sciendo Economics and Business Review
https://www.ebr.edu.pl
Vol. 9 (3), 2023:
https://doi.org/10.18559/ebr.2023.3.800

The choice of external financing source: The role of company size and stock liquidity

Szymon Stereńczak[1] Jarosław Kubiak[2]

Abstract

This paper aims to answer whether firms of different sizes and stock liquidities differ in the choice of external sources of financing in companies listed in CEE countries. To this end the net debt issuance is regressed on the financial deficit. In regressions Pecking Order Coefficients are allowed to vary across firms with different sizes and stock liquidities. The results indicate that companies with less liquid shares prefer issuing debt to cover financial deficits more than companies with more liquid shares. This implies that stock liquidity may substitute debt issuance in alleviating the adverse effects of information asymmetry, especially in relatively small companies. This is the first study in which the relationship between liquidity and debt-equity choice is considered solely from a pecking order theory point of view. Also this is the first study in which stock liquidity effects on capital structure are studied in the CEE countries. Research results may point to the advantages of increasing the liquidity of shares which may contribute to reducing information asymmetry and thus a better allocation of resources.

Keywords

- stock liquidity
- debt-equity choice
- external financing
- financial deficit
- pecking order theory

JEL codes: G12, G14, G15, G32

Article received 27 February 2023, accepted 30 May 2023.

Acknowledgment: The study was supported by the National Science Centre, Poland under grant 2017/27/N/HS4/00751.

Suggested citation: Stereńczak, S., & Kubiak, J. (2023). The choice of external financing source: The role of company size and stock liquidity. *Economics and Business Review*, *9*(3), https://doi.org/10.18559/ebr.2023.3.800

[1] Department of Corporate Finance, Poznań University of Economics and Business, al. Niepodległości 10, 61-875 Poznań, Poland, szymon.sterenczak@ue.poznan.pl, https://orcid.org/0000-0003-4825-3229.

[2] Department of Corporate Finance, Poznań University of Economics and Business, al. Niepodległości 10, 61-875 Poznań, Poland, corresponding author: jaroslaw.kubiak@ue.poznan.pl, https://orcid.org/0000-0001-6479-7811.

Introduction

One of the important tasks of business management is to reduce the negative effects of information asymmetry. According to the pecking order theory such a result can be achieved by appropriately shaping the capital structure. The problem of information asymmetry affects smaller companies to a greater extent and is more acute in less mature capital markets which certainly include those in Central and Eastern Europe (CEE). Capital markets in post-communist countries experience severe information asymmetry and investors' rights protection is quite poor. Thus, external investors in these countries may have significantly less knowledge about the company than insiders do. As it is more difficult for small businesses to access capital to reduce negative information asymmetries it is worth seeking alternative methods of achieving this goal.

As suggested by recent research on the intersection of the stock market microstructure and corporate finance improving stock liquidity may be one such method. This is because stock liquidity seems to alleviate the adverse effects of information asymmetry (Jiang et al., 2017; Stereńczak & Kubiak, 2022). Therefore, this research aims to answer whether firms of different sizes and stock liquidities differ in the choice of external sources of financing financial deficits in companies listed in CEE countries. This would permit an answer as to whether higher stock liquidity can substitute debt issuance in reducing the adverse effects of information asymmetry.

There is no single theory which directly explains why stock liquidity should have an effect on companies' debt-equity choices. However, several existing capital structure theories provide some indirect reasoning for the existence of stock liquidity effects on debt-equity choices. The first is the static trade-off theory. Stock liquidity affects companies' cost of equity (Amihud & Mendelson, 2000) hence according to that theory it also affects company target leverage. The second theory is the dynamic trade-off theory. Stock liquidity affects the cost of issuing equity (Butler et al., 2005) which impacts the speed of leverage adjustment towards the target. Finally, the effect of stock liquidity may also be explained in terms of the pecking order theory. According to that theory, companies with large information asymmetry concerns should prefer external debt financing more than firms with less information asymmetry. High liquidity makes stock prices more informative (Fang et al., 2009; Wang & Wei, 2021) and alleviates the adverse effects of information asymmetry (Jiang et al., 2017; Stereńczak & Kubiak, 2022). Thus, stock liquidity may influence a firm's preference for debt financing.

