Capital Structure of Private Pharmaceutical Companies in Russia

MARIA SHELUNTCOVA*

Economics and Finance Department, National Research University Higher School of Economics, Postal address: Lebedeva Street 27, Perm 614017, Russia

ABSTRACT

This paper is devoted to trends in capital structure choice of private pharmaceutical companies in Russia. The sample of 144 private pharmaceutical companies for the period from 2006 to 2011 is used for testing hypotheses on capital structure determinants. It is revealed that main firm-specific factors affecting the total debt to total assets ratio are firm's size, profitability, assets' structure, and short-term liquidity. The negative impact of the recent economic crisis has been confirmed. It is found that unstable macroeconomic and institutional environment influences the capital structure significantly.

Key words: Determinants of capital structure, private companies, pharmaceutical industry, Russia.

JEL: G3

INTRODUCTION

Decisions on the company's capital structure are an important aspect of corporate finance. Capital structure influences the company's value and shows accessibility to resources of a financial market. Financial decisions of the firm affect the firm's growth, which contributes to the economic growth of the country. Investigation of capital structure determinants is particularly important for emerging markets

* Corresponding Author: E-mail: sheluntsova@gmail.com
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since it appends to the understanding of key relationships in the financial market and reveals imbalances of the economic development.

Empirical research papers present findings on the capital structure determinants for both a single country (Keister (2004), Sogorb-Mira (2005)) and cross-country comparisons. Investigations are made for both developed and emerging markets (Booth *et al.* (2001), Bancel and Mitoo (2004), Psillaki and Daskalakis (2009), (Gurcharan, 2010)). Generally, companies from emerging markets use less debt than companies from developed countries, and financial leverage has been decreasing in recent years (Glen and Singh (2004)).

The majority of studies focus on the capital structure determination of listed companies. It is explained by the availability of information about companies' financial statements, payout policy, share price, etc. There are a few studies based on an analysis of private companies and on comparisons of public and private firms (e.g. Nivorozhkin (2004) for companies from the Czech Republic and Bulgaria, Bhole and Mahakud (2004) for companies from India). Private firms probably choose the capital structure in the way, which is different from the way public companies behave, since private and public firms have dissimilar opportunities to attract financial resources.

Considering capital structure determinants for emerging markets, existing research studies pay low attention to the analysis of private companies operating in a particular industry. The reason is the lack of observations and insufficiency of data. The given research is focused on the Russian pharmaceutical industry. It is one of the growing production sectors of Russian economy, and it absorbs a great number of private enterprises. The paper analyzes capital structure determinants of private pharmaceutical companies in Russia. Investigating the financial behavior of Russian private companies adds to studies of firms' capital structure on emerging markets.

LITERATURE REVIEW

Examination of capital structure for Russian private pharmaceutical companies require a brief review of capital structure measures and their explanatory factors. We pay attention to widely considered theories in the related literature that are trade-off and pecking order theories. Trade-off theory focuses on finding the balance between the tax advantages of borrowed money and the costs of financial distress when the debt is too much (Shyam-Sunder and Myers, 1999). Pecking order theory put emphasis on asymmetric information between "insiders" and "outsiders" of the firm (Myers and Majluf, 1984). This theory implies that a firm uses debt only after internal funds (Nivorozhkin, 2004).

Capital Structure

Previous research papers on the issue indicate that there are two measures of the capital structure. The first is debt / equity ratio: Shanmugasundaram (2008). The second is total debt / total assets ratio: Rajan and Zingales (1995), Michaelas *et al*. (1999), Nivorozhkin (2004), Bonfim and Antao (2012), Mateev *et al*. (2013). Considering Russian private companies, the second measure is the best one, because of high volatility of the debt / equity ratio. Moreover, it is a common situation, when private companies use only short-term liabilities and avoid long-term debt. Generally, Russian private companies finance operations with the help of short-term liabilities. It reflects poor institutional environment and unstable macroeconomic conditions. Long-term liabilities are associated with an extremely high financial risk.

Studying private companies, we are limited to use the book values of debt and equity. Private companies are not listed, and data is incomplete to derive market values of capital's sources. Evidence of using book values is indicated in the paper of Delcoure (2007). Meanwhile there are many followers of market values' calculations, e.g. Booth *et al*. (2001), Miguel and Pindado (2001).

The next step is the description of explanatory variables for the capital structure with an emphasis on Russian private companies. A review is based on previous scientific papers. The following factors are pointed out.

Size

The impact of a firm's size on the capital structure is investigated in a huge number of research papers, e.g. Ferri and Jones (1979), Rajan and Zingales (1995), Shanmugasundaram (2008), Psillaki and Daskalakis (2009). According to the pecking order theory there is the negative relationship between a firm's size and the capital structure. The trade-off theory states that this relationship is positive. Empirical findings give evidence to both opinions. For example, Booth *et al*. (2001), Rajan and Zingales (1995), Psillaki and Daskalakis (2009) revealed positive relationship, while Bevan and Danbolt (2002), Chakraborty (2010) found negative correlation.

As a rule, authors measure a firm's size with the help of natural log of total assets (Nivorozhkin, 2004; Shanmugasundaram, 2008; Mateev, 2013) or natural log of sales (Chakraborty, 2010). In this research, we use natural log of sales to estimate a size of a private pharmaceutical company in Russia.

Profitability

According to the pecking order theory, firms prefer to use internal sources for financing their operations. In the framework of this theory, negative relationship between leverage and profitability is expected. The opposite conclusion comes from the trade-off theory, which states that profitable firms prefer to use debt in order to receive benefits from the tax shield. Most of the empirical studies confirm the pecking order theory: Harris and Raviv (1991), Rajan and Zingales (1995), Michaelas *et al*. (1999), Booth *et al*. (2001), Chen (2004), Chakraborty (2010), and others.

Generally, authors consider two different measures of profitability. These measures are EBITDA / total assets ratio (Chakraborty (2010)) and cash flow / total assets ratio (Bhaduri (2002)). It should be noted that Russian private companies do not have incentives for finding the balance between investment attractiveness and understatement of income tax. Private firms try to show the lowest possible earnings in the profit and loss account. Though, positive earnings undoubtedly point at financial prosperity of a private firm. Due to unreliable data on EBITDA we are constrained to use EBIT in calculations instead. Thus, we apply EBIT to total assets ratio to measure profitability.

Short-term Liquidity

According to Bonfim and Antao (2012), as well as Mateev *et al*. (2013), current assets / current liabilities ratio should be used to control for short-term liquidity effects. Mentioned authors revealed negative correlation of short-term liquidity with firms' leverage ratios. In the present study, we also include current assets to current liabilities ratio into analysis.

Assets' Structure

Many authors pay attention to the fact that the specificity of companies' assets affects the capital structure choice. Usually, capital assets are considered to be less risky than current assets: Van der Wijst and Thurik (1993), Psillaki and Daskalakis (2009). We follow research studies mentioned above and include capital assets to current assets ratio into the range of explanatory variables.

One more important factor affecting the capital structure is **the recent economic crisis**. Nowadays the impact of economic crisis on firms' financial decisions has not yet been studied in a comprehensive way especially for companies from emerging markets. The given research is an attempt to make up for this deficiency in the scope of capital structure for Russian private companies.

HYPOTHESES AND DATA

Hypotheses on capital structure of private pharmaceutical companies in Russia are based on the review of recent studies. Hypotheses are as follows:

> *H1 : The larger the size of the firm the higher the total debt/ total assets ratio.*

Generally, large firms are more financially stable and have better reputation than small firms have. It enables large firms to take long-term loans since this option is cheaper than raising equity.

> *H2 : The higher the profitability of the firm the higher the total debt/total assets ratio. High earnings in the profit and loss account give firms better opportunities to attract debt than low earnings, because high earnings guarantee the financial health of the firm in the near future.*

> *H3 : The short-term liquidity is negatively correlated with the company's total debt/total assets ratio. Current liabilities represent a significant proportion of the total debt of Russian private pharmaceutical companies. A firm with a higher current assets / current liabilities ratio has better solvency. This results in less need to borrow.*

> *H4 : The assets' structure significantly influences the total debt/ total assets ratio.*

> *H5 : The recent financial crisis has had a significant impact on the firm's financial behavior.*

Because of the negative experience during the crisis, Russian private pharmaceutical companies tend to use less debt in a post-crisis period than in a period of financial prosperity.

For testing the hypotheses, a panel data of 144 private Russian pharmaceutical companies for the period from 2006 to 2011 is used. Necessary information is obtained from the special database "FIRA" (First Independent Rating Agency in Russia). The sample includes limited liability companies and closed corporations. These forms of organizing the business are the most widespread in Russia. Federal unitary enterprises are not included in the sample, because these companies are not

free in their financial decisions. As usual, such companies finance their operations through government subsidies.

When preparing the sample, a common problem for panel data has been appeared. It is a decrease in the number of objects under observation due to non-systematic reasons. This is mainly incidental errors in data collection (for instance, negative sales) and missing information in some periods. In total, the sample represents Russian private pharmaceutical companies that operate during 2006 - 2011. The average age of firms in the sample is 13 years. It is worth noting that we include in the sample both start-ups and maturity firms maintaining proportions of the general totality.

Dependent variable is a balance ratio of total debt to total assets. We include into the debt both long-term liabilities and current liabilities. It is often found that long-term debt of a Russian private firm is equal to zero while short-term liabilities are significant. This is explained by difficult access to long-term bank loans. These circumstances force private firms to use short-term debt or equity to finance business. Average total debt to total assets ratio is 52,4% in the sample. The sample represents a wide variety of firms including those financed through 100% debt or 100% equity.

Explanatory variables are capital assets / current assets ratio (an assets' structure measure), current assets / current liabilities ratio (a short-term liquidity measure), EBIT / total assets ratio (a profitability measure), and natural logarithm of sales (a firm's size measure). It is important to note that companies' sales in all periods are estimated in prices of 2006 year with a help of inflation index. Characteristics from firms' balance sheets are calculated as averages for each particular year. Correlation coefficients among explanatory variables are less than 18,5%. Consequently, we suggest the absence of multicollinearity and analyze all variables simultaneously. Descriptive statistics of explanatory variables are given in the Table 1.

Table 1 shows that pharmaceutical industry in Russia is rather homogenous. There are no too large or too small private companies in the sample. On average, private pharmaceutical companies in Russia prefer to use current assets than capital assets. It is explained by the tendency to avoid the property tax. Companies try to keep away from the ownership and to avoid classifying assets as capital assets. As a rule, companies have positive net working capital. In the mean, current assets are higher than current liabilities of 4,5 times. This option of working capital management is very conservative. This fact indirectly suggests that firms assess business risks the high and agree to donate their profitability for the stability.

Table 1 Descriptive statistics of capital structure's determinants

	Capital assets / Current assets	Current assets / Current liabilities	EBIT / Total assets	Ln (Sales)
Mean	0,3724	4,535	0,176	10,769
Median	0,1457	1,79	0,126	10,79
Maximum	26,94	161	2,51	14,79
Minimum	0,0002	0,348	-0,91	4,98
Std. Dev.	1,49	10,47	0,242	1,85

In Russia, an average return on assets of pharmaceutical companies is 17,6% during the period from 2006 to 2011. It indicates a sufficient return on capital. With all of these, the sample includes companies that suffer losses, as well as companies with outstanding earnings. However, these cases are extreme. Generally, there are no firms systematically unprofitable or super profitable.

It is interesting that the majority of firms in the sample (787 of 864 observations), as well as in the general totality, have current liabilities exceeding long-term liabilities. It demonstrates the unwillingness of private companies in Russia to finance operations with long-term liabilities or the lack of such a possibility. The current liabilities / long-term liabilities ratio does not change for companies from the sample over time, so this ratio is not included into analysis. This feature of the Russian private firms is the evidence of institutional environment's peculiarity. Despite the significant impact of such peculiarity on a firms' financial behavior, it is difficult to measure it. This fact motivates us to use a fixed effect model in the further analysis.

MODEL DESCRIPTION AND ESTIMATION RESULTS

We estimate a fixed effect model to reveal the determinants of a capital structure for private pharmaceutical companies in Russia. We eliminate undesirable fixed effects in cross-sections and use the following specification:

$$Y_{it} = \alpha_i + X_{it}' * \beta + \varepsilon_{it} \tag{1}$$

α_i – fixed effects in cross-sections;

Y_{it} – dependent variable, which is balance ratio of total debt to total assets;

X_{it} – vector of explanatory variables. It includes capital assets / current assets ratio, current assets / current liabilities ratio, EBIT / total assets ratio,

natural logarithm of sales, and dummy-variables for the following years: 2007, 2008, 2009, 2010, and 2011. Dummy-variables are used to test the impact of financial crisis on the firms' capital structure;

β – vector of coefficients;

ε_{it} – vector of errors.

Estimation results are given in Table 2. The adjusted R-squared equals 82%. The model is statistically significant in terms of the F-statitic. Darbin-Watson statistic shows the absence of autocorrelation in the model. It is worth noting that the model without fixed effects is also statistically significant, and the adjusted R-squared is 25%. Thus, unobservable factors play an essential role in capital structure formation of private pharmaceutical companies in Russia.

Table 2 Estimating capital structure's determinants for private pharmaceutical companies in Russia

Variable	Coefficient	95% Confidence interval
Absolute term	0,7894***	(0,622097; 0,956744)
Ln (Sales)	-0,0197**	(-0,035483; -0,003873)
Capital assets / Current assets	-0,0144***	(-0,023953; -0,004844)
Current assets / Current liabilities	-0,003***	(-0,004154; -0,001973)
EBIT / Total assets	-0,1367***	(-0,190172; -0,083278)
D2007	0,0053	Coefficient is insignificant
D2008	-0,0024	Coefficient is insignificant
D2009	0,0001	Coefficient is insignificant
D2010	-0,0297**	(-0,0598; 0,000386)
D2011	-0,0354**	(-0,065445; -0,005361)

*** Coefficient is significant at the 1% level
** Coefficient is significant at the 5% level

Based on the results of estimation we conclude on the hypotheses as follows:

1. The size of a firm significantly influences the decision on capital structure. As we can find from the 95% confidence interval, the size of a firm is negatively related to the total debt / total assets ratio. This result is consistent with the pecking order theory.

2. Hypothesis 2 on the impact of profitability on the capital structure is not correct. The corresponding variable is statistically significant, but the impact is negative. The higher the profitability of a company, the less the total debt / total assets ratio is. This result supports the pecking order theory.

3. Estimations confirm the significant impact of short-term liquidity on the capital structure. The higher the current assets / current liabilities ratio, the lower the total debt / total assets ratio.

4. The assets' structure (capital assets / current assets ratio) has a significant impact on the company's capital structure. The direction of the influence is negative. It indicates the tendency to finance operations with the help of equity rather than debt. The reason may lie in macroeconomic instability and limited access to the capital market for private companies without a solid reputation, good credit history, and stable positive earnings.

5. The importance of the recent financial crisis for the capital structure formation is confirmed. Dummy-variables for 2007-2009 years are insignificant, but dummies for 2010 and 2011 are significant. After the crisis (in 2010 and 2011) firms have started to employ less debt than in the period from 2006 to 2009. Evidently, firms have begun to assess the risk of debt financing as being higher than before the crisis.

CONCLUSION

The main results of the paper are summarized as follows. It is discovered that firm's size, profitability, assets' structure, and short-term liquidity are negatively related to debt / total assets ratio for private pharmaceutical companies in Russia. This conclusion is consistent with the recent papers of Chakraborty (2010) for India, Bonfim and Antao (2012) for Portugal, and Mateev *et al*. (2013) for Central and Eastern Europe as well as Nivorozhkin (2002) for Hungary. Companies' preferences for equity reflect specifics of doing business in unstable macroeconomic conditions and poor institutional environment.

It is found that economic crisis has significantly influenced firms' financial decisions in Russian pharmaceutical industry in 2010-2011. Negative impact of the crisis is devoted to the fact that firms have started to reduce liabilities. Firms consider debt as an element of instability and try to avoid it.

Limitations of the research are devoted to the availability of necessary data on Russian private companies. Results of the given research may help the evolution of corporate finance's applications in emerging markets.

REFERENCES

Babu, S. and Jain, P. K. (1998) Empirical Testing of Pecking Order Hypothesis with Reference to Capital Structure Practices in India, *Journal of Financial Management and Analysis*, **11(2)**, 63-74.

Bancel, F. and Mittoo, U. (2004) Cross-country Determinants of Capital Structure Choice: A Survey of European Firms, *Financial Management*, **33(4)**, 103-133.

Bevan, A. A. and Danbolt, J. (2002) Capital structure and its determinants in the UK – A decompositional analysis, *Applied Financial Economics*, **12**, 159-170.

Bhaduri, S. N. (2002) Determinants of Capital Structure Choice: A Study of the Indian Corporate Sector, *Applied Financial Economics*, **12**, 655-665.

