuation of stock companies with illiquid shares can be of great importance. Because of significant difficulties associated with valuation of companies and especially non-traded ones, it is necessary to critically review possible valuation approaches used in foreign countries and make conclusions about their applicability to Russian companies.

Among all approaches used in foreign practices for determination of fair value of the company, it is possible to outline the most relevant ones that can be applied to private companies. The most commonly used approaches for valuation of the private companies are:

- Comparable Trading Method;
- Comparable Transaction Method;
- Discounted Cash Flow Method.

The first approach, the Comparable Trading Method, implies using multiples of similar traded companies for valuation of private non-traded companies. Since this method involves the valuation of the company by selection of the multiples of similar companies it creates the need for a functioning market with a large number of similar companies. In other words, this approach works in a developed market with a large number of similar traded companies with different characteristics: industry, size, earnings, growth perspectives etc. As it was mentioned before, about 300 of Russian stock companies are listed on the stock exchange and about 50 of them have a liquid market. It is a very challenging process to find Russian comparable traded and non-traded companies in terms of industry, size and revenues. Thus, Comparable Trading Method cannot serve as unified approach for valuation of Russian non-traded companies.

The second approach, the Comparable Transaction Method is very similar to the previous method. The only difference is that in Comparable Transaction Method multiples of the actual transaction is used instead of multiples of the company as a whole. Transactions should be similar in terms of the industry group, geographical location and size. This approach also cannot be applicable for the valuation of the Russian private companies because of lack of similar transactions. In addition, data about private equity transactions on the Russian market is limited.

The third approach, Discounted Cash Flow Method uses expected cash flows of the target company to estimate its market value. Forecasted cash flows need to be discounted at an appropriate rate which is the weighted average cost of the capital in the industry plus some

additional risk factors for the particular private company. It is obvious that the process of collecting data needed for proper DCF analysis of Russian private companies is complicated. In addition, for each particular company individual equity risk premiums should be estimated. This may be done by consulting firms and appraisal companies but the price of such service can be unaffordable for private companies. Thus, DCF method cannot serve as a simple and unified approach for valuation of medium-size and small-size private companies in Russia.

Liquidity is extremely important for the Russian stock market where only a small number of shares are actively traded. Small and rare number of deals with illiquid stocks can significantly move their price. Therefore, only in case of the liquid market with a large number of traded companies it is possible to talk about reliability of fundamental valuation models and unified approaches for valuation of the companies. Nevertheless, previous works of A.Bukhvalov, D.Volkov and I.Berezinets (Bukhvalov, Volkov, 2005), (Volkov,Berezinets,2006) proved that accounting-based valuation models are reliable and have a good explanatory power over Russian companies.

Thereby, implementation of simple valuation model based on publicly available data that is applicable for non-traded companies is of great importance for the Russian market. Unified valuation mechanism appropriate for a large number of private companies operating on Russian market will be valuable for private equity deals valuation. It will also bring improvements into decision-making process inside the target company, ease the process of transformation of the holding companies to a single share. Also, it will be valuable for companies going IPO. Therefore, such valuation model will increase the liquidity of private companies and in such a way encourage the creation of developed private equity market in Russia.

2.2 Research goal and objectives

The goal of this research paper is to test reliability of valuation model based on accounting data and to propose unified approach for valuation of non-traded companies in Russia. Many researchers believe that basics of the residual income model were proposed and developed in the concept of economic income by Alfred Marshall (Marshall, 1890). Interest to this theory reappeared in the 70's of the 20th century. It is possible to conclude that among the direct theoretical sources of the Residual Earnings Model are works of E.Fama, M.Miller and F.Modigliani (Fama, Miller, 1972; Miller, Modigliani, 1961), as well as E.Edwards and P.Bell (Edwards, Bell, 1961).

Methodology for valuation approach based on accounting data was proposed by J.Ohlon (Ohlson, 1995; Feltham, Ohlson 1995). Empirical results of testing reliability of such models and their advantages over Dividend Discount Model and Cash Flow Discount Model were discussed in number of works published later. G.Richardson and S.Tinaikar (Richardson, Tinaikar 2004) published an article where two basic approaches of accounting-based valuation models were identified - historical and forecasted approaches. In their paper, authors tried to reconcile the historical and forecasting branches in the published works. The historical branch assumes defining the connection between the fundamental and market values based on actually observed data from financial statements and actual market prices. Alternatively, the forecasting branch implies determination of connection between forecasted financial statements data and observable market prices. This research can be attributed to historical branch. It is worth to mention the most important works within the historical approach of valuation (Ohlson, 1995; Feltham, Ohlson, 1995, 1996; Bar-Yosef, Callen, Livnat, 1996; Lee, 1999; Myers, 1999; Lo, Lys, 2000; Biddle, Peter, Zhang, 2001; Callen Dechow, Hutton, Sloan, 1999; Morel, 2001; Begley, Feltham, 2002; Easton, Pae, 2003; Bukhvalov, Volkov, 2005; Volkov, Berezinets 2007). The question of forecasting framework for valuation was raised in these works: (Penman, Sougiannis, 1998; Courteau, Kao, Richardson, 2001).

This research is a logical sequel of previous works by A.Bukhvalov, D.Volkov, I.Berezinets. In their research authors proved the reliability of accounting-based models, in particular, Residual Earnings Model, for valuation of Russian companies. In one of the latest articles (Bukhvalov, Akulaeva, 2014) authors conducted research on a sample of more than 50 Russian companies (496 company-years) and received high level of reliability of Residual Earnings Model (R^2 over 0,7). It is important to mention that authors used unconsolidated

accounting data which was prepared in accordance with Russian Accounting Standards. Nevertheless, even research conducted with unconsolidated accounting data resulted into significant and reliable regression coefficients which have explanatory power on market value of Russian companies. Despite the limitations of accounting data prepared under RAS (equity book value is calculated using historical values) it can serve as a proxy for regression variables (Bukhvalov, Akulaeva, 2014).

This research is based on findings of A.Bukhvalov, D.Volkov, I.Berezinets in which reliability of Residual Earnings Model was tested and proved. Further in this research we will define the model, assumptions underlying it, formalize modification of the valuation model, conduct econometric analysis and analyze obtained results.

In order to meet announced goals following objectives should be accomplished:

- description and formalization of the valuation model should be provided;
- regression analysis should be conducted;
- analysis of the regression descriptive statistics should be executed;
- regression coefficients should be applied to valuation of Russian companies;
- results derived from the application of the model should be compared to actual values;
- conclusions about efficiency and applicability of the model should be made.

The research method of this paper is qualitative and multiple regression analysis will be conducted.