Research on the stock liquidity effects on companies' capital structures has appeared only recently and is based on the trade-off theories of capital structure. These studies confirm the effect of stock liquidity on a firm's debt-equity choice. Lipson and Mortal (2009), Nadarajah et al. (2018) and Dang

et al. (2019) prove that firms with more liquid shares are less leveraged due to lower cost of equity. Chen et al. (2020) find similar though they attribute this relationship to information asymmetry and blockholders' threat of exit. Lipson and Mortal (2009) find that firms with more liquid shares prefer equity financing when raising capital. The same relationship was observed by Rashid and Mehmood (2017) for the Pakistani and Dutta et al. (2022) for the Indian market. Ho et al. (2021) investigate the effect of liquidity on the speed of adjustment (SOA) of capital structure and find that firms with more liquid stocks have faster SOA. Also Nguyen et al. (2021) find that firms with more liquid bonds relative to stocks have higher leverage. This paper aims to answer whether firms of different sizes and stock liquidities differ in the choice of external sources of financing financial deficits in CEE countries. Therefore, unlike the previous research presented above, the analyses are based on empirical verification of the pecking order theory. Recent studies on the relationship between stock liquidity and capital structure focus mainly on trade-off theories. Thus, this study is the first in which the relationship between liquidity and debt-equity choice is considered solely from a pecking order theory point of view.

The study contributes to the ongoing research on the intersection of stock market liquidity and corporate finance. Recent studies in this field suggest that liquidity affects companies' financing decisions either by impacting target leverage (Dang et al., 2019; Lipson & Mortal, 2009; Nadarajah et al., 2018; Nguyen et al., 2021) or by impacting the speed of adjustment of capital structure (Ho et al., 2021). By analysing the liquidity effect on the companies' scopes for debt financing of a deficit another proof of the dependence of corporate capital structure on stock liquidity is provided. The study results suggest that firms with more liquid shares are more willing to issue equity to cover their financial deficit than firms with less liquid equity. This is visible especially in relatively smaller companies.

This study also contributes to the literature on the pecking order theory. According to that theory, when raising capital companies aim to minimize the adverse effects of information asymmetry between insiders and outsiders. Therefore, when companies need to raise external capital they should prefer issuing debt as it arises less adverse effects of information asymmetry. The study results suggest that stock liquidity may substitute debt issuance in alleviating the adverse effects of raising external capital. If this supposition is true, shocks to the company's stock liquidity may alter the choice of the source of external financing.

In addition, the research is important because it examines the scale of financing deficit with debt in the context of mitigating the effects of information asymmetry through relatively higher stock liquidity dependant on the size of the company. Kumar et al. (2020) pointed out the research gaps and proposed future research areas on the capital structure of small companies.

One of these areas is the search for other than the classic factors of capital structure; one such factor may be stock liquidity. The capital structure choices between equity and debt are different for small firms than for large firms in part because small businesses tend to be more informationally opaque than large firms (Berger & Udell, 1998). From this perspective small companies should raise external capital to a greater extent through debt.

As Martinez et al. (2019) pointed out only a few studies analyse the capital structure of small and medium-sized companies in emerging countries. Thus, as this study covers fourteen markets of Central and Eastern Europe, it also contributes to the literature on emerging and frontier stock markets. CEE markets provide an interesting setting for a study on stock liquidity effects on external financing sources especially for small companies. According to Hasan et al. (2017), small companies constitute a key element in enabling CEE countries to transition from a planned to a market economy. Moreover, these exchanges are relatively young and underdeveloped markets. According to the MSCI classification, CEE markets are either emerging or frontier. Due to a generally low level of development CEE markets are densely populated by low-liquid shares and small-cap stocks, experience severe information asymmetry and poor investors' rights protection. Even more importantly firms in CEE countries are focused more on indirect bank financing rather than on direct financing through the capital markets. Also a relatively high percentage of small and medium-sized companies in CEE countries use internal financing which may result from low financial market development (Moritz et al., 2016). A significant number of large companies in CEE countries, however, are State Owned Enterprises (Matuszak, 2020) which may have an effect on their choices of financing sources. These features may significantly influence the liquidity effects on the choice of the source of external financing.

The remainder of the paper is structured as follows. Section 1 provides a brief literature review and develops hypotheses tested in the empirical part of the study. Then Section 2 depicts the sources of data and methods applied. Section 3 presents baseline empirical results and robustness tests are provided in Section 4. The final section discusses and concludes the results.

