

# Determinants of Enterprises' Capital Structure in Poland: Evidence from Warsaw Stock Exchange



Leszek Czerwonka and Jacek Jaworski

**Abstract** The aim of the paper is to identify factors that affect the financing structure of Polish companies listed on the Warsaw Stock Exchange in the period 1998–2012. In the first part of the paper the modern theories of capital structure are reviewed and main determinants of this structure are identified. The second part provides empirical verification of the relationship between debt and found factors using panel models. The capital structure of studied enterprises measured by the total debt ratio is most adequately explained by the pecking order theory. The increase in the share of fixed assets in total assets, profitability, liquidity and company size influences the reduction of its debt. The non-debt tax shield affected the debt level differently from the pecking order theory. The positive relationship between non-debt tax shield and debt corresponds to the agency theory. While a large number of studies conducted in other countries confirm the significance of the impact regarding the above factors on the long-term debt ratio, in Poland a similar relationship is not noticeable. Long-term debt is determined only by the share of fixed assets in total assets. It indicates the importance of short-term debt in the financing of Polish enterprises.

**Keywords** Capital structure · Cost of capital · Financing · Determinants of capital structure · Capital structure theories · Warsaw Stock Exchange

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L. Czerwonka

Faculty of Economics, University of Gdańsk, Gdańsk, Poland

e-mail: [leszek.czerwonka@ug.edu.pl](mailto:leszek.czerwonka@ug.edu.pl)

J. Jaworski (✉)

Department of Finance, WSB University in Gdańsk, Gdańsk, Poland

e-mail: [jjaworski@wsb.gda.pl](mailto:jjaworski@wsb.gda.pl)

## 1 Introduction

One of the key financial decisions in any organisation is seeking financing sources. These decisions depend on many internal and external factors. The impact of these factors on the relationship of equity and debt has been the research subject for decades. Until now, many theories called capital structure theories have been formulated. The most notable theories include: The Modigliani-Miller model, the signalling theory, the agency theory, the pecking order theory and the static trade-off theory. Most of these theories were empirically tested. The studies have not brought unambiguous confirmation or falsification of any of these theories so far. Therefore, the studies are further conducted on various capital markets and for different sectoral conditions, using very different research methods. The current study is part of this research trend. Its aim is to identify the factors that may affect the capital structure of enterprises in Poland.

In the first part of the paper the modern theories were reviewed, and on that base the determinants of capital structure were identified. The second part of the study provides empirical verification of the significance of the factors affecting corporate debt using panel models. The objects of the research are companies listed on the Warsaw Stock Exchange in the period 1998–2012.

## 2 Contemporary Theories of Capital Structure

One of the oldest major theories of capital structure is the MM model (Modigliani and Miller 1958). Assuming a perfect capital market, the authors showed that the cost of capital and thus the market value of a company are independent from the capital structure. With the increase in the share of cheaper debt capital in financing the risk increases, and consequently the shareholders' required rate of return (cost of equity) increases too. These values are mutually offset and that is why weighted average cost of capital does not change. The original MM model was modified by introducing into the model different factors, making the functioning of a company closer to reality (corporate tax, shareholders' income taxes, etc.). The insertion an income tax into the MM model resulted in the emergence of benefits from having debt (interest tax shield), and the optimum capital structure was based on the only share of debt in the capital of the company.

Jensen and Meckling (1976) published a concept of financial decisions based on an agency theory. It takes into account conflicts of interest between shareholders, creditors and the company management. The result of using contracts for assuring interests of the parties is agency costs. Capital structure should then be determined, taking into account the costs of issuing equity and costs of issuing and service of debt. It is assumed that the debt is a way of reducing conflicts. It causes the need for ongoing maintenance of obligations, thus reducing the amount of cash left to the managers (Jensen and Meckling 1976). Jensen (1986) also pointed out that the

payment of increased dividends reduces the cash available to managers. Summing it up, the tendency of managers to implement unprofitable projects can be limited by increasing the amount of dividends and/or use of debt.