2.3 Research questions

In the first chapter of this research paper, it was discussed that Russian private equity market is less developed and institutionalized compared to the US and European markets. As a result, private equity does not constitute a major source of capital for Russian businesses and its contribution to Russian economic growth is rather small. The quantity and size of private equity deals like LBO's in Russia are significantly smaller than in other well-developed markets. In addition, such kind of deals is uncommon for Russia. Nevertheless, development of the private equity industry is important since most of the companies operating on Russian market are non-traded or privately held and thus, can be regarded as private equity.

It is important to mention that LBO and other similar kinds of deals with private equity capital require special valuation methodology for various reasons. In case of LBO's, unified valuation approach cannot be implemented because of huge amount of debt that is involved. Companies during LBO deals face significant increase of bankruptcy and other associated risks. Special valuation approach for each particular company during LBO deal should be utilized. It is also not possible to apply single unified valuation mechanism for fast-growing venture capital firms and companies with piece-production and long production cycle. The valuation methods applicable in mentioned above situations are off scope of this research. Thereby, this research is focused on implementation of the valuation approach for non-trade companies during consolidation and other deals with shares in holding companies, privatization, mergers and acquisitions and IPO's. In addition, unified valuation mechanism can be beneficial for creating the basis for the rewarding system of the executive management.

The most typical deals with private equity in Russia are selling subsidiaries of the holding companies, integrating of the holding companies into one entity by transferring to a single share (consolidation) and going IPO. In each of this deal, it is necessary to implement efficient valuation model and calculate the fair value of the company. In countries with well-developed financial markets and a large number of traded companies, it is possible to use comparable methods. However, this approach will not work for Russia because of a small number of liquid traded companies that will serve as comparables.

According to the stated goals and objectives, this research is aimed to apply the modification of Residual Earnings Model for Russian companies and consequently implement unified approach for valuation of non-traded companies. In order to achieve stated goals and objectives of the research such questions should be answered:

1) What are the key characteristics of private equity industry in Russia?

This question is formulated in order to define types and key characteristics of the private equity deals that are common in Russia. The answer to this question will be helpful in understanding why private equity industry is less developed in Russia and what types of valuation models can be applied to Russian private companies.

2) Do the value of residual earnings and equity book value have explanatory power over real market values of the Russian companies?

This question is focused on proving the relation between capitalization of the traded company calculated by applying Residual Earnings Model and real market capitalization. The answer to this question will let to understand if the capitalization of the company can be estimated by conducting the analysis of accounting data and whether market capitalization reflects a real fundamental value of the company.

3) Does the IFRS-based Residual Earnings model is more effective in estimating market capitalization of the companies than the RAS-based model?

This question is closely related to the previous one where the efficiency of the valuation model is tested. It is aimed to determine whether consolidated accounting data prepared in accordance with IFRS is more predictive than RAS data for estimating market capitalization and thus the fundamental value of the company. To answer for this question market capitalization for selected companies will be calculated by application of the Residual Earnings Model based on consolidated IFRS accounting data. Then results for the same companies and years will be compared to results of the similar analysis (Bukhvalov, Akulaeva, 2014) that was based on RAS accounting data

4) Do the fundamental valuation approach can be used for estimating real market values of the non-traded companies in Russia?

This question can be regarded as the most important for this research. For answering this question a study of the interdependence between market capitalization and fundamental value of the company should be conducted. In case if the observable connection between these variables exists and accounting data allows estimating capitalization of the company it will be possible to develop and implement unified approach for valuation of non-traded companies. For answering this question two steps should be made. First, it is necessary to determine if accounting data

allows estimating capitalization of the company. Second, the relevance of the capitalization and real market values of the company should be proved. These steps will be carried out by applying Residual Earnings Model for calculating stock prices of the companies after the IPO. Then estimated stock prices will be compared to the real prices.

2.4 Research hypotheses

For the research being effective and impactful after discussing research problem, setting research goals and objectives and formulating research questions it is necessary to elaborate research hypotheses. As it was mentioned in previous sections, this paper is focused on the testing applicability of fundamental valuation model, namely Residual Earnings Model, for valuation of non-traded companies in Russia. The first hypothesis is:

Infinite flows of residual incomes and equity book value have explanatory power over the market value of the company.

Stated above hypothesis will be tested by running multiple regressions which will be formulated in the following subsection. Part of the quantitative analysis of this work is based on previous works of A.Bukhvalov, D.Volkov and I.Berezinets. The difference between this particular research and previous works of mentioned above authors is the type of accounting data. For example, in (Bukhvalov, Akulaeva, 2014) unconsolidated RAS accounting data was used for regression analysis. For the sake of this research IFRS accounting data will be used. Also, different time periods will be taken because consolidated IFRS accounting data for many Russian companies is not available for the time period prior 2006.

The second hypothesis that will be tested in this research paper is:

Regression analysis with different required rates of return on equity used uniformly for all companies and time periods of the chosen sample, will yield significant results that will be close to real values.

In a number of works where Residual Earnings Model was tested, individual required rates of return on equity were applied to each company in the sample. For instance, (Jiang, Lee, 2005), (Bukhvalov et al., 2012). Although in some specific cases this approach can give more accurate results, the assumption that same required rates of return can be applied to all companies and time periods in the sample is important. If it is true, the process of company's valuation can be simplified and used uniformly for companies operating in different industries. Because the main goal of this research is to implement unified approach for valuation of non-traded companies, this hypothesis can be essential. In order to test this hypothesis, regression analysis with different required rates of return on equity for the same time period will be conducted.

The third hypothesis is as follows:

Fundamental valuation approach namely Residual Earnings Model provides an estimation of the company's value that reflects fair market value, and thus this model can be applied to implement unified approach for valuation of non-traded companies.

To test this hypothesis regression model used for testing previous hypotheses will be applied. Values of chosen companies after IPO will be calculated with the model and then these values will be compared with actual prices.

2.5 Formalization of the Residual Earnings Model

In order to conduct regression analysis for testing the relationship between the fundamental and market value of selected companies, we will use the modification of accounting-based valuation approach, namely Residual Income Model. This valuation approach is based on a concept of economic income which was introduced by Alfred Marshall (Marshall,1890).

The Residual Income Model is based on the assumption that fundamental value of a company is interrelated with four factors. These factors are:

- an amount of investments at the moment of valuation;
- actual returns on investments;
- required returns on investments;
- an ability of a company to generate returns on investment above the required.

After reformulating the key hypotheses of the Residual Income Model it is possible to conclude that the fundamental value of equity of a company is based upon the two main elements: book value of equity at the moment of valuation; discounted flow of residual incomes ensuring gain of the fundamental value over the book value of equity capital (Volkov,Berezinets,2007). The main concept of this approach is Residual Income which is accounting income of the company after deducting required return on equity for the given period.

Residual Income can be expressed as:

$$RI_t = \pi_t - k \times I_{t-1} \quad (1)$$

where:

RI_t — residual income of the reported (t) year;

π_t — accounting income for the reported (t) year;

k — required rate of return on invested capital;

I_{t-1} — book value of invested capital at the end of previous year (t-1).