1. Literature review and hypotheses development

According to the pecking order theory, when raising capital companies do not aim to reach their target leverage but use such financing sources that will minimize the adverse effects of information asymmetry. Therefore, companies should prefer debt to finance their deficits as debt financing causes less adverse effects of information asymmetry. Shyam-Sunder and Myers (1999)

found that the pecking order theory reliably describes the behaviour of U.S. companies. Fama and French (2002) concluded that the pecking order theory 'wins' over the trade-off theory but only in explaining the case of low-leveraged and relatively more profitable firms. Frank and Goyal (2003) showed that debt is a preferred source of raising capital in large firms. Small companies use debt to a lesser extent as compared to big ones. Halov (2006) claimed that the choice of a financing source depends on both the current and future level of information asymmetry. Companies which currently are characterized by a significant information asymmetry may choose to issue equity instead of debt because they expect an amplification of the information asymmetry in the long run. This coincides with Myers and Majluf's (1984) conclusions who recommended that corporations that do not suffer from information asymmetry should build their financial slack in future. Shen's (2014) research indicates that companies replace equity with debt when information asymmetry increases. Qu et al. (2018) find that consistent with the predictions of the pecking order theory companies whose shareholders face more severe informational disadvantages are associated with a higher degree of leverage.

Thus, according to the pecking order theory, debt financing is supposed to mitigate the negative effects of information asymmetry. However, recent studies show that stock liquidity may alleviate this problem. High liquidity makes stock prices more informative (Fang et al., 2009; Jiang et al., 2017; Wang & Wei, 2021). Bakri et al. (2020) stated that in emerging markets with high information asymmetry the informational effect of stock liquidity is crucial in mitigating information asymmetry as compared to the developed markets with lower information asymmetry. Stereńczak and Kubiak (2022) pointed out that high stock liquidity in the CEE markets prompts investors to gain additional information to mitigate adverse selection concerns. Based on the indications of the pecking order theory and the empirical evidence on the role of stock liquidity in mitigating adverse selection problems the following hypothesis is stated:

H1: Firms with more liquid shares prefer financing their financial deficit through equity issuance more than firms with less liquid shares.

Several publications on the pecking order theory indicate that the firm's size is an important aspect in differentiating the capital structure. Smaller companies are affected by various information asymmetries issues such as adverse selection and moral hazard, among others (Martinez et al., 2019). On the one hand, more debt raising can be expected in these companies. As Berger and Udell (1998) emphasized financial intermediaries play a crucial role in the private markets as information producers who can assess small business quality and address information problems through the activities of screening, contracting and monitoring. On the other hand, small companies face greater constraints in accessing external debt financing with

respect to large companies and those limitations arise mainly due to asymmetric information problems between borrowers and lenders (Beck et al., 2005). This may result in higher debt issuance costs for small companies compared to large ones. In addition, they are characterised by insufficient creditworthiness.

The difficulties in obtaining credit by small and medium-sized enterprises are well known in literature. Stiglitz and Weiss (1981) described the phenomenon of credit rationing. The authors found that pledging outside collateral may help resolve adverse selection problems when the borrower has more information about the quality of the investment than the lender and may help prevent credit rationing. The fact that smaller companies are treated unfairly in access to bank loans has been highlighted in a study by Nguyen and Ramachandran (2006). Czerwonka and Jaworski (2021) examined the small and medium-sized enterprises' capital structure determinants in Central and Eastern Europe and found that these firms' leverages do not exceed their debt capacities which is consistent with the pecking order theory. The aforementioned obstacles in obtaining credit may in part explain the findings of Frank and Goyal (2003) who revealed that larger firms are more likely to follow a pecking order than small ones. The greater leverage of large companies is among others a result of a greater ability to collateralise credit.

As noted above the liquidity of shares is capable of being a substitute for issuing debt in alleviating adverse effects of information asymmetry. However, due to the limited availability of debt for small and medium-sized enterprises the second hypothesis is stated as follows:

H2: The negative relationship between stock liquidity and the scope for financing deficit through a debt is more pronounced in relatively smaller companies.

2. Data and methodology

For the empirical study the data from the cash flow statements and balance sheets of firms listed in 14 countries of Central and Eastern Europe (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, Slovenia, Slovakia and Ukraine) in the period from 2009 to 2021 are gathered from S&P Capital IQ database. These exchanges are relatively young markets, densely populated by low liquid shares and experience severe information asymmetry and poor investors' rights protection. These features may significantly influence the liquidity effects on the choice of the source of external financing. The distribution by country of the research sample is provided in Table 1. The initial research sample consists of 2,138 companies,

however, firms from the financial sector (493 companies) are excluded due to their unique financial statements. Also observations with incomplete financial data (1,320 observations) and less than 100 trading days within a year (5,742 observations) are discarded. The final dataset comprises 1,265 firms and 9,238 firm-year observations. The research sample is overrepresented by Polish companies which constitute over half of the sample (Table 1).