Ross (1977) is considered to be the author of the signaling theory. It assumes that only the management has accurate information about future profits and investment opportunities of the company. It means that share prices which are determined by the market do not reflect all relevant information. The management can transfer its knowledge to the company environment by choosing a relationship of equity and debt. A larger share of debt in the capital structure gives the signal of large future cash flow enabling repayment of obligations. In turn, it causes an increase in investor confidence leading to the rise in share prices.

The observed low financial leverage of highly profitable businesses gave the premise to formulate the pecking order theory (Myers 1984; Myers and Majluf 1984). According to this theory, the company prefers the specific, based on negative selection, order of financing sources. The management knows the exact value of the company assets and possibilities of its development, so they readily spend generated profit on further financing for the company. External investors have less knowledge about the company. Thus, from their point of view, participation in equity is more risky than borrowing money. Therefore the risk premium expected by investors is higher in the case of the purchase of shares than granting the loan. In summary, managers firstly choose the internal financing, then debt. The issue of shares is chosen as the last option.

On the basis of discussions on the MM model, the static trade-off theory has been formulated. It claims that the optimal capital structure results from the comparison of the tax benefits, costs of financial distress and potential agency costs of equity and debt. The risk of bankruptcy is adopted as a cost of debt, which counterbalances benefits from the interest tax shield (Hirshleifer 1966). The first model based on these assumptions has been proposed by Kraus and Litzenger (1973). The model enhanced by Myers (1984) stipulates that a company sets a target debt-to-value ratio, and then gradually moves towards the target determined by balancing the benefits of tax shield and costs of financial distress (bankruptcy).

### **3 Factors Affecting the Capital Structure of Enterprises**

The wide analysis of the capital structure theories was conducted by Harris and Raviv (1991). Under these theories, they indicated factors that may influence decisions on financing. Based on Polish experience, a similar list was developed by Cwynar et al. (2015). These factors include: the share of fixed assets in total assets, the company size and growth rate, profitability, liquidity and non-debt tax shield.

Fixed assets are good collateral of obligations and they are to a lesser extent than current assets exposed to lose a value in the case of financial distress. From the static trade-off theory point of view, high share of fixed assets in total assets may cause the

increase in the share of debt in financing sources. Better debt collateral also reduces the cost of its issuing. Thus, from the point of view of the agency theory the relationship between increase in fixed assets and debt ratio is positive. This relationship is negative according to the pecking order theory. The higher level of assets, the less information asymmetry, and it decreases the cost of equity.

The static trade-off theory and the agency theory justified next factor of the capital structure: the company size. For the first of the above theories, it is important that large companies are more diversified and their bankruptcy risk is lower. Large companies also operate longer than smaller companies. They are more known and according to the second theory, debt issuance costs are lower because of their reputation. It means that the larger the enterprise, the higher the share of debt in its financing.

The size of the company also helps to reduce the cost of shares issuing. For a large enterprise it is easier to issue and sell their shares than for a small company. On the other hand, large companies have more assets in absolute terms, what means that the phenomenon of adverse selection of purchasers of these shares is for them more important. It means that from the point of view of the pecking order theory the relationship between the company size and the level of debt may be important, but the impact can be both: positive or negative.

The factor which is associated with the size is the rate of company growth. The dynamic growth requires a corresponding increase in financing. In this case, according to the pecking order theory, the debt is more preferred than the issue of shares. According to the signalling theory, faster growth of a company is a positive signal to investors and raises the share price. Higher valuation gives the company the opportunity to take advantage of the debt at a lower price, at a relatively low risk of bankruptcy. It means that for both above theories there is a positive relationship between the growth of the company and debt.

In turn, the static trade-off theory and the agency theory indicate the opposite relation. According to the first of these theories, the costs of bankruptcy are higher for companies with rapid growth—such companies loose relatively more value. The agency theory points out that fast-growing enterprises finance riskier projects, and that is why the cost of debt for them is higher. Conclusion: the higher rate of the company growth, the lower the share of debt in its financing.

One of the key determinants of the company growth is profitability. According to the pecking order theory, the profitability should promote self-financing, and thus limit the share of debt in the capital structure. Profitable businesses generate large cash surpluses and it is possible to a greater extent to use internal financing sources than in the case of companies with losses. The other discussed theories claim that the relationship between profitability and the share of debt in financing is opposite. According to the trade-off theory profitable businesses have lower costs associated with the risk of bankruptcy and more appreciate the benefits of the interest tax shield. According to the signaling theory, a profitable company sends positive signals to the creditors, which enables a further increase in debt. The agency theory also recognizes a higher level of debt to be more beneficial for profitable businesses, because it can make the problem of free cash flow less troublesome.

**Table 1** Selected empirical studies verifying determinants of capital structure

Factor/direction of impact	Positive	Negative
Fixed assets	Rajan and Zingales (1995) Pandey et al. (2000) Frank and Goyal (2003) Buferna et al. (2005)	Chittenden et al. (1996) Huang and Song (2006)
Size and growth of a company	Chaplinsky and Niehaus (1990) Frank and Goyal (2003) Huang and Song (2006)	Rajan and Zingales (1995) Barclay and Smith (1996) Bauer (2004)
Profitability	Um (2001)	Rajan and Zingales (1995) Huang and Song (2006)
Liquidity	Chaplinsky and Niehaus (1990) Nejad and Wasuzuzaman (2013)	–
Non-debt tax shield	Chaplinsky and Niehaus (1990) Campbell and Jerzemowska (2001)	Upneja and Dalbor (2001) Qian et al. (2007)

Source: Own elaboration

The pecking order theory shows that liquidity is the next variable affecting the share of debt in company financing. Enterprises, which are able to generate a significant amount of cash, use internal sources of financing to avoid the use of debt. Thus, high liquidity causes a lower level of debt. However, according to the static trade-off theory the relationship is positive. With the increase in liquid assets the cost of selling them decreases. It means lower risk of bankruptcy, which allows companies to increase debt and the use of the interest tax shield.

The trade-off theory shows another determinant of capital structure—non-debt tax shield. It is based on the share of depreciation in the costs. The increase of that ratio is a substitute for the interest tax shield and reduces the demand for borrowing money. A similar relationship can be formulated for the pecking order theory. High depreciation causes larger financial surplus which translates into increased opportunities for self-financing. Contrary, positive correlation between non-debt tax shield and debt can be derived from the agency theory. The increasing depreciation means wider free cash flow available to managers. The natural way to reduce the unreasonable use of cash by managers is to increase debt. Table 1 summarizes selected empirical research, the results of which confirmed the above-mentioned relationships.

There are many other variables mentioned in the literature that may affect the capital structure of a company. These are: probability of bankruptcy, advertising expenditures, expenditures and the quality of research and development, innovation, etc. (Barowicz 2014). However, these factors are usually justified by one theory. There is also not enough confirmation for them in empirical research. Based on the literature and empirical research, the following research hypothesis can be formulated: capital structure of companies in Poland depends on the share of fixed assets in total assets, the size and growth of a company, its profitability, liquidity and size of non-debt tax shield.

## 4 Research Method

From a methodological point of view, an important issue is to define the dependent and independent variables and to specify their measures. There are in the literature four alternative approaches to define the capital structure (dependent variable) (Błach 2009):

1. The equity and interest-bearing liabilities—it assumes that the use of trade credit without interest has a technical and not financial nature.
2. The relationship of debt and ownership securities issued—it is specific for the Anglo-Saxon system of corporate financing based mainly on the capital markets.
3. The equity and long-term liabilities—this approach assumes the dominant role of the fixed capital in corporate financing.
4. The equity and total liabilities—it includes all financial sources of the company.

Rajan and Zingales (1995) analysed the above approaches and the usefulness of the results from measures of the capital structure and found, that the appropriate choice should be based on the characteristics of the studied economy. The first three definitions do not include accounts payable in the capital structure. For the economies (including the Polish economy), where trade credit is an important source of financing, it becomes reasonable to take into account the last definition. Measures of capital structure based on this definition can have various forms. One of the most relevant is the debt ratio understood as “the relationship of total liabilities to total assets” (the sum of equity and liabilities). This ratio was applied among others by Mazur (2007), Cortez and Susanto (2012), Abeywardana and Banda (2015), Imtiaz et al. (2016). It is also the primary dependent variable in this study. The additional variable is the long-term debt ratio understood as the relationship of long-term liabilities and total assets. A similar control measurement was applied among others such as Cekrezi (2013).

The first of the independent variables is defined in the literature clearly as a share of fix assets in total assets (Campbell and Jerzemowska 2001; Mazur 2007; Rauh and Sufi 2010; Cortez and Susanto 2012; Imtiaz et al. 2016). For the company size several measures can be distinguished. The most frequently used in the empirical studies are: sales revenue (Cortez and Susanto 2012; Nejad and Wasiuzzaman 2013) and the value of total assets (Mazur 2007; Rauh and Sufi 2010). To eliminate the impact of abrupt differences in the balance sheet amounts of individual companies on the calculation, thus the use of linear scale. Some authors as a measure of the company size use the natural logarithm of total assets (Campbell and Jerzemowska 2001; Abeywardana and Banda 2015; Imtiaz et al. 2016).

Even more varied in the literature are measures of another explanatory variable related to the company growth. It is measured e.g. as the total value of the investment expenditure (Huang and Ritter 2009), the relationship of these expenditures to total assets (Campbell and Jerzemowska 2001), as well as using the dynamics of the return on operating assets (Kędzior 2012) or the percent increase in assets (Cortez and Susanto 2012; Imtiaz et al. 2016). The last dimension is the most

appropriate for the application previously discussed measure of the company size: the value of total assets. This dimension is applicable also to measure the company profitability where the relationship of the operating profit and total assets (ROA) is most often used (Campbell and Jerzemowska 2001; Kędzior 2012; Cortez and Susanto 2012; Abeywardana and Banda 2015; Imtiaz et al. 2016). The other measures of profitability e.g. the return on sales (ROS) are less frequently used in empirical studies (Mazur 2007).

The common measures of liquidity are the static ratios. They show the coverage of current liabilities by the respective components of asset. The most capacious static ratio is the current ratio. It's the relation of the total current assets and the current liabilities. It was used in studies concerning capital structure among others by Campbell and Jerzemowska (2001), Mazur (2007), Abeywardana and Banda (2015). Quick liquidity ratio, being the relationship of the most liquid assets (receivables and cash) and current liabilities was used in the studies of Imtiaz et al. (2016). Liquid assets related to the sales revenues were the measure of liquidity in the research of Nejad and Wasiuzzaman (2013).

The last of the capital structure factor mentioned in the research hypothesis is a non-debt tax shield. It is a substitute for the interest tax shield and it results from fixed assets depreciation. The non-debt tax shield is most often measured by the relationship of the annual amount of depreciation and total assets (Mazur 2007; Cortez and Susanto 2012; Nejad and Wasiuzzaman 2013; Abeywardana and Banda 2015). As an exception to the adopted rule, the study of Campbell and Jerzemowska (2001) can be pointed out. These authors measured the non-debt tax shield by the share of the depreciation reduced by tax liabilities in total sales revenue.

Taking into account the above analysis, Authors decided to use in this study the measures of the dependent and explanatory variables listed in Table 2.

The study was based on the financial statements of 335 companies listed on the Warsaw Stock Exchange between the years of 1998–2012. The financial data was taken from the Notoria database. In total, the study included 3134–5025 observations. The primary reason that the number of observations is less than the maximum

**Table 2** Measures of variables used in study

Variable	Short	Measure
Capital structure (primary measure)	DR	$\frac{\text{total liabilities}}{\text{total assets}}$
Capital structure (additional measure)	LDR	$\frac{\text{long-term liabilities}}{\text{total assets}}$
Share of fixed assets in total assets	TANG	$\frac{\text{fixed assets}}{\text{total assets}}$
Company size	SIZE	$\ln(\text{total assets})$
Company growth	GROW	$\frac{\Delta \text{total assets}}{\text{total assets}} \times 100\%$
Profitability	PROF	$\frac{\text{EBIT}}{\text{total assets}}$
Liquidity	LIQ	$\frac{\text{current assets}}{\text{current liabilities}}$
Non-debt tax shield	NDTS	$\frac{\text{depreciation}}{\text{total assets}}$

Source: Own elaboration

**Table 3** Descriptive statistics of research sample

Variable	Mean	Median	Standard deviation	Minimum	Maximum
LDR	0.0864	0.0416	0.1202	0.0000	1.5836
DR	0.4818	0.4365	0.4823	0.0000	11.8650
TANG	0.5121	0.5105	0.2271	0.0000	0.9986
SIZE	11.7670	11.6440	1.7371	3.4340	20.1050
GROW	291.6600	8.3986	10.547	-100.0000	546,840
PROF	0.0338	0.0471	0.2539	-7.5676	0.7770
LIQ	3.9665	1.4680	35.6340	0.0145	1668.0000
NDTS	0.0362	0.0290	0.0348	0.0000	0.6606

Source: Own elaboration

is the fact that not all companies were listed during the whole period of the analysis. The number of observations for variable GROW is 3134 (this variable is the index and for calculations the data from two successive periods were needed). The number of observations of variable LIQ is 3458. For the other remaining variables the number of observations is 3461.

For the assessment of the correctness of the data and isolate outliers the descriptive statistics of the research sample were verified (Table 3). The questionable cases were explained or eliminated from the study.

The arithmetic mean of the debt ratio (DR) is 48%, and median 44%. For 300 companies this variable ranges from 0 to 1. Only in 35 companies, debt ratio exceeds one, because they generate losses and negative equity value—a special case of this value is 11.87, representing a maximum for DR. The share of long-term debt in the financing of Polish enterprises is significantly lower. The arithmetic mean of LDR in the research sample is 8.4% while the median is 4.1%.

The TANG variable defining the share of fixed assets in total assets has values between zero and one. Both, the arithmetic mean and the median are 0.51. The SIZE specifying the size of the company, measured as the natural logarithm of the total assets range from 3.43 to 20.1. The arithmetic mean is 11.76 and does not much differ from the median.

Variables GROW and PROF, meaning the rate of asset growth and profitability are also negative. Due to the huge outliers for these variables the median should be considered as a better measure than the average mean as well as for variables LIQ and NDTS. The standard deviation also indicates great variability for these variables. For variables GROW, PROF and LIQ it repeatedly exceeds the arithmetic mean what indicates a much greater variation than in the case of other variables. Therefore using the median to determine the average, it may be noted that half of the companies in the research sample increased its assets at a rate to 8.4%, while the rest is growing at a faster rate. Similarly, half of the studied companies achieved a profitability of 4.7%, the next half is even more profitable. The median of the liquidity ratio is up to 1.47, and of the NDTS is 0.029.

The adequacy of the model describing the dependent variable is preserved only when the independent variables are uncorrelated or weakly correlated (independent)



**Table 4** Correlation coefficients of variables studied

TANG	SIZE	GROW	PROF	LIQ	NDTS	
1.0000	0.3342	0.0052	-0.0635	0.0010	0.1134	TANG
	1.0000	0.0025	0.0874	-0.0147	-0.2022	SIZE
		1.0000	-0.0249	-0.0025	-0.0209	GROW
			1.0000	-0.0028	-0.1900	PROF
				1.0000	-0.0571	LIQ
					1.0000	NDTS

Note: critical value = 0.0277,  $p = 0.05$

(Kufel 2007). The Pearson correlation coefficients were calculated in order to determine the relationship of the variables (Table 4).

The correlation between the independent variables in most cases does not occur (for the level of significance  $p = 0.05$  most of the correlation coefficients do not exceed the critical value). In seven cases, the correlation exists, but its strength is small reaching a maximum of 0.33 for the variables SIZE and TANG.

In order to identify and measure the relevance and impact of the independent variables on the dependent variables the econometric, linear panel models were applied. They are based on:

1) regression model (Ordinary Least Squares Method):

$$DV_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 SIZE_{it} + \beta_3 GROW_{it} + \beta_4 PROF_{it} + \beta_5 LIQ_{it} + \beta_6 NDTS_{it} + \varepsilon_{it} \quad (1)$$

2) model with fixed effects:

$$DV_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 SIZE_{it} + \beta_3 GROW_{it} + \beta_4 PROF_{it} + \beta_5 LIQ_{it} + \beta_6 NDTS_{it} + \mu_{it} \quad (2)$$

3) model with random effects:

$$DV_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 SIZE_{it} + \beta_3 GROW_{it} + \beta_4 PROF_{it} + \beta_5 LIQ_{it} + \beta_6 NDTS_{it} + \mu_{it} + \varepsilon_{it} \quad (3)$$

where  $DV_{it}$  are dependent variables, respectively  $DR_{it}$  and  $LDR_{it}$ .