Depending on our understanding of the term investments (I) we can define the two basic types of the Residual Income value: Residual Operating Income and Residual Earnings of a company (Volkov, Berezinets, 2007). It is important to mention, that in calculation Residual Income it is necessary to meet the requirement of required rate of return on investments and accounting income value compliance with selected investment basis. Accounting income values, required returns on investments and book value of investments taken for the calculation of the Residual Income value should comply with each other.

In this research, we will use Residual Earnings as a notion of Residual Income. The usage of Residual Earnings instead of Residual Operating Income is justified since both of approaches will give practically similar results for fundamental value of the equity (Volkov,2004a). Thereby, Residual Earnings are assumed to be the net comprehensive income of the company after deduction of the cost of equity. Investments into the company are represented by the book value of equity, the cost of equity is denoted as k_e , and income is represented by Net Income for the given period. Thus, equation for the Residual Earnings can be expressed as follows:

$$RE_t = NI_t + k_e \times E_{t-1}^{BV} \quad (2)$$

where:

RE_t — residual earnings of the reported year;

NI_t — net income for the reported year;

k_e — require return on equity;

E_{t-1}^{BV} — book value of equity at the beginning (at the end of previous year) of the reported year

Thereby, the valuation model for calculating fundamental value of the company in this research will be defined as Residual Earnings Model. In current interpretation of Residual Earnings Model fundamental value of the company is calculated as sum of equity book value (E^{BV}) and perpetuity of residual earnings (RE_t) discounted at appropriate required rate of return (k_e). It is worth mentioning that in current notion the assumption about constant at all future periods residual earnings of a company is used.

Taking into consideration all assumptions we can define Residual Earnings Model formula:

$$V_{REM} = E_{t-1} + \frac{RE_t}{k_e} \quad (3)$$

Before continuing to formulation of the econometric regression model for testing stated hypotheses and assumptions about the adequacy of Residual Earnings Model some additional remarks should be made.

In this research market capitalization of a company (which is a number of shares outstanding multiplied by share price) is taken as explained variable. Consequently, explanatory variables (book equity value and residual earnings) are taken at their absolute values. This approach is similar to that was used in previous works (Bukhvalov, Volkov, 2005) and (Bukhvalov, Akulaeva, 2014). However, in (Volkov, Berezinets, 2007) authors took market share price as explained variable and thus explanatory variables were taken in relation to the single share price.

The question about taking market capitalization or share price as explained variable is debatable. The model with share price as explained variable can give the higher coefficient of determination. In other words, such modification can have more explanatory power over the fundamental value of the company. As an example, it is possible to compare analysis of the Residual Earnings Model which was conducted in (Bukhvalov, Volkov, 2005) and similar the analysis by (Volkov, Berezinets, 2007). In both papers authors used same data of the Russian market for the years 2000 — 2003. In (Bukhvalov, Volkov, 2005) where market capitalization served as explained variable coefficient of determination was $R^2=0,61$, while in (Volkov,Berezinets,2007) coefficient of determination was about $R^2 = 0,89$.However, division of equity into shares is optional by the scale of a separate share and brings in a statistical error in connection with heteroscedasticity of the model (different scales of data). In this sense building of models in relation to price rather than in relation to capitalization “cuts off” the whole class of management applications of the model such as forecasting of the capital value of closed companies and companies carrying out IPO (Volkov, Berezinets, 2007). The main goal of this research is to develop unified approach for valuation of non-traded companies. Therefore, the choice of market capitalization instead of single share price as explained variable is justified.

Another question is raised when market information is compared with accounting data. Financial information used in the model at time period t is published with a certain time lag. In addition, market needs time for incorporation of accounting data included in newly published financial statements. Therefore, comparison of accounting information of period t with market data at the same period is not adequate because share prices and consequently company's capitalization will not actually include this information at time period t . For these reasons, in this research accounting information at time period t is compared to the market data with a certain time lag τ ($0 < \tau < 1$). This allows the market prices and therefore market capitalization to adjust for new publicly available accounting information. Taking into account all assumptions and remarks stated above now it is possible to proceed to the formulating of regression equation.

In order to conduct regression analysis for studying the relationship between fundamental value of equity, perpetuity of residual earnings and equity book value of a company we will use two-factor model. Such model allows evaluating the influence of separate elements of regression (residual earnings and equity book value) on the fundamental value of a company. In general, following two-factor linear regression should be used:

$$Cap_{t+\tau,i} = \alpha + \beta_1 \times E_{t-1,i}^{BV} + \beta_2 \times RE_{t,i}^* + \varepsilon_{t+\tau,i} \quad (4)$$

where,

$Cap_{t+\tau,i}$ – market capitalization of a company at time period t with lag τ ;

$E_{t-1,i}^{BV}$ – book value of equity at the beginning of the period;

$RE_{t,i}^*$ – residual earnings of a company at the end of period;

α, β_1, β_2 – regression coefficients;

$\varepsilon_{t+\tau,i}$ – error term.

It is necessary to explain that residual earnings in equation (4) are calculated at the period when valuation is performed. The value of $RE_{t,i}^*$ is derived by subtracting from net income of a given period cost of equity of a previous period and discounting by the rate of return on equity.

Thus, the equation for calculating $RE_{t,i}^*$ can be expressed as:

$$RE_{t,i}^* = \frac{RE_{t,i}}{k_e} = \frac{NI_{t,i} - k_e \times E_{t-1,i}}{k_e} \quad (5)$$

where:

k_e — required rate of return on equity;

$NI_{t,i}$ — net income for the period;

$E_{t-1,i}$ — equity book value.

Another important adjustment should be done to equation (4) concerning research goals of this paper. Since regression function should be applied to the valuation of non-traded companies regression model with constants zero term should be used. The sample consists of liquid traded companies with market capitalization which is not comparable with the capitalization of non-traded companies in terms of size. In other words, regression (4) with large free term will make it impossible to apply this model for medium-size non-traded companies. If we apply this model for non-traded company and assume that residual earnings and equity book value equals to zero, company's value will be determined by a free term. In other words, a company will worth something even when the value of equity and residual earnings is equal to zero.

Therefore, the regression model with zero-intercept should be applied. It can be expressed as follows:

$$Cap_{t+\tau,i} = \beta_1 \times E_{t-1,i}^{BV} + \beta_2 \times RE_{t,i}^* + \varepsilon_{t+\tau,i} \quad (6)$$

2.6 Data collection

In order to study the interdependence of market capitalization with residual earnings and equity book value and thus evaluate the fundamental value of a company, sample had to be collected. Regression analysis of this research is based on a sample of Russian companies-issuers that have their common shares listed on Russian Stock Exchange. Therewith, shares of banks and other financial institutions are excluded from the sample for compliance with the requirement of data homogeneity.