Table 1. Structure of the research sample

	Initial sample		Excluding financial firms				Final sample			
Country	**Firms**	**% of firms**	**Firms**	**Obs.**	**% of firms**	**% of obs.**	**Firms**	**Obs.**	**% of firms**	**% of obs.**
Bulgaria	236	11.04	185	1,330	11.25	8.88	106	477	8.38	5.11
Croatia	115	5.38	80	646	4.86	4.31	53	454	4.19	4.87
Czechia	62	2.90	44	246	2.67	1.64	16	79	1.26	0.85
Estonia	24	1.12	24	234	1.46	1.56	17	160	1.34	1.72
Hungary	101	4.72	50	507	3.04	3.38	43	313	3.40	3.36
Latvia	34	1.59	12	125	0.73	0.83	10	69	0.79	0.74
Lithuania	41	1.92	27	299	1.64	2.00	27	188	2.13	2.02
Poland	862	40.32	703	7,515	42.74	50.17	654	5,052	51.70	54.16
Romania	90	4.21	74	844	4.50	5.63	67	523	5.30	5.61
Russia	251	11.74	201	2,089	12.22	13.95	185	1,499	14.62	16.07
Serbia	181	8.47	134	433	8.15	2.89	34	181	2.69	1.94
Slovakia	31	1.45	23	368	3.65	2.46	7	196	0.55	2.10
Slovenia	70	3.27	60	136	1.40	0.91	29	41	2.29	0.44
Ukraine	40	1.87	28	208	1.70	1.39	17	96	1.34	1.03
Total	2,138	100	1,645	14,980	100	100	1,265	9,328	100	100

Source: own work.

Stock liquidity denotes the ability to buy or sell large quantities of shares within a short time interval, with low cost and without causing an unfavourable price impact. Defined as such it encompasses several dimensions, i.e. quantity (depth), time (immediacy), cost (tightness) and price impact (resiliency) dimensions. In the study liquidity is measured with the most commonly used proxy for liquidity, i.e. Amihud's (2002) illiquidity ratio. It reflects only the price impact dimension of stock liquidity but for robustness purposes the remaining liquidity dimensions are also taken into account. The liquidity measure is computed strictly following Amihud (2002):

$$ILLIQ_{it} = \frac{1}{NoTD_{it}} \sum_{m=1}^{NoTD_{it}} \frac{|r_{imt}|}{Val_{imt}} \quad (1)$$

where $NoTD_{it}$ is the number of trading days on stock i in year t, r_{imt} denotes log stock return on ith stock in day m of year t, and Val_{imt} is the respective daily value of shares traded expressed in millions of EUR. In order to eliminate the outliers the log transformation of ILLIQ ($lnILLIQ$) is used in the study.

For each firm-year observation in the sample the financial deficit (DEF) is computed following Frank and Goyal (2003) as a sum of the change in working capital (ΔW), investments (I) and cash dividends (DIV), less internal cash flows (C):

$$DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} - C_{it} = \Delta D_{it} + \Delta E_{it} \quad (2)$$

A financial deficit may be covered by debt issuance either by equity issuance hence DEF is expected to be equal to the sum of the net debt issued or retired (ΔD) and the net equity issued or retired (ΔE). To ensure comparability of DEF among companies of different sizes in the empirical analyses the deficit is scaled by the company's total assets. Its negative value means a surplus of funds with which the company pays back creditors or owners while a positive result means a deficit and therefore the need to raise external debt or equity.

The study also uses some control variables to capture the effect of other factors on the choice between issuing debt and equity. In particular, a firm's *Leverage* is calculated as a ratio of total debt to the book value of assets. The market-to-book value (*M-BV*) is used to proxy for past stock performance and stock overvaluation and Altman's Z-Score (Altman & Hotchkiss, 2006) to proxy for a firm's credibility. Descriptive statistics on all variables used in the study are presented in Panel A of Table 2.