Bhole, L. and Mahakud, J. (2004) "Trends and determinants of Corporate Capital Structure in India: A Panel Data Analysis". *Finance India* 18, no. 1: 37-55.

Bonfim, D. and Antao, P. (2012) The dynamics of capital structure decisions. Banco De Portugal Working Paper Series No. 6, Economics and Research Department, Banco de Portugal, Portugal.

Booth, L., Aivazian, V., Demirguc-Kunt, A. and Maksimovic, V. (2001). Capital structures in developing countries, *Journal of Finance*, 87-130.

Borgia, D. and Newman, A. (2012) The Influence of Managerial Factors on the Capital Structure of Small and Medium-sized Enterprises in Emerging Economies: Evidence from China, *Journal of Chinese Entrepreneurship*, **4(3)**, 180-205.

Chakraborty, I. (2010) Capital Structure in an Emerging Stock Market: The Case of India, *Research in International Business and Finance*, **24**, 295-314.

Chen, J. J. (2004) Determinants of capital structure of Chinese-listed companies, *Journal of Business Research*, **57**, 1341-1351.

Delcoure, N. (2007) The determinants of capital structure in transitional economies, *International Review of Economics and Finance*, **16**, 400-415.

Ferri, M. G. and Jones, W. H. (1979) Determinants of Financial Structure: A New Methodological Approach, *Journal of Finance*, **34(3)**, 631-644.

First Independent Rating Agency in Russia. http://fira.pro (accessed March, 2013).

Glen, J. and Singh, A. (2004) Comparing Capital Structures and Rates of Return in Developed and Emerging Markets, *Emerging Markets Review*, **5**, 161-192.

Gurcharan, S. (2010) A Review of Optimal Capital Structure Determinant of Selected ASEAN Countries, *International Research Journal of Finance and Economics*, **47**, 32-43.

Harris, M. and Raviv, A. (1991) The theory of capital structure, *The Journal of Finance*, **46**, 297-355.

Keister, L. (2004) Capital Structure in Transition: The Transformation of Financial Strategies in China's Emerging Economy, *Organization Science*, **15(2)**, 145-158.

Mateev, M., Poutziouris, P. and Ivanov, K. (2013) On the Determinants of SME Capital Structure in Central and Eastern Europe: A Dynamic Panel Analysis., *Research in International Business and Finance*, **27**, 28-51.

Michaelas, N., Chittenden, F. and Poutziouris, P. (1999) Financial Policy and Capital Structure Choice in UK SMEs: Empirical Evidence from Company Panel Data, *Small Business Economics*, **12**, 113-130.

Miguel, A. and Pindado, J. (2001) Determinants of Capital Structure: New Evidence from Spanish Panel Data, *Journal of Corporate Finance*, **7**, 77-99.

Myers, S. C. and Majluf, N. (1984) Corporate Finance and Investment Decisions When Firms Have Information That Investors Do Not Have, *Journal of Financial Economics* **13**, 187-221.

Nivorozhkin, E. (2002) Capital Structures in Emerging Stock Markets: The Case of Hungary, *The Developing Economies*, **XL-2**, 87-166.

Nivorozhkin, E. (2004) The Dynamics of Capital Structure in Transition Economies. *Economics of Planning*, **37**, 25-45.

Psillaki, M. and Daskalakis, N. (2009) Are the Determinants of Capital Structure Country or Firm Specific?, *Small Business Economics*, **33(3)**, 319-333.

Rajan, R. G. and Zingales, L. (1995) What Do We Know About Capital Structure? Some Evidence from International Data, *Journal of Finance*, **50**, 1421-1460.

Shanmugasundaram, G. (2008) Intra-Industry Variations of Capital Structure in Pharmaceutical Industry in India, *International Research Journal of Finance and Economics*, **16**, 162-174.

Shyam-Sunder, L. and Myers, S. (1999) Testing Static Tradeoff Against Pecking Order Models of Capital Structure, *Journal of Financial Economics*, **51**, 219-244.

Sogorb-Mira, F. (2005) How SME Uniqueness Affects Capital Structure: Evidence from a 1994-1998 Spanish Data Panel, *Small Business Economics*, **25(5)**, 447-457.

Van der Wijst, D. and Thurik, R. (1993) Determinants of Small Firm Debt Ratios: An Analysis of Retail Panel Data, *Small Business Economics*, **5**, 55-65.