The main criterion for choosing company was high liquidity on a stock exchange. Because of changing economic environment some companies disappeared while others appeared on the market. Therefore, the sample for regression analysis was reviewed at each time period and a number of companies for each year is different. Number of companies for each year and total number of firm years is represented in the table below.

Table 2 Number of companies in sample

Time period	year						
	2006	2007	2008	2009	2010	2011	2012
Number of companies	21	31	38	38	40	41	44
Number of firm-years	21	52	90	128	168	209	253

Accounting data for the years 2006-2012 needed for research was taken from financial reports of the companies and SKRIN database (www.skrin.ru). Because of the merger of Moscow Interbank Currency Exchange (MICEX) and the Russian Trading System (RTS) market data for some companies in the years prior 2011 was not available. Additional databases had to be used.

Market data about trading ordinary shares of selected companies for the years 2007-2013 was acquired from the following websites: www.moex.com; www.finam.ru; www.quote.rbc.ru.

All data is presented in USD and accounting data presented in RUR was converted into USD at the official Russian Federation Central Bank exchange rate at the end of reported period.

All financial data used for the research was consolidated accounting data prepared in accordance with IFRS. This is a key factor since one of the objectives of this research is to compare fundamental value estimated with two versions of Residual Earnings Model. Empirical tests of the model with data prepared in accordance with RAS were conducted in (Bukhvalov, Akulaeva, 2014). Results of empirical tests of the model based on consolidated IFRS accounting data will be compared to results of empirical tests of RAS-based model (Bukhvalov, Akulaeva, 2014) in the third chapter.

For calculation of the explained variable (market capitalization of the company), weighted average of shares in respect to daily trading volume was taken. Moreover, weighted average rate of shares was calculated with data for the second half of the year when valuation was performed. In other words, a time lag that was mentioned in the previous subsection when the model was formalized constitutes two quarters of the year. This is done in accordance with the assumption that market needs time to react to newly available accounting information that is usually published in the second quarter of the year. General description of data and regression coefficients will be described in the next subsections.

One of the important questions arising during regression analysis of Residual Earnings Model is choosing right required return on equity (k_e). Many authors state that it is possible to use constant required rate of return for each company in the sample and get significant results about the interrelation of a fundamental value of a company and its book value of equity and residual earnings. For example, in (Bukhvalov, Volkov, 2005) 30% required rate of return was taken uniformly for each company in the sample and results were significant. As it was mentioned in previous subsections, one of the objectives of this research is to compare results of RAS-based Residual Earnings Model with IFRS-based model. In their research (Bukhvalov, Akulaeva, 2014) where RAS-based Residual Earnings Model was tested, authors assumed constant required rate of return for each company to be 27%. For the adequate and proper comparison, the same 27% required rate of return will be taken in this research.

Nevertheless, in the second subsection of the third chapter, we will test different required rates of return and make conclusions about the significance of the model with different rates.

3. EMPIRICAL RESULTS OF APPLICATION RESIDUAL EARNINGS MODEL

3.1 Comparison of IFRS-based and RAS-based valuation models

This part of empirical research is devoted to the comparison of RAS-based and IFRS-based Residual Earnings Model. After estimating regression coefficients and testing the efficiency of the IFRS-based model, capitalization for selected companies for the years 2011-2013 will be calculated and compared.

In this subsection, the same regression model as in (Bukhvalov, Akulaeva, 2014) will be used. But sample will be collected for the years 2006-2012 and will include only companies that prepared their financial statements in accordance with IFRS. As it was discussed in the methodological section, constant required rate of return on equity 27% will be used.

For estimating regression coefficients for the years 2011-2013 three separate regressions had to be run. Descriptive statistics of the whole sample is presented below:

Table 3 Descriptive statistics of the sample, USD mln.

Variable	Mean	Median	Standard deviation	Number of firm-years
Market capitalization 2007-2013	12 581,3	4 506,2	29 113,9	253
Equity book value at the beginning of the year, 2006-2012	7 351,6	1 143,1	23 594,1	253
Equity book value at the end of the year, 2006-2012	8 241,5	1 452,3	25 632,4	253
Net Income for the year, 2006-2012	1 278,1	202,1	3 103,8	253

The next step of empirical research is running two-factor regression model with zero-intercept (6), where market capitalization was explained variable and book value of equity along with the infinite flow of residual earnings were explanatory variables.

Regression coefficients and other outputs are summarized in the table below:

Table 4 Results of the regression analysis

Capitalization for the year	Estimators of regression coefficients		p-values for regression coefficients		Characteristics of the model	
	β_1	β_2	β_1	β_2	R^2	Adj. R^2
2011	2,2798	1,5952	0,0000	0,0000	0,7943	0,7918
2012	1,8354	1,2042	0,0000	0,0000	0,7215	0,7187
2013	1,7952	1,3371	0,0000	0,0000	0,6833	0,6808

After estimating regression coefficients it is necessary to test how well regression function explains relations between chosen variables. In addition, analysis of the significance of the regression model and variables should be conducted. The test of hypothesis about model significance can be carried out by executing Fisher's test. Testing of hypotheses about the significance of each explanatory variable is performed by using Student's t-test.

The determination coefficient (R^2) demonstrates how much of the variation in market capitalization of companies can be explained by equity book value and infinite flow of residual earnings. For all years, R^2 is well above 0,65 meaning that regression function explains 68-79% of changes in market capitalization of companies. An important issue is connected with adding variables to the regression. When new factors are added to the regression model, R^2 usually rises because of new variables. But these variables can have a negligible effect on explained variable. For overcoming this problem, adjusted R^2 is reflected in the table.

The test of significance of the two-factor regression model is done by formulating following hypotheses:

$$H_0 \beta_1=0; \beta_2=0$$

$$H_1 \beta_1 \neq 0; \beta_2 \neq 0$$

As it was mentioned before, Fisher's test is used for testing hypothesis about the significance of the model. The test is done in three steps. First, F –statistics is calculated. Second, F-critical value for given level of significance is defined. Third, F-statistics is compared to the F-critical value and if it is higher, then null hypothesis should be rejected and regression model can be considered significant.

F-statistics is calculated with following formula:

$$F = \frac{R^2}{(1 - R^2)} \times \frac{s - n}{n - 1} \quad (7)$$

where:

F – is F –statistics

s – is sample size;

n – number of unknown coefficients in the regression;

Thus, F-statistics is different for each year and depends on a number of firm-years and coefficient of determination (R^2). The same situation with F-critical value, it will be different for every year because a number of firm years is not equal. F-critical values for each time period with given degrees of freedom can be derived from the Fisher's distribution table.

Now we will proceed with testing of the hypothesis about each factors influence on explained variable. For conducting t-test it is necessary to formulate following hypotheses:

$$H_0 \beta_1=0; H_1 \beta_1 \neq 0$$

$$H_0 \beta_2=0; H_1 \beta_2 \neq 0$$

Null hypothesis means that coefficient before regression factors is equal to zero. In other words, regression factor has no impact of explained variable. On the contrary, alternative hypothesis means that explanatory variable influence explained variable. For testing stated above hypothesis, comparison between t-value and rejection region with given level of significance should be done. The boundaries of two-sided rejection region with 5 % level of significance are: -1,97 and 1,97.

The results of testing model overall significance and regression coefficients are presented in the table below:

Table 5 Results of estimation of the regression model

Variable	Regression coefficients					
	2011		2012		2013	
	β_1	β_2	β_1	β_2	β_1	β_2
Standard error	0,0132	0,1129	0,0727	0,1493	0,1604	0,1811
t-statistics	13,186	22,119	17,856	24,991	15,804	19,493
t-critical (5 % level of significance)	1,97	1,97	1,97	1,97	1,97	1,97
Conclusion of null hypothesis	Reject	Reject	Reject	Reject	Reject	Reject
F-statistics	318,569		266,838		269,695	
F-critical (5 % level of significance)	3,05		3,04		3,02	
Conclusion of null hypothesis	Reject		Reject		Reject	

From the table above we can see that t-values for both coefficients in every year do not fall into two-sided 5 % rejection region. Thus, the null hypothesis can be rejected meaning that both coefficients significantly differ from zero. In other words, equity book value and infinite flow of residual earnings influence market capitalization of the company.

Since F-critical value at 95% probability level is much lower for every period than the observed F-statistics value, the null hypothesis can be rejected. Consequently, alternative hypothesis accepted and regression model should be considered significant.

After model and regression coefficients were tested and proved to be significant now it is possible to proceed with the comparison of IFRS-based and RAS-based Residual Earnings Models.

In (Bukhvalov, Akulaeva, 2014) regression analysis of the RAS-based model for the time period 2002-2012 was conducted and significance of the model was proved. However, authors claimed that excluding consolidated IFRS accounting data and using RAS data instead can be a barrier for company's fundamental value estimation. This can be the case because of difference between IFRS and RAS. It is necessary to overview differences between these two sets of accounting standards in detail for making reasonable conclusions.

Many authors believe that IFRS is more objective set of rules and it better reflects the financial situation and therefore is more reliable than RAS (Lukashev, Mogin, 2008). Main differences between these two sets of accounting standards are concerned with such issues as: revenue recognition, assets value reflection, investments and goodwill recognition. Thus, taking

into account that IFRS may be more reliable than RAS it is possible to assume that IFRS-based Residual Earnings Model can be more precise than RAS-based in estimating the fundamental value of a company.

For comparison of two different types of model, market capitalization for selected companies will be estimated by using regression coefficients from the Table 4. For example, fundamental value of the company in 2011 is calculated as follows:

$$V_{i2011} = 2,2798E_{i2010}^{BV} \times 1,5952 \frac{RE_{i2010}}{0,27} \quad (8)$$

After that, discrepancy with real market capitalization will be calculated and results will be compared with RAS-based model (Bukhvalov, Akulaeva, 2014). Formula for calculating discrepancy can be expressed as:

$$Discrepancy = \frac{Cap_i - V_i}{Cap_i} \quad (9)$$

where:

Cap_i – real market capitalization of the company;

V_i – market capitalization calculated with the model.

Table 6 Comparison of RAS-based and IFRS-based models for the year 2011

Company	Average market capitalization 2011, mln.USD	Capitalization 2011 according to RAS-based model, mln. USD (Bukhvalov, Akulaeva, 2014)	Discrepancy 2011, %	Capitalization 2011 according to IFRS-based model, mln.USD	Discrepancy 2011, %
Lukoil	56 377,3	87 287,5	-55%	41611,6	26%
Rosneft	91 636,3	62 549,6	32%	66265,4	28%
Gazprom	180 564,5	217 461,2	-20%	212991,5	-18%
RusHydro	14 347,3	19 126,3	-33%	21653,8	-51%
Rosseti	6 393,1	15 030,9	-135%	4017,1	25%
Surgutneftegas	36 577,6	53 009,3	-45%	59485,3	-63%
Magnitogorsk Iron and Steel Works	11 756,7	9 153,1	22%	10077,5	14%
Mechel	11 387,4	13 269,0	-17%	13749,0	-21%
Novatek	39 739,9	12 113,9	70%	13996,6	42%

Company	Average market capitalization 2011, mln.USD	Capitalization 2011 according to RAS-based model, mln. USD (Bukhvalov, Akulaeva, 2014)	Discrepancy 2011, %	Capitalization 2011 according to IFRS-based model, mln.USD	Discrepancy 2011, %
Sistema	11 464,7	20 457,9	-78%	712,6	94%
Raspadskaya	4 948,8	2 200,0	56%	19308,1	-68%
Severstal	18 294,1	679,9	96%	2763,3	44%
Tatneft	13 242,9	13 570,4	-2%	3658,9	80%
Rostelecom	11 869,6	10 942,0	8%	14935,6	-13%
Aeroflot	2 722,6	3 739,9	-37%	11563,4	3%
Norilsk Nickel	49 596,0	33 795,7	32%	3888,5	-43%
FGC UES	16 644,0	34 263,0	-106%	35771,7	28%
OGK-2	4 477,2	1 409,9	69%	27839,2	-67%
Inter RAO UES	5 386,7	3 574,7	34%	1628,8	64%
E.ON Russia	5 680,2	4 151,3	27%	13122,3	-105%
Average (absolute values) for all companies			52%		46%

Source: (Bukhvalov, Akulaeva, 2014)

Average of discrepancy absolute values for selected companies in the year 2011 is lower for the IFRS-based model than for RAS-based model. Even though the difference between models in some cases is not significant and for some companies RAS-based model produces even more accurate results, IFRS model is more precise in general. The reason for different capitalization estimations within IFRS and RAS models is a mismatch between accounting results reported in financial statements composed in accordance with different accounting standards. For example, 100% difference between models for Rosseti can be explained by positive net income reported in consolidated IFRS financial report and net loss under RAS accounting standards.

It is worth mentioning that in some extreme cases discrepancy with real market capitalization estimated with both models is above 80%. The reasons for such difference will be discussed after comparing results for the years 2012 and 2013 further in this subsection.

Table 7 Comparison of RAS-based and IFRS-based models for the year 2012

Company	Average market capitalization 2012, mln.USD	Capitalization 2012 according to RAS-based model, mln. USD (Bukhvalov, Akulaeva, 2014)	Discrepancy 2012, %	Capitalization 2012 according to IFRS-based model, mln.USD	Discrepancy 2012, %
Lukoil	47 498,9	79 613,6	-68%	52 054,4	-10%
Rosneft	69 452,1	57 522,6	17%	60 403,9	13%
Gazprom	127 381,0	282 627,7	-122%	270 135,7	-112%
RusHydro	9 320,5	12 685,7	-36%	11 812,4	-27%
Uralkali	21 182,2	9 563,4	55%	9 688,2	54%
Surgutneftegas	31 002,1	64 182,6	-107%	68 924,8	-122%
MTS	14 998,9	9 096,4	39%	10 179,7	32%
Magnitogorsk Iron and Steel Works	3 904,9	1 966,9	50%	2 843,6	27%
Mechel	2 965,6	519,7	82%	1 715,2	42%
Novolipetsk Steel	10 905,2	5 246,6	52%	9 867,3	10%
Novatek	33 102,9	24 676,2	25%	11 702,6	65%
Magnit	10 870,0	5 397,8	50%	3 705,3	66%
Sistema	7 536,3	7 750,7	-3%	4 934,4	35%
Raspadskaya	2 131,5	791,0	63%	1 994,8	6%
Severstal	10 274,3	13 762,0	-34%	7 499,5	27%
Tatneft	12 322,3	6 063,1	51%	14 961,9	-21%
Rostelecom	6 129,9	12 098,4	-97%	12 234,2	-100%
Aeroflot	1 605,8	2 466,2	-54%	2 601,1	-62%
Norilsk Nickel	26 027,2	29 214,7	-12%	30 866,0	-19%
FGC UES	9 537,3	14 804,7	-55%	13 136,4	-38%
OGK-2	1 838,5	1 534,0	17%	2 965,2	-61%
Inter RAO UES	8 561,2	-7457,2	187%	-5 569,5	165%
Rosseti	3 212,4	14 451,1	-350%	9 754,7	-204%
E.ON Russia	5 000,5	4 175,5	16%	4 509,8	10%
Average (absolute values) for all companies			68%		55%

Source: (Bukhvalov, Akulaeva, 2014)

The results of estimating capitalization for selected companies for the year 2012 are similar to previous year results. On average, IFRS-based model produces values that are closer to market results than the RAS-based model.

Table 8 Comparison of RAS-based and IFRS-based models for the year 2013

Company	Average market capitalization 2013, mln.USD	Capitalization 2013 according to RAS-based model, mln. USD (Bukhvalov, Akulaeva, 2014)	Discrepancy 2013, %	Capitalization 2013 according to IFRS-based model, mln.USD	Discrepancy 2013, %
Lukoil	52 068,9	79 322,2	-52%	58012,3	-11%
Rosneft	73 427,9	74 560,6	-2%	71456,7	3%
Gazprom	90 831,8	207 585,1	-129%	180199,1	-98%
RusHydro	4 832,3	12 331,0	-155%	9409,7	-95%
Uralkali	21 085,9	10 988,0	48%	7292,8	65%
Surgutneftegas	30 175,4	54 748,8	-81%	43654,5	-45%
MTS	17 360,3	9 580,8	45%	13872,9	20%
Magnitogorsk Iron and Steel Works	2 627,1	3 949,3	-50%	4203,3	-60%
Mechel	1 527,6	4 127,5	-170%	3438,6	-125%
Novolipetsk Steel	8 938,1	9 929,5	-11%	10711,9	-20%
Novatek	30 010,1	13 995,5	53%	12163,2	59%
Magnit	20 342,7	6 317,7	69%	8959,9	56%
Sistema	8 103,7	8 876,6	-10%	6883,5	15%
Raspadskaya	906,3	490,0	46%	286,1	68%
Severstal	6 564,7	6 432,6	2%	6065,3	8%
Tatneft	12 322,3	18 395,4	-49%	19655,4	-60%
Rostelecom	5 524,8	8 057,5	-46%	5465,9	1%
Aeroflot	1 835,3	1 548,1	16%	1773,1	3%
Norilsk Nickel	24 169,9	14 225,3	41%	16573,4	31%
FGC UES	4 772,1	6 011,4	-26%	5761,1	-21%
OGK-2	950,3	157,3	83%	2217,2	-133%
Inter RAO UES	4 362,6	5 327,3	-22%	7310,6	-68%
Rosseti	2 261,5	9 631,6	-326%	6453,2	-185%
E.ON Russia	4 962,1	5 294,5	-7%	5725,6	-15%
Average (absolute values) for all companies			64%		53%

Source: (Bukhvalov, Akulaeva, 2014)

The results for the year 2013 correspond to results for previous years. Average discrepancy estimated with the IFRS-based model is lower than discrepancy estimated with the RAS-based model.

Thus, it is possible to conclude that accounting data from consolidated financial statements prepared under IFRS allows estimating market capitalization of Russian companies more precisely than RAS accounting data. It is important to mention that time period for regression analysis was limited to 6 years because of absence of IFRS accounting data for selected companies in previous years. That is why further research with larger number of observations should be conducted in order to estimate precisely better efficiency of IFRS-based valuation model over RAS-based model.

As it was discussed in the beginning of this subsection, discrepancy between real market capitalization and capitalization estimated with accounting-based models can be significant for some companies. Nevertheless, existence of discrepancy can be justified by assumption that market capitalization not always correspond to fair value of a company. As an example, it is possible to overview Gazprom capitalization. It can be assumed that fundamental value of Gazprom calculated with Residual Earnings Model reflects better strategic value of a company than significantly dropped market capitalization (Bukhvalov, Akulaeva, 2014). Of course, there can be other reasons for discrepancy. Limitation of accounting data discussed in the first chapter can be among these reasons.

Some authors argue that accounting-based valuation models cannot serve as reliable approach for valuation of the company. For example, in (Flegm, 1989) author concludes that it is not possible to measure reliably the value of a business or predict its future growth perspectives based only on accounting information from annual financial reports. Two examples of major limitations of financial statements discussed in this paper are historic cost accounting and non-recognition of internally generated goodwill. In addition, the paper argues that financial statements represent a summary of past events, and have a little explanatory power over future growth perspectives of the company. Even though, accounting standards changed a lot since that time and become more reliable, problem of historical values in the balance sheet still has not been overcome.

The question about usefulness of annual financial statements in determining firm value is very topical because of increasing gap in the book to market ratio. This problem was discussed in many studies. In (Lev, Sougiannis 1999) authors described this as phenomena that exists even on well-developed markets and has yet to be explained in modern literature. Many works, where accounting-based valuation models are discussed, dedicated to this problem and many authors attempted to explain the gap. It is possible to divide explanations by three main directions. First, some researchers associate gap between book and market values with mispricing of growth

companies with the high price to earnings ratio (Lakonishok, Schleifer, Vishny, 1994). Second, some authors argue high book to market ratios can be justified because of existence of certain companies with higher possibility of financial distress. For such companies higher returns are demanded because of higher risks associated with financial distress (Fama, French, 1995). Third, discrepancy between market and book values can be attributed to the error in market participants' expectations about future earnings of a company (Frankel, Lee, 1995).

Another important aspect of reliability of accounting-based valuation methods is information asymmetry. It is obvious that management of a company has more information than the shareholders. Thus, shareholders are not able to estimate a fair value of a company with the publicly available information that can be limited. The problem of information asymmetry can be exacerbated by intangible assets that are knowledge intensive and always difficult to measure. In addition, such kind of assets usually not reflected annual financial statements. These issues underline the problem of usefulness of annual financial statements in fundamental valuation of the company.

Even though accounting-based valuation models have limitations, they can be important for Russian market. In absence of comparable companies and deals, accounting-based valuation methods can be extrapolated on non-traded companies. Residual Earnings model can serve as unified method for valuation of private equity deals and non-traded companies. Of course, this model is not applicable for fast-growing companies and companies with high bankruptcy probability (Zhang, 2000). Another important feature of this model is that only publicly available information is needed for valuation. Despite all limitations mentioned above, Residual Earnings model can be extrapolated and easily applied for valuation of non-traded companies.

3.2 Test of the regression model with different required rates of return on equity

This subsection of the research is devoted to testing whether regression analysis with different required rates of return on equity applied uniformly to all companies and time periods in the sample and used for calculating residual earnings, will yield significant results. The answer to this question is of great importance in the context of this research. For implementing unified valuation approach for non-traded companies it is necessary to develop correctional factors considering the reason of valuation (IPO, consolidation, divestments etc). Usage of different required rates of return can be helpful in developing those correctional coefficients and will improve accuracy of the valuation process. Table below demonstrates results of regression analysis with different rates of return.

Table 9 Results of regression analysis with different required rates of return for the year 2013

Variable	Different required rates of return, %				
	10	15	27	30	35
Regression coefficients					
β_1	1,332	1,521	1,795	2,167	2,362
β_2	1,019	1,123	1,337	1,441	1,773
Determination coefficients					
R^2	0,716	0,691	0,683	0,713	0,707
Adj, R^2	0,714	0,689	0,680	0,711	0,705
t-test (5 % level of significance)					
t-statistics (β_1)	19,392	14,510	15,804	18,326	20,517
t-statistics (β_2)	17,871	16,025	19,493	21,515	23,707
t-critical value	1,97	1,97	1,97	1,97	1,97
Conclusion on null hypothesis	Reject	Reject	Reject	Reject	Reject
F-test (5 % level of significance)					
F-statistics	322,704	279,137	269,695	317,993	308,860
F-critical	3,02	3,02	3,02	3,02	3,02
Conclusion on null hypothesis	Reject	Reject	Reject	Reject	Reject

According to obtained results, regression analysis with different required rates of return on equity proves hypothesis mentioned above. In other words, regression coefficients differ from

zero and can be considered as significant. Whole regression is significant as well. Thus, it is possible to utilize various required rates of return on equity in Residual Earnings Model depending on the reason for valuation and such approach will yield significant results. However, fundamental principles of defining required rate of return in each particular case depend not only on goals of valuation and econometric variables but also on behavioral stereotypes (Bukhvalov, Volkov, 2005). This question can be studied in further research on the topic of accounting-based valuation models.

3.3 Application of the model for IPO price estimating

After testing the significance and reliability of Residual Earnings model it is possible to proceed with its application to the valuation of non-traded companies and private equity deals. Although the model can be used for different valuation purposes (consolidation of the holding structures, divestments, privatization, mergers and acquisitions, private equity deals, etc), in this research paper the applicability of the model will be tested on companies after the IPO. However, before application of the model for IPO price estimation, it is necessary to conduct an overview of recent trends of Russian IPO market.

The Russian IPO market had been quite active before the 2008 global financial crisis. Over 24 companies placed their shares on a stock exchange in the years 2006 and 2007, in particular, 13 companies in the year 2006 and 12 companies in the year 2007 completed IPO procedure. About third of the companies went public in these years are from extractive industries – oil and gas and metals and materials industries. The rest of the companies are represented by such industries as consumer and retail, real estate, and finance and banking (Puffer, McCarthy, 2012). Global financial crisis decreased dramatically number of companies that planned IPOs. As a result, only two Russian companies carried out successful IPOs in 2008, and a similar situation prevailed in 2009.

The year 2011 proved to be another challenging year for Russian companies, reflecting the worldwide difficulty in launching IPOs due to economic uncertainties, particularly in Europe (Cowan, 2011). After the appearance of positive trends in the investment climate in the year 2010, over 100 of Russian companies expressed intentions to carry out IPO between 2012 and 2016.

The management of the companies that postponed IPO usually states unfavorable market conditions as the key reason for the delay in going public. In other words, company owners are not satisfied with a fundamental value estimated by investors. This point is consistent with IPO timing theories. An underpricing phenomenon has been tested in many research papers. It is defined as a difference between the price company's shareholders expects to get for its shares offered through an IPO and the actual price of the stock (Bell et al., 2008). Thus regarding the instability of the Russian IPO market, where lots of uncertainties about the valuation of private companies exist, reliable valuation approach can be important.

In the Table 10 general information about companies selected for the analysis is presented.

Table 10 General information about IPO of selected companies

Company	Characteristics					
	Placement specification	Placement amount	Placement volume, mln., USD	Offering price, USD	Trading floor	Industry
PhosAgro	GDR	1 280 952	538	14,00	LSE	Chemicals and petrochemicals
Global Ports Investments Plc	Common stock	116 800 000	588	5,00	LSE	Transport and logistics
HMS Group	GDR	43 000 000	360	8,25	LSE	Engineering
MD Medical Group	GDR	25 900 000	311	12,00	LSE	Healthcare
MegaFon	Common stock, GDR	93 000 000	1 860	20,00	LSE, MICEX	Technologies, telecommunications and media
QIWI Plc	ADR	12 500 000	213	17,00	NASDAQ	Financial services
Luxoft	Common stock	4 092 070	70	17,00	NYSE	Technologies, telecommunications and media
ALROSA	Common stock	1181000 000	1304	1,10	MICEX	Gold, Diamonds & Gemstones mining

Company	Characteristics					
	Placement specification	Placement amount	Placement volume, mln., USD	Offering price, USD	Trading floor	Industry
PROTEK	Common stock	114 285714	400	3,50	MICEX, RTS	Pharmaceutical industry
RUSAL Plc	Common stock	161000000	2 240	1,39	Hong Kong Stock Exchange	Metal and mining
Mail.ru Group	GDR	32 930 000	912	27,70	LSE	Technologies, telecommunications and media
TransContainer	Common stock, GDR	4 863 170	400	80,00	LSE, MICEX, RTS	Transport and logistics
Moscow Exchange	Common stock	272 000000	485	1,78	MICEX	Financial services

Unfortunately, the number of IPO in Russia is significantly lower than in US and Europe. That is why getting representative which could be used to test reliability of Residual Earnings model for IPO price estimation is complicated. Nevertheless, application of the model to the limited sample of companies after the IPO can possibly allow making reasonable conclusions about applicability of accounting-based valuation models for private equity deals and non-traded companies in Russia.