Panel B of Table 2 presents some descriptive statistics for DEF values and leverage of companies covered in the study divided into groups of different sizes and stock liquidities. As depicted small firms relatively more often experience a zero value of DEF which may indicate that they rely relatively more on internal financing. This, in turn, is consistent with recent evidence by Moritz et al. (2016), Jiang et al. (2017), Neville and Lucey (2022) and Stereńczak and Kubiak (2022) among others. Among all size subsamples the proportion of deficits and surpluses within a subsample is roughly equal. The average surplus is also roughly equal across all three company-size groups. However, small firms experience relatively the highest deficits (Table 2) which is in line with the findings of De Jong et al. (2010). Small firms are also least leveraged which may seem surprising as they are subject to high information asymmetry concerns and thus should rely more on debt financing. However, taking their lower creditworthiness into account it can be assumed that this is the reason for the relatively low use of debt financing by these firms. It is in

line with research results presented by De Jong et al. (2010) and Bhama et al. (2015) who pointed out that in a situation of large deficits firms are less likely to issue more debt. In addition, Chaklader and Padmapriya (2021) noticed that financial deficit is negatively related to financial leverage for small and medium-sized firms. Thus, the relatively smaller CEE companies surveyed seem to follow patterns observed in other markets.

Table 2. Descriptive statistics

Panel A: Descriptive statistics of all variables							
Variable	**Mean**	**Median**	**Standard deviation**	**Skewness**	**Kurtosis**	**Min**	**Max**
DEF/Assets	1.89%	0%	7.26%	2.164	5.946	–10.36%	38.35%
ΔD/Assets	0.118%	0%	3.74%	1.041	2.827	9.42%	15.15%
lnAssets	5.710	5.296	3.344	0.387	–0.024	–7.621	16.966
lnILLIQ	2.511	3.300	3.272	–0.949	0.436	–9.762	7.174
Leverage	20.57%	17.14%	18.84%	1.014	0.822	0%	99.75%
M-BV	6,291.13	21.206	95,229.23	37.692	1,929.69	0.00004	5,995,069
Z-Score	1.738	1.349	51.174	–73.577	6,569	–5,107.66	291.36
Panel B: Deficits and leverages in subgroups							
Sample	**% of**			**Average**			**Average *Leverage***
	Deficit	***DEF* = 0**	**Surplus**	**Deficit**	***DEF***	**Surplus**	
All firms	41.72	15.91	42.37	7.45	1.89	2.88	20.57
Small	39.23	25.35	35.42	8.95	2.57	2.66	12.90
Medium	40.58	11.93	47.50	7.05	1.45	2.97	21.62
Big	45.41	10.57	44.02	6.53	1.66	2.96	26.07

Source: own work.

As the study investigates the relationship between liquidity and the degree to which deficits are financed through debt in companies of different sizes it starts by independently splitting the sample into terciles of distribution of size ($lnAssets$) and liquidity ($lnILLIQ$), obtaining 9 "portfolios" (3 x 3). Then within each of the nine portfolios the net debt issuance is regressed on the financial deficit, as in Shyam-Sunder and Myers (1999) and Frank and Goyal (2003):

$$\Delta D_{it} = a + b_{PO} DEF_{it} + e_{it} \tag{3}$$

where ΔD_{it} denotes the amount of net debt issued (retired if ΔD_{it} is negative) by the ith firm in year t, and DEF_{it} is ith firm's financial deficit (surplus

if DEF_{it} is negative) in year t, both scaled by assets. According to pecking order theory, a is expected to be insignificantly different from 0, and b_{PO} is a Pecking Order Coefficient and reflects firms' scope for debt financing. Estimating equation (3) across nine groups of companies allows a comparison of preferences for financing deficits through debt issuance for firms of different sizes and stock liquidities. According to hypothesis H1, b_{PO}s are expected to be higher for firms with more illiquid stocks. Also larger firms are expected to have higher b_{PO}s.

As company size and stock liquidity may be not only determinants of a firm's preference for debt financing of the financial deficit the b_{PO}s in equation (3) are allowed to vary across firms with different characteristics. A similar approach was applied by Ho et al. (2021) in their analysis of stock liquidity effects on a firm's speed of leverage adjustment. To this end the b_{PO} is specified as a function of the firm's size, stock liquidity and control variables as follows:

$$b_{PO} = a_0 + a_1\, lnILLIQ_{it} + a_2\, lnAssets_{it} + a_3\, lnILLIQ_{it} \cdot lnAssets_{it} + a_4\, X_{it} \quad (4)$$

where *X* denotes control variables, i.e., *Leverage*, *M-BV* and *Z-score*. Recent studies proved these variables are significant for European enterprises' capