Paweł Mielcarz, Dmytro Osiichuk
Kozminski University
e-mails: pmielcarz@kozminski.edu.pl; dosiichuk@kozminski.edu.pl

DETERMINANTS OF THE LIABILITY MATURITY OF POLISH COMPANIES

DETERMINANTY TERMINU ZAPADALNOŚCI ZOBOWIĄZAŃ POLSKICH PRZEDSIĘBIORSTW

Summary: Using the firm-level panel data for Polish companies, we analyze the determinants of liability maturity with particular attention paid to the factors of financing constraints and information asymmetry. Consistent with prior research, we find that asset tangibility, liquidity, leverage and profitability significantly influence liability maturity choices. Additionally, we evidence that financing constraints may alter the impact of these factors. Companies identified as being financially constrained appear to have lower maturity of liabilities. Firms quoted on the main market of the Warsaw Stock Exchange are shown to hold a higher proportion of long-term liabilities compared to those quoted on New Connect, a stock exchange dedicated to young small cap companies. We also find that constrained status may determine firm's financing decisions under crisis settings. Our empirical results show that companies experiencing financing constraints are likely to reduce liability maturity during a crisis, while their unconstrained counterparts may recur to additional long-term external financing in order to accommodate the repercussions of a trough. These findings contribute to the discussion of the financing constraints theory and shed light on some of the firms' tactical financing decisions in an emerging economy.

Keywords: liability maturity, financing constraints, emerging economy.

Streszczenie: Artykuł prezentuje wyniki badań panelowych w zakresie czynników kształtujących termin zapadalności zobowiązań polskich przedsiębiorstw. W analizie szczególną uwagę poświęcono zagadnieniu wpływu na badane zjawisko takich czynników, jak ograniczenia kapitałowe oraz asymetria informacji. Uzyskane wyniki potwierdziły ustalenia płynące z wcześniejszych prac badawczych prezentowanych w literaturze przedmiotu: termin zapadalności zobowiązań w przedsiębiorstwach jest w istotny sposób zależny od wartości aktywów trwałych, stopnia płynności i rentowności oraz poziomu zadłużenia. Ponadto ustalono, że ograniczenia kapitałowe mogą zmieniać wpływ wymienionych wcześniej czynników na termin zapadalności zobowiązań. Podmioty zidentyfikowane jako te, które mogą doświadczać ograniczeń kapitałowych, mają bliższy termin zapadalności zobowiązań. Co więcej, spółki notowane na warszawskiej Giełdzie Papierów Wartościowych utrzymują wyższy poziom zobowiązań długoterminowych niż podmioty notowane na New Connect, czyli na rynku przeznaczonym dla młodych przedsiębiorstw o niższej kapitalizacji. Przeprowadzone bada-

nia dowiodły również, że fakt doświadczania ograniczeń kapitałowych determinuje decyzje spółek w okresie kryzysu. W tym czasie podmioty doświadczające ograniczeń kapitałowych zmniejszają, podczas gdy pozostałe spółki powiększają zobowiązania długoterminowe. Prezentowane wyniki badań wpisują się w dyskusję na temat wpływu ograniczeń kapitałowych na zachowania przedsiębiorstw i rzucają nowe światło na zagadnienie finansowych decyzji przedsiębiorstw na rynkach wschodzących.

Słowa kluczowe: termin zapadalności zobowiązań, ograniczenia kapitałowe, rynki wschodzące.

1. Introduction

The problems of corporate financing decisions have attracted considerable attention of the research community. Several hypotheses were proposed in an attempt to elucidate the motives behind capital structure choices. Jensen [1986] highlighted the role of debt in alleviating the agency problem between management and stockholders. Barclay and Smith [1995] provided extensive support for the contracting-cost hypothesis and highlighted the role of asymmetric information in determining a firm's debt maturity structure. Kale and Noe [1990] postulated that high-quality companies shortened debt maturity in order to convey information regarding their creditworthiness to the market, while low-quality firms tried to minimize the borrowing costs by contracting long term debt. Demirguc-Kunt and Maksimovic [1999] analyzed the influence of capital market imperfections on the liability structure of the corporate sector: they found that stock market development was positively correlated with the debt maturity of the large companies, while the size of the banking sector significantly influenced the financing choices of small firms by reducing their reliance on short-term debt. The specific features of the institutional environment and industry characteristics may also account for part of the leverage differential [Rajan, Zingales 1995].

The aim of the paper is to clarify the principal determinants of the liability maturity choices in the Polish corporate sector. Special attention is drawn to the factors of capital constraints and information asymmetry which may be of particular importance in an emerging economy where the capital markets undergo dynamic changes. By using firm-level panel data for Polish companies, we attempt to analyze the influence of financing constraints on the patterns of liability maturity decisions. The paper is structured as follows: firstly, we present a review of the existing empirical literature devoted to the problems of liability maturity choices; secondly, we formulate the research hypotheses, present the dataset and methodology; a discussion of empirical results concludes.

2. Literature review

The research of the determinants of liability structure mostly concentrates around several key theoretical constructs: 1) the contracting-cost hypothesis; 2) the signaling hypothesis; 3) the financing constraints theory. These pillars of the capital structure theory are further built upon to accommodate the diversity of the characteristics of capital markets, institutional environments, industries and firms.

The contracting-cost hypothesis postulates that debt maturity is inversely related to the value of the real options embedded in the firm's discretionary investment decisions [Myers 1977]. Managers are reluctant to undertake risky investment projects because the benefits would largely accrue to the debtholders. The ensuing underinvestment problem, which is particularly acute in the presence of valuable real options, may be solved by incurring more short-term debt [Myers 1977]. In accordance with the underinvestment hypothesis, Elyasiani et al. [2002] found that companies which had more valuable growth options had lower debt maturity. Johnson [2003] argues that when deciding on the debt maturity, companies face a trade-off between increased liquidity risk and the negative consequences of underinvestment.

The signaling hypothesis [Flannery 1986] implies that under conditions of information asymmetry, investors attempt to assess the firm's quality based on the analysis of its capital structure. Financing decisions may convey important information to the investment audience. Hence to signal its financial soundness, firms might prefer to issue short-term collaterised debt, while low-quality firms may be more reliant on short-term debt, which reduces transaction costs and the monitoring effect. Guedes and Opler [1996] found that companies with a speculative investment grade avoided short-term debt to reduce liquidity risks, while simultaneously having limited access to long-term debt due to elevated credit risks. Investment-grade companies were borrowing both short and long-term, which may implicitly corroborate the tenets of the signaling and contracting-cost hypotheses.

Demirguc-Kunt and Maksimovic [1999] and Diamond [1984] show that short-term debt allows to reduce the problem of information asymmetry. The need to roll-over short-term loans more often causes the banks to track the performance of the corporate borrowers more frequently and, if necessary, renegotiate or change the terms of credit agreements. Studying the determinants of loan maturity of small businesses Ortiz-Molina and Penas [2008] concluded that short-term credit lines served to alleviate the problem of information asymmetry and compensate for the elevated credit risk. A bad credit history, lack of entrepreneurial experience and collateral reduced debt maturity, while the availability of pledgeable assets was found to increase debt maturity. Similar findings were reported by Berger and Udell [1990], who found that company's risk profile influenced the degree of collateral use with riskier firms being more likely to obtain secured loans. Other studies [Carey et al. 1998; Berger, Udell 2006] also evidenced that the availability of assets which

may be used as collateral was one of the key factors facilitating access to external financing, hence, determining the gearing level.

Financing constraints play a salient role in shaping capital structure decisions. Having compared the financing strategy of privately owned and public companies, Brav [2009] concluded that private companies mainly relied on debt financing, had higher gearing ratios and had limited access to external capital markets. Therefore their financing decisions were more dependent on their operating performance than those of publicly traded companies. Faulkender and Petersen [2006] reported that companies with an access to the bond market had significantly higher gearing ratios. Similar findings were reported by Stephan et al. (2011), who studied the liability maturity choices of Ukrainian companies. Multinational companies were found to have better access to international financial markets, which may cause them to have higher gearing ratios Doukas, Pantzalis 2003]. Multinationals also tend to have shorter debt maturity, which may be explained by the availability of relatively more growth options compared to domestic companies and increased agency costs engendered by the managerial complexity of MNCs [Fatemi 1988].

Stohs and Mauer [1996] confirmed that firms matched the maturity of assets and liabilities. Additionally, large firms which were less likely to suffer the information asymmetry problem and to experience financing constraints, were more reliant on long-term debt. Firms with both the best and the worst credit ratings appeared to have shorter debt maturities. In cases of well-performing companies this may point to the validity of the signaling hypothesis.

For a sample of privately owned Belgian firms, Heyman et al. [2008] found the asymmetry of information and agency costs to explain the capital structure decisions. Assets tangibility was associated with higher debt levels, while profitability and growth rates appeared to be negatively correlated with leverage. The sampled firms were found to match the maturity of their assets and liabilities. Riskier firms relied more on short-term financing, while larger companies had higher gearing and lower debt maturity, which contradicts the tenets of the signaling hypothesis.

Diamond [2004] argued that better creditor protection and lower costs of law enforcement reduce reliance on short-term debt. Zheng et al. [2012] evidenced that the quality of institutional environment improves firms' access to long-term debt.

Based on data for the MENA region, Awartani et al. [2016] found a positive influence of leverage, firm's size and assets tangibility on debt maturity structure. Contrary to the tenets of the signaling hypothesis, companies experiencing financial difficulties are found to be more reliant on short-term debt. Additionally, a higher level of financial intermediation, the better development of financial markets and a mature institutional background are evidenced to increase debt maturity.

The crisis settings may considerably alter the capital structure decisions. The onset of an economic downturn aggravates the problems of information asymmetry and capital constraints, amplifies uncertainty and causes the corporate sector to revise its financing strategy. Campello et al. [2012] showed that the outbreak of the crisis

increased the role of short-term credit lines which substituted for long-term bank loans and helped the corporate sector to accommodate the negative consequences of the credit contraction. Gonzales [2015] evidenced that financial crisis caused the debt maturity to decline with the effect being particularly pronounced for companies heavily dependent on external financing. The crisis outbreak was shown to be marked with a shift towards short-term debt financing. In countries with a more developed banking sector, large companies were less vulnerable to the crisis repercussions with their debt maturity declining less than that of small firms.

The problematics of liability maturity choices in emerging economies appears to require additional research. In Poland, where the financial markets are in the process of dynamic transformation and development, difficulties of an institutional origin may significantly shape capital structure decisions. Empirical studies [Guariglia et al. 2012; Jackowicz et al. 2016] demonstrate that the Polish corporate sector faces significant financial constraints which may influence long-term financing strategies. Białek-Jaworska and Nehrebecka [2016] studied the influence of profitability, cash flow, fixed assets, growth opportunities, taxes and monetary policy on the capital structure decisions of Polish companies. Large companies were found to be less reliant on debt financing. Consistent with the pecking order theory, cash flow was found to be inversely related to the gearing ratio.

The impact of factors of information asymmetry and financing constraints on liability maturity choices may necessitate further inquiry. Empirical studies (e.g. [Czekaj 2010] show that as financial markets mature, they may improve their informational and allocation efficiency. Hence, the determinants of financing decisions in an emerging economy may significantly differ from those prevailing on mature markets.

3. Hypotheses development

The paper aims at identifying the determinants of debt maturity choices in the Polish corporate sector. We will start with the factors which are conventionally believed to be the key variables determining the capital structure decisions i.e. asset tangibility, firm's size, growth opportunities approximated by the price-to-book ratio and profitability [Harris, Raviv 1991].

H1: Liability maturity is positively related to a company's asset tangibility.

The availability of pledgeable fixed assets which can be used as collateral reduces the risk for the lender and alleviates the potential conflict of interest between shareholders and bondholders. Hence, firms with more tangible fixed assets on the balance sheet are expected to have higher gearing ratios. We use the ratio of fixed assets to total assets as a proxy for assets tangibility.

H1.1: The impact of asset tangibility on liability maturity is more pronounced for financially constrained companies.

The availability of tangible assets, which may be used as a collateral, appears to be more important for firms experiencing financing constraints [Berger, Udell, 1990] as they are characterized by an increased credit risk and the asymmetry of information between insiders and external lenders. Additionally, constrained companies potentially face higher costs of financial distress.

H2: Higher growth opportunities translate into lower liability maturity.

In accordance with the contracting-costs theory, firms which have valuable growth options may forego attractive investment opportunities due to excessive leverage. Shortening liability maturity may remedy the underinvestment problem [Myers 1977], hence we expect growth opportunities, approximated by market-to-book ratio, to be negatively correlated with the liability maturity. Additionally, companies with high market-to-book ratios are more likely to issue equity, thereby benefiting from the 'hot market' situation

H3: Firm's size positively influences liability maturity.

Larger companies are likely to have better access to the capital markets and have a credit rating. They are also less likely to be financially constrained and face a liquidity shortage. Company size may be also used as a proxy for the probability of financial distress and degree of information asymmetry [Rajan, Zingales 1995]. Larger companies are scrutinized by lenders and enjoy a broad analyst coverage. Therefore, we hypothesize that larger companies have a longer liability maturity. Alternative hypothesis is derived from the signaling theory, whereby larger financially sound companies use short-term borrowing to convey information regarding their creditworthiness and future prospects. The latter conclusion would imply a negative relationship between debt maturity and the size of the company. We use the natural logarithm of a firm's assets as a proxy for size.

H4: Profitability negatively influences the level of liability maturity.

The pecking order theory [Myers, Majluf 1984] postulates that companies prefer internal sources of finance over external capital and equity. Therefore, companies which are sufficiently profitable are expected to refrain from contracting more expensive debt. On the other hand, the agency theory [Jensen 1986] implies that in order to prevent the misallocation of the generated cash flows, firms will increase gearing which might have a disciplining effect on managers. In turn, managers may be reluctant to incur additional debt in order to avoid committing the generated cash flows. Signaling hypothesis would imply that more profitable companies contract more short-term debt to inform the investment public about their growth prospects. Profitable companies are also more likely to have a better access to external finance as their credit risk is relatively lower. The ultimate interrelation between liability maturity and profitability is determined by the cumulative influence of the enumerated factors and may have a multifaceted interpretation. We use return on assets (ROA) as a proxy for firm's profitability.

H5: There is a positive relationship between a company's liability maturity and its leverage ratio.

Companies with lower gearing ratios face a lower probability of financial distress. Hence they are more likely to incur short-term debt [Stohs, Mauer 1996]. Highly leveraged companies are more reliant on long-term debt in order to minimize transaction and refinancing costs. Additionally, low-leverage firms are more likely to be financially constrained and therefore excluded from long-term capital market, which makes them recur to short-term financing.

H6: Availability of pledgeable short-term assets positively influences liability maturity.

The availability of short-term pledgeable assets in the form of working capital may enhance a firm's debt capacity by reducing its credit risk. Therefore a company with more pledgeable working capital is expected to have a higher debt maturity. On the other hand, empirical evidence shows that firms tend to match liability and asset maturity [Stohs, Mauer 1996], which would imply a negative relationship between working capital investment and liability maturity. From the standpoint of financial management, conservative working capital finance may constitute a suboptimal strategy, which engenders excessive cost of capital. We use net working capital scaled by total assets as a proxy for pledgeable short-term assets.

H7: Liquidity has a negative impact on liability maturity.

On the one hand, the availability of liquid assets implies that a company is less likely to endure financial distress. This should cause that firms with a better liquidity position to have a higher liability maturity. On the other hand, empirical studies [Opler et al. 1999] show that firms having volatile cash flows and valuable growth opportunities hold relatively more cash. Generally, financially constrained companies which have to rely on internal sources of finance are likely to substitute cash for external finance. Therefore high liquidity may signal a constrained status, which implies restricted access to long-term capital. If this line of reasoning holds, we would expect liability maturity to be negatively influenced by liquidity. We use the value of cash and cash equivalents scaled by total assets as a proxy for liquidity position.

H8: Financially constrained companies have a lower liability maturity.

Due to limited access to capital markets, financially constrained companies are unable to contract long-term debt. From the multitude of available criteria allowing to distinguish between constrained and unconstrained companies, we will use the dividend payout ratio [Fazzari et al. 1988], age and size of a given company [Devereux, Schiantarelli 1990]. We classify the companies into dividend-paying, which are assumed to be unconstrained, and non-dividend-paying. We construct a synthetic indicator, which is the product of the natural logarithm of total assets and the number of years since the company went public (instead of taking the company's age). This indicator is assumed to approximate a company's status as either constrained or unconstrained. We also analyze the difference between the companies quoted on the Warsaw Stock Exchange and those quoted on New Connect. Companies listed on the WSE face more stringent disclosure requirements; they are larger, have better access

to the capital markets and are less likely to be financially constrained than companies quoted on New Connect.

H9: During a financial crisis, constrained and unconstrained companies have differing patterns of liability maturity adjustment: unconstrained companies tend to increase liability maturity, while constrained companies decrease liability maturity.

A financial crisis magnifies the problem of financing constraints. The corporate sector experiences a cash flow shortage accompanied by the rising costs of external finance. Under conditions of a credit crunch, constrained companies may find it difficult to renegotiate credit lines or obtain additional long-term financing. Thereby constrained status effectively forces the companies to reduce liability maturity by either paying down debt or contracting available short-term debt, which is less risky for the lender. On the other hand, for unconstrained companies which have a better access to capital markets, contracting additional long-term debt may constitute a sound strategy for accommodating operating a cash flow deficiency. Therefore we would expect unconstrained companies to increase liability maturity during a financial crisis.

Table 1. Hypotheses and explanatory variables

Variable	Calculation	Expected Sign	Hypothesis	Theory
Liability Maturity	Long-Term Liabilities/Total Liabilities			
Tangibility	Fixed Assets/Total Assets	+	H1	Agency theory
Growth Opportunities	Price-to-Book Ratio	–	H2	Contracting-cost hypothesis
Size	Log Total Assets	+	H3	Signaling hypothesis; asymmetry of information
Profitability	Return on Assets	+ / –	H4	Agency theory; signaling hypothesis, pecking order' theory
Leverage	Leverage ratio	+	H5	Financing constraints; transaction costs
Pledgeable Short-Term Assets	Working Capital/Total Assets	+ / –	H6	Agency theory; matching asset and liability maturity
Liquidity	Cash and Cash Equivalents/Total Assets	+ / –	H7	Agency theory; financing constraints
Financial Constraints	Dividend Dummy; Market Dummy; Age & Size Dummy	+ for unconstrained companies; – for constrained companies	H8	Financing constraints
Crisis	Crisis Dummy	+	H9	Financing constraints

Source: own elaboration.

4. Dataset and model specification

The research hypotheses were tested on an unbalanced panel dataset for 737 listed Polish companies (listed on the WSE and New Connect) over the period 1997--2014 retrieved from the Notoria database. The sample comprises only non-financial companies including those which ceased to exist in order to avoid survivorship bias. The dataset includes 4270 observations.

To test the hypotheses we used static panel regression with fixed effects. All equations also include year dummies, which are not reported. Equation (1) presents the general specification of the tested econometric models.

$$Liability\ Maturity_{it} = f \begin{pmatrix} Tangibility_{it}; \dfrac{P}{BV_{it}}, Log\,Total\,Assets_{it} : ROA_{it}; \\ Leverage_{it}; WCI_{it}; Cash_{it}; Constr; Crisis \end{pmatrix}, \quad (1)$$

where i encodes the firm and t encodes the observation period; $Liability\ Maturity_{it}$ – explained variable calculated as long-term liabilities scaled by total liabilities; $Tangibility_i$ – fixed assets scaled by total assets; $\dfrac{P}{BV_{it}}$ – market-to-book ratio; $Log\ Total\ Asset\,s_{it}$ – natural logarithm of total assets approximating company's size; ROA_{it} – return on assets; $Leverage_{it}$ – leverage ratio; WCI_{it} – net working capital scaled by total assets; $Cash_{it}$ – cash and cash equivalents scaled by total assets; $Constr$ – a set of dummy variables denoting financially constrained companies; $Crisis$ – dummy variable denoting the subperiod 2008-2011.

The set $Constr$ includes three dummy variables: $DivDummy$, $Market$ and $AgeSize$. $DivDummy$ is a dummy variable which is equal to 1 for companies paying dividends, which are assumed to be unconstrained and 0 otherwise. $Market$ dummy equals 1 for companies listed on the WSE and 0 otherwise. $AgeSize$ is a dummy variable constructed based on the synthetic Age/Size index, which is a product of the natural logarithm of the company's total assets and the number of years elapsed since the company went public. $AgeSize$ is equal to 1 for the companies with the Age/Size index above the median for the entire sample and 0 for those with Age/Size index below the median. $AgeSize\ Tangibility$ and $AgeSizeCrisis$ are interaction terms which are used to test H1.1, H8 and H9.

5. Empirical results

Tables 2-4 present the results of hypotheses testing. The constructed econometric models possess the required properties to allow for valid inference. The regressors are jointly statistically significant at the conventional levels. Several independent variables demonstrate individual statistical significance and preserve their signs in all model specifications.

In contrast to the findings of Białek-Jaworska and Nehrebecka [2016], liability maturity appears to be independent from a company's size and growth opportunities: respective regression coefficients are persistently statistically insignificant. Therefore, we cannot validate H2 and H3.

In line with expectations, liability maturity is found to be positively influenced by assets tangibility; the effect is statistically significant in all model specifications, which positively verifies H1. The same holds for the availability of short-term pledgeable assets approximated by the stock working capital. We positively verified H6; regression coefficient is statistically significant. On one hand, the empirical outcome proves that collateral is one of the key factors shaping the financing decisions, which corroborates prior findings in this domain. On the other hand, it implicitly suggests that companies do not match assets and liability maturity and may tend to finance working capital with long-term liabilities.

In line with H4, profitability approximated by ROA appears to have a negative impact on liability maturity. The findings are in line with the 'pecking order' theory, however, other interpretations are possible. Empirical results may suggest the presence of an agency problem, whereby managers are reluctant to incur additional debt in order to avoid committing generated cash flows to interest payments. Signaling hypothesis offers another explanation: profitable companies may contract more short-term debt to signal their future performance to the investors.

In line with H5, gearing is found to be one of the key determinants of liability maturity. Liquidity appears to have a statistically significant negative influence on liability maturity. We believe that this empirical result can be explained by the higher propensity of financially constrained companies to hold cash.

Market dummy is statistically significant, which suggests that companies listed on the WSE have a higher liability maturity than firms quoted on New Connect. The *DivDummy* is not statistically significant, implying the lack of difference between dividend-paying and non-dividend-paying companies in terms of liability maturity.

The *Crisis* dummy has a positive sign, but is not statistically significant. This outcome may suggest that the onset of the financial crisis did not alter the liability maturity choices in the Polish corporate sector. This may be explained by the fact that the crisis was less severe in the Polish economy and did not result in a significant output contraction.

The *AgeSize* is statistically significant, which means that companies identified as financially constrained have a lower liability maturity than their unconstrained counterparts. Two out of three proposed dummies in the *Constr* set (i.e. *Market* and *AgeSize*) are statistically significant, which allows us to infer that the factor financing constraints represents one of the key determinants of capital structure decision and liability maturity choices.

The interaction term *AgeSizeTangibility* is statistically significant and has a positive sign. It implies that the positive effect of asset tangibility on liability maturity is more pronounced for companies identified as financially unconstrained, which resonates with earlier empirical studies. Therefore we reject H1.1.

The statistical significance of the interaction term *AgeSizeCrisis* validates H9 and suggests that financially unconstrained companies increase liability maturity during a financial crisis, while their constrained counterparts may be forced to incur short-term debt to remedy temporary operating cash flow shocks.

Table 2. Results of H1-H7 Tests

	1	2	3	4	5
No. of observa-tions	4270	4270	4270	4270	4270
Wald (joint)	95,32***	114,5***	2690***	3268***	115,7***
R^2	0,6396079	0,6409735	0,9278254	0,9280117	0,6432916
AR(1) test	−3,162***	−3,139***	−3,987***	−3,975***	−2,995***
AR(2) test	−2,492**	−2,495**	−1,575	−1,568	−2,478**
Constant	−0,149746***	−0,135424**	−0,761027***	−0,754524***	−0,16469***
	(0.055)	(0.055)	(0.051)	(0.053)	(0.056)
Log_Total Assets	−0,00450088	−0,0049871	−0,000383481	−0,000775282	−0,00356644
	(0.006)	(0.006)	(0.002)	(0.002)	(0.006)
P/BV	−0,00196205	−0,00179804	0,000236795	0,000340917	−0,00214184
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
Tangibility	0,269744***	0,255555***	0,727457***	0,726661***	0,263231***
	(0.029)	(0.030)	(0.053)	(0.053)	(0.030)
WCI	0,101572***	0,109775***	0,772155***	0,770299***	0,123142***
	(0.021)	(0.022)	(0.046)	(0.047)	(0.024)
Cash		−0,0872083***	−0,0648417***	−0,0654476***	−0,0848532***
		(0.027)	(0.019)	(0.019)	(0.026)
Leverage			0,829794***	0,832247***	
			(0.035)	(0.034)	
ROA				0,0100185	−0,0351077***
				(0.006)	(0.011)

Notes: This table presents the static panel model estimates. The equations were estimated using fixed firm and year effects (not reported). Standard errors appear in parentheses. The heteroscedasticity robust standard errors are provided in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: own elaboration.

Table 3. Results of H8 Tests

	1	2	3	4
No. of observations	4270	4270	4270	4270
Wald (joint)	9124***	129,3***	117,4***	202000***
R^2	0,6432916	0,6435996	0,6432916	0,9280117
AR(1) test	−2,995***	−3,098***	−2,995***	−3,975***
AR(2) test	−2,478**	−2,499**	−2,478**	−1,568
Constant	−0,16469***	−0,164123***	−0,186468***	−0,754524***
	(0.056)	(0.056)	(0.049)	(0.053)
Log_Total Assets	−0,00356644	−0,00372625	−0,00356644	−0,000775282
	(0.006)	(0.006)	(0.006)	(0.002)
P/BV	−0,00214184	−0,00208418	−0,00214184	0,000340917
	(0.002)	(0.002)	(0.002)	(0.001)
Tangibility	0,263231***	0,264329***	0,263231***	0,726661***
	(0.030)	(0.030)	(0.030)	(0.053)
WCI	0,123142***	0,123549***	0,123142***	0,770299***
	(0.024)	(0.024)	(0.024)	(0.047)
Cash	−0,0848532***	−0,0842984***	−0,0848532***	−0,0654476***
	(0.026)	(0.026)	(0.026)	(0.019)
Leverage				0,832247***
				(0.034)
ROA	−0,0351077***	−0,0351325***	−0,0351077***	0,0100185
	(0.011)	(0.011)	(0.011)	(0.006)
Market	0,376312***			0,186738***
	(0.039)			(0.038)
DivDummy		−0,00755863		
		(0.006)		
Crisis			0,0217781	
			(0.018)	

Notes: This table presents the static panel model estimates. The equations were estimated using fixed firm and year effects (not reported). Standard errors appear in parentheses. The heteroscedasticity robust standard errors are provided in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: own elaboration.

Table 4. Results of H1.1 and H8-H9 Tests

	1	2	3
No. of observations	4270	4270	4270
Wald (joint)	120,2***	120,7***	135***
R^2	0,6439573	0,6449267	0,6444661
AR(1) test	4,135***	4,126***	4,121***
AR(2) test	−0,8758	−0,8734	−0,7807
Constant	−0,162281***	−0,146893***	−0,164062***
	(0.056)	(0.057)	(0.056)
Log_Total Assets	−0,00447747	−0,00432382	−0,00465748
	(0.006)	(0.006)	(0.006)
P/BV	−0,00213006	−0,00219085	−0,00202031
	(0.002)	(0.002)	(0.002)
Tangibility	0,263424***	0,238672***	0,264146***
	(0.030)	(0.030)	(0.030)
WCI	0,122819***	0,123798***	0,122408***
	(0.024)	(0.023)	(0.024)
Cash	−0,0846665***	−0,0843782***	−0,083884***
	(0.026)	(0.026)	(0.026)
ROA	−0,0344426***	−0,0334597***	−0,0342734***
	(0.011)	(0.011)	(0.011)
AgeSize	0,020646***	−0,00742036	−0,0112976
	(0.008)	(0.017)	(0.017)
AgeSizexTangibility		0,0572716*	
		(0.031)	
AgeSizexCrisis			0,0400469**
			(0.017)

Notes: This table presents the static panel model estimates. The equations were estimated using fixed firm and year effects (not reported). Standard errors appear in parentheses. The heteroscedasticity robust standard errors are provided in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: own elaboration.

6. Conclusions

The paper represents an inquiry into the determinants of liability maturity choices in the Polish corporate sector. Empirical findings suggest that asset tangibility, liquidity, leverage and profitability constitute the principal factors influencing financing strategies. The presented results validate the tenets of the contracting-costs hypothesis. Additionally, we analyze the influence of financing constraints and crisis settings on the liability maturity choices. We find that unconstrained companies have a higher liability maturity and tend to increase liability maturity during a financial crisis. Empirical findings also suggest that the impact of asset tangibility on liability maturity is more pronounced for unconstrained companies, which contradicts previous empirical findings. The lack of the significant influence of growth options and company's size on liability maturity may deserve further research.

Our findings suggest that Polish companies are confronted with considerable capital market imperfections which may hinder their organic growth and cause suboptimal resource allocation. In order to alleviate the problem, policy measures may be designed to improve the information efficiency of capital markets and ensure the adequate disclosure of relevant financial information by all market participants.

Bibliography

Awartani B., Belkhir M., Boubaker S., Makhyereh A., 2016, *Corporate debt maturity in the MENA region: Does institutional quality matter*?, International Review of Financial Analysis, 46, pp. 309-325.

Barclay M., Smith C., 1995, *The maturity structure of corporate debt*, Journal of Finance, 50(2), pp. 609-632.

Berger A., Udell G., 1990, *Collateral, loan quality and bank risk*, Journal of Monetary Economics, 25(1), pp. 21-42.

Berger A., Udell G., 2006, *A more complete conceptual framework for SME finance*, Journal of Banking & Finance, 30(11), pp. 2945-2966.

Białek-Jaworska A., Nehrebecka N., 2016, *Preferences of Polish enterprises as regards debt financing*, Ekonomista, 4, pp. 469-501.

Brav O., 2009, *Access to capital, capital structure, and the funding of the firm*, The Journal of Finance, 64(1), pp. 263-308.

Campello M., Giambona E., Graham J., Harvey C., 2012, *Access to liquidity and corporate investment in Europe during the financial crisis*, The European Financial Review, 16, pp. 323-346.

Carey M., Post M., Sharpe S., 1998, *Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting*, The Journal of Finance, 53(3), pp. 845-878.

Czekaj J., 2014, *Efektywność giełdowego rynku akcji w Polsce z perspektywy dwudziestolecia*, Polskie Wydawnictwo Ekonomiczne, Warszawa.

Demirguc-Kunt A., Maksimovic V., 1999, *Institutions, financial markets, and firm debt maturity*, Journal of Financial Economics, 54, pp. 295-336.

Devereux M., Schiantarelli F., 1990, *Investment, Financial Factors, and Cash Flow: Evidence from UK Panel Data*, [in:] R. Hubbard (ed.), *Asymmetric Information, Corporate Finance and Investment*, University of Chicago Press, Chicago, pp. 279-306.

Diamond D., 1984, *Financial intermediation and delegated monitoring*, The Review of Economic Studies, (51), pp. 393-414.

Diamond D., 2004, *Presidential address, committing to commit: Short-term debt when enforcement is costly*, The Journal of Finance, 59(4), pp. 1447-1479.

Doukas J., Pantzalis C., 2003, *Geographic diversification and agency costs of debt of multinational firms*, Journal of Corporate Finance, 9(1), pp. 59-92.

Elyasiani G., Guo L., Tang L., 2002, *The determinants of debt maturity at issuance: a system-based model*, Review of Quantitative Finance and Accounting, 19(4), pp. 351-377.

Fatemi A., 1988, *The effect of international diversification on corporate financing policy*, Journal of Business Research, 16(1), pp. 17-30.

Faulkender M., Petersen M., 2006, *Does the source of capital affect capital structure?*, Review of Financial Studies, 19(1), pp. 45-79.

Fazzari S., Hubbard G., Petersen B., Blinder A., Poterba J., 1988, *Financing constraints and corporate investment*, Brookings Papers on Economic Activity, 1(1988), pp. 141-206.

Flannery M., 1986, *Asymmetric information and risky debt maturity choice*, Journal of Finance, 41(1), pp. 19-37.

Gonzales V., 2015, *The financial crisis and corporate debt maturity: The role of banking structure*, Journal of Corporate Finance, 35, pp. 310-328.

Guariglia A., Tsoukalas J., Tsoukas S., 2012, *Investment, irreversibility, and financing constraints in transition economies*, Economics Letters, 117, pp. 582-584.

Guedes J., Opler T., 1996, *The determinants of the maturity of corporate debt issues*, Journal of Finance, 51(5), pp. 1809-1833.

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

Heyman D., Deloof M., Ooghe H., 2008, *The financial structure of private held Belgian firms*, Small Business Economics, 30(3), pp. 301-313.

Jackowicz K., Kozłowski Ł., Mielcarz P., 2016, *Financial constraints in Poland: the role of size and political connections*, Argumenta Oeconomica, 1(36), pp. 225-240.

Jensen M., 1986, *Agency costs of free cash flow, corporate finance, and takeovers*, American Economic Review, 76(3), pp. 323-329.

Johnson S., 2003, *Debt maturity and the effects of growth opportunities and liquidity risk on leverage*, Review of Financial Studies, 16(1), 209-236.

Kale J., Noe T., 1990, *Risky debt maturity choice in a sequential game equilibrium*, Journal of Financial Research, 13, pp. 155-165.

Myers S., 1977, *Determinants of corporate borrowing*, Journal of Financial Economics, 5, pp. 147-175.

Myers S., Majluf S., 1984, *Corporate financing and investment decisions when firms have information that investors do not have,* Journal of Financial Economics, 13(2), pp. 187-221.

Opler L., Pinkowitz T., Stulz R., Williamson R., 1999, *The determinants and implications of corporate cash holdings*, Journal of Financial Economics, 52, pp. 3-46.

Ortiz-Molina H., Penas M., 2008, *Lending to small businesses: The role of loan maturity in addressing information problems,* Small Business Economics, 30(4), pp. 361-383.

Rajan R., Zingales L., 1995, *What do we know about capital structure? Some evidence from international data*, The Journal of Finance, 50(5), pp. 1421-1460.

Stephan A., Talavera O., Tsapin A., 2011, *Corporate debt maturity choice in emerging financial markets*, The Quarterly Review of Economics and Finance, 51, pp. 141-151.

Stohs M., Mauer D., 1996, *The determinants of corporate debt maturity structure*, The Journal of Business, 69(3), pp. 279-312.

Zheng X., El Ghoul S., Guedhami O., Kwok C., 2012, *National culture and corporate debt maturity*, Journal of Banking & Finance, 36(2), pp. 468-488.