Therefore, for the final part of empirical research 14 companies that performed IPO in the years 2010-2013 were selected. Including companies that had IPO in the years prior 2010 to the sample can give inadequate results because regression coefficients were estimated for the time period beginning in 2006. For example, for calculating the value of companies for the year 2010 regression coefficients that were estimated with the sample of 168 firm-years were used.

The results of application of Residual Earnings model for estimating share prices of selected companies are provided in the table below:

Table 11 Results of application REM model for IPO price estimating

Company	Capitalization, USD mln.	Shares offered,%	Share price, USD	Share price according to the model,USD	Difference between prices,%
2010					
TransContainer	1 300	35%	80,00	64,53	-19%
Mail.ru Group	5 710	17%	27,70	21,14	-24%
PROTEK	2 200	25%	3,50	3,12	-11%
RUSAL Plc	22 300	11%	1,39	1,22	-12%
2011					
PhosAgro	5 200	11%	14,00	13,41	-4%
Global Ports Investments Plc.	2 350	25%	5,00	2,73	-45%
HMS Group	846	45%	8,25	7,48	-9%
2012					
MD Medical Group	889	35%	12,00	3,84	-68%
MegaFon	11 100	15%	20,00	18,36	-8%
2013					
QIWI Plc.	884	24%	17,00	3,04	-82%
ALROSA	8 139	16%	1,10	0,99	-10%
Luxoft	555	13%	17,00	29,53	74%
Moscow Exchange	4 200	12%	1,78	1,33	-25%

The most obvious finding from the application of Residual Earnings model for IPO price estimation is that discrepancy between market prices and model estimations are higher for companies with the lowest market capitalization. The explanation is straightforward. One of the limitations of Residual Earnings model is determined by the fact that capitalization of the companies being valued with the model should be greater than minimal capitalization of the companies included in the sample for regression coefficient estimation (Bukhvalov et al., 2012). If this rule is violated, then the application of the model can result in inadequate estimations of the fundamental value.

For companies with the market capitalization, less than 1 billion USD the difference between estimated price and initial market price is well above 50 %. However, the HMS Group is an exception. The difference between companies with low market capitalization being analyzed is determined by the percentage of shares offered during IPO. The companies Luxoft, QIWI Plc. and MD Medical Group offered less than 40% of free-float shares. However, HMS Group offered 45% of shares. According to (Volkov, 2005) the fact of IPO blocking stake, as well as the presence of an identifiable for investor brand names, can create the situational enhancing effect in IPO price estimation.

For the rest of the companies, the difference between price estimated with the model and market price is within the 20% range. Unfortunately, it is not possible to make generalized conclusions about interdependence between industry type of valued companies and error in estimation of their share prices with Residual Earnings model because of the small number of companies went IPO.

It is also important to underline that share price estimation with Residual Earnings model results into lower prices for 13 out of 14 selected companies compared to initial market prices. In (Bukhvalov et al., 2012) Residual Earnings model resulted in overvalued share prices for companies went IPO. In (Bukhvalov et al., 2012) regression model with the share price as explained variable was used while in this research market capitalization served as explained variable. Nevertheless, mentioned above issue can be explained by the market situation. In the years, prior financial crisis investors and companies going IPO were optimistic about future perspectives because of positive accounting and financial indicators. After the year 2009 when financial crisis happened, the financial performance of companies worsened and many companies decided to postpone IPOs. Therefore, the mismatch between market expectations and financial indicators can explain the results of the valuation.

Thus, we can conclude that Residual Earnings model can be applied to companies going IPO. Of course it is unlikely that the model can be used by owners of the company for determination of initial price level during the IPO. The usefulness of the Residual Earnings model is associated with the opportunity for outside investors to define the reasons for IPO by using it. If the company goes public to attract funds for realization of profitable projects, it is likely that share price will rise after the IPO. Conversely, if the company's strategic investment opportunities are limited than future earnings are already incorporated in the share price. In such situation, the reason for the IPO might be the desire of key shareholders to sell shares for fixing earnings. Thus, it is unlikely that outside investors will benefit from participation in such IPO.

Regarding all mentioned above, Residual Earnings model can be used by outside investors to assess potential benefits from participation in IPO. The key advantage of such model that it uses publicly available accounting data and can be applied to firms in developing markets where there are no comparable companies. Thus, the accounting-based valuation model which connects the market prices with the fundamental value of a company can serve as a valuable tool for outside investors.

CONCLUSIONS

Nowadays the problem of developing a unified valuation approach, suitable for most sectors of the Russian economy, applicable to non-traded companies and private equity deals is of great importance. This problem is especially significant because the the valuation approaches used for private companies can not be applied to companies operating on Russian market due to the lack of comparable firms and transactions, poor liquidity and transparency. The absence of such valuation method inhibits the consolidation of holding structures, transactions with shares of non-traded companies, divestments, and the development of private equity market. The persistent problems in valuation of Russian companies have attracted increased attention of researchers and practitioners likewise and initiated a number of studies. This research is logical sequel of previous works in which authors studied the reliability of accounting-based models, in particular, Residual Earnings Model.

Empirical tests of accounting-based valuation model proved that accounting data from consolidated financial statements prepared under IFRS allows estimating market capitalization of Russian companies more precisely than RAS accounting data. Even though in some cases the discrepancy between model estimations and observable market values can be significant, Residual Earnings model still remains a useful tool for assessing the fundamental value of a company.

The regression analysis revealed that various required rates of return on equity can be utilized for valuation and can produce meaningful results. Usage of different required rates of return can be helpful for implementing unified valuation approach. It allows developing correctional factors depending on the reason of valuation (IPO, consolidation, divestments etc). Those correctional coefficients will improve the accuracy of the valuation process.

The results of application of the Residual Earnings model for IPO price estimation allow making a conclusion about applicability of the model. It is unlikely that the model can be used by owners of the company for determination of initial price level during the IPO because the mismatch between the price estimated with model and market prices can be significant. However, the usefulness of the model is associated with the opportunity for outside investors to evaluate the fundamental value of a company with publicly available accounting data. In such way, investors may measure potential benefits from participation in IPO. In addition, this valuation approach can be used by key shareholders for determining IPO timing.

From the theoretical point of view, the results of this research contribute to explaining the relevance of accounting data to value of a company and interdependence between market capitalization its fundamental value. From the practical point of view, the test of applicability of the model demonstrated its practical importance for non-traded companies valuation. Accounting-based valuation methods such as Residual Earnings model can be used for implementing unified valuation approach for Russian companies. However, further tests with more representative and broad sample are needed.

The research presented in this paper is interim step towards the developing of an adequate valuation model for the Russian market companies. Further research may be conducted in the following areas. Firstly, it is necessary to conduct research over non-accounting factors influencing the market capitalization of the company. Secondly, the connection between required rate of return on equity and market capitalization should be studied and fundamental principles of its determining should be developed.

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