Analogous or similar methods are used in the studies among others: Mazur (2007), Nejad and Wasiuzzaman (2013), Cortez and Susanto (2012), Uddin (2015), Cekrezi (2013) and Intiaz et al. (2016). The simplest method of panel data analysis is to treat them as cross-sectional data. Then the model of the Ordinary Least Squares Method (OLS) can be applied for the estimation. However the use of such an estimator very often leads to inefficient or even biased estimations, due to the heterogeneity of the population. Therefore, if it is accepted that the individuals are varied, it would be more appropriate to use a model with fixed effects which takes into account the presence of unknown but constant in time differences between

individuals. When the individual effects are not the same in subsequent periods, the model with random effects should be used (Greene 2003).

To determine whether the model can be estimated using OLS, the hypothesis of the existence of the individuals effects must be verified. For this purpose the Breusch-Pagan test was used. Failure to reject the null hypothesis according to which the variance of the individual effects is zero, meaning that these effects do not occur, and model OLS can be used. The rejection of the above hypothesis means that it is entitled to enter the individual effects and the OLS estimation cannot be applied (Kufel 2007; Maddala 2006).

For selecting individual effects between fixed and random the Hausman test is helpful. The null hypothesis of this test assumes no correlation between the independent variables and random effects, while an alternate hypothesis claims that the correlation exists. Failure to reject the null hypothesis indicate compliance of both estimators. But the estimator for the random effects is more effective. The rejection of the null hypothesis suggests a choice of model with fixed effects (Kufel 2007).

## 5 Findings

Table 5 contains the estimated parameters of the models adopted in the study and the results of tests verifying their adequacy.

The results of the Breusch-Pagan test for both dependent variables (value does not exceed the level of significance 0.05) indicate that the null hypothesis must be rejected—it is not possible to use the OLS estimation. Similarly, the results of the Hausman test (in both cases, the value is lower than the level of significance 0.05) indicate rejection of the null hypothesis, which means choosing the model with fixed effects as best describing both response variables.

Parameters of the model with fixed effects for the DR indicates that the GROW variable is statistically insignificant. It means that the company growth measured by the dynamics of assets does not play a statistically significant role in shaping of the total debt in the companies studied.

The TANG, SIZE, PROF, LIQ, NDTs variables were proved significant. The first four variables have a negative impact on total debt of the company (DR). In the case of TANG variable the capital structure of Polish enterprises is similarly affected like in the case of enterprises from United Kingdom and China (Chittenden et al. 1996; Huang and Song 2006). For the SIZE and PROF variables we have found the same dependence like Rajan and Zingales (1995), Barclay and Smith (1996) and Bauer (2004) (USA and Czech Republic).

For the last variable (NDTS) the positive relationship was observed. It means that when the share of fixed assets in total assets, company size, profitability and liquidity were higher, the average total debt ratio is lower. Determinant increasing total debt ratio is a non-debt tax shield. It confirms findings of Campbell and Jerzemowska

**Table 5** Result of models' estimations

Variable/Model	OLS		Random effects		Fixed effects	
	DR	LDR	DR	LDR	DR	LDR
Constant	0.6867*** (0.0583)	-0.0927*** (0.0150)	0.8734*** (0.0756)	-0.03578 (0.0238)	1.9656*** (0.1419)	0.0232 (0.0339)
TANG	-0.5027*** (0.0369)	0.1487*** (0.0095)	-0.5010*** (0.0423)	0.12749*** (0.0115)	-0.4147*** (0.0564)	0.1165*** (0.0134)
SIZE	0.0027 (0.0050)	0.0080*** (0.0013)	-0.0140** (0.0065)	0.00460** (0.0020)	-0.1086*** (0.0123)	4.71e-5 (0.0029)
GROW	-1.98e-7 (7.22e-7)	6.26e-8 (1.86e-7)	-4.9e-7 (6.84e-7)	-4.49e-8 (1.62e-7)	-1.13e-6 (6.92e-7)	-1.42e-7 (1.64e-7)
PROF	-0.8859*** (0.0307)	0.0043 (0.0079)	-0.8266*** (0.0301)	0.00796 (0.0073)	-0.7841*** (0.0313)	0.0070 (0.0075)
LIQ	-0.0015*** (0.0003)	4.52e-5 (8.79e-5)	-0.0013*** (0.0003)	7.91e-5 (7.80e-5)	-0.0010*** (0.0003)	8.15e-5 (7.95e-5)
NDTS	1.4486*** (0.238)	0.2122*** (0.0614)	1.6634*** (0.2597)	0.12392* (0.0675)	1.2119*** (0.3132)	0.05504 (0.0747)
No. of obs.	3118	3118	3118	3118	3118	3118
Adj. R squared	0.2600	0.1170				
Breusch-Pagan test	LM = 643.61 p = 5.5e-142	LM = 1281.55 p = 1.6e-280	Chi-squared(1) = 643.61 p = 5.5e-142	Chi-squared(1) = 1281.55 p = 1.2e-280		
Hausman test	H = 123.795 p = 2.6e-024	H = 21.847 p = 0.00129	Chi-squared (6) = 123.80 p = 2.6e-024	Chi-squared (6) = 21.85 p = 0.00129		

Standard errors are in parentheses

Source: Own elaboration

\*Variable significant at the level p = 0.1

\*\*Variable significant at the level p = 0.05

\*\*\*Variable significant at the level p = 0.01

(2001) for Polish enterprises. It is the same dependence as diagnosed by Chaplinsky and Niehaus (1990) in the USA.

There is only one statistically significant variable affecting the level of the LDR. It's the TANG variable with a positive sign. It means that the higher the share of fixed assets in total assets, higher will be the long-term debt ratio.

## 6 Conclusions

Table 6 summarizes the research results in the background of the factors resulting from modern capital structure theories. The comparative analysis of the data leads to the conclusion that the formation of capital structure (measured by total debt ratio) of companies listed on the Warsaw Stock Exchange is most adequately explained by the pecking order theory. According to this theory increasing the share of fixed assets in total assets, profitability and liquidity in a company causes a reduction in total debt. And it is happened in the enterprises studied. The pecking order theory does not indicate precisely the direction of the relationship of the company size and capital structure. In the case of the studied companies it is negative. For the GROW variable, which according to the pecking order theory has a positive impact on the total debt, the dependence was not observed. The last variable (NDTS) affected total debt ratio differently than according to the pecking order theory. The positive relationship between NDTS and debt corresponds to the agency theory.

These results confronted with the analysis for the long-term debt ratio indicate an important issue concerning the specifics of Polish companies. While a large number of studies conducted in the world confirm the significance of the impact of the factors considered in this study on both general and long-term ratios, in Polish enterprises the dependence is noticeable only for the total debt. Long-term debt is determined only by the share of fixed assets in total assets. The assignment on this basis adequate capital structure theory for long-term debt ratio seems doubtful. It indicates the importance of short-term debt for financing Polish enterprises, including, and perhaps to a great degree, trade credit.

**Table 6** Influence of selected factors on share of debt in financing sources

Factor/ share of debt	Agency theory	Signaling theory	Pecking order theory	Static trade- off theory	Research results DR	Research results LDR
TANG	+	n/a	–	+	–	+
SIZE	+	n/a	±	+	–	n/a
GROW	–	+	+	–	n/a	n/a
PROF	+	+	–	+	–	n/a
LIQ	n/a	n/a	–	+	–	n/a
NDTS	+	n/a	–	–	+	n/a

+ positive dependence; – negative dependence; ± unspecified dependence; n/a no grounds to identify the dependence

Taking into account the total debt ratio as a measure of the capital structure of Polish enterprises, the identified dependences can confirm the research hypothesis. The capital structure depends on the share of fixed assets in total assets, company size, its profitability, liquidity and on the non-debt tax shield. An exception to the rule is the company, growth for which there was no impact on the total debt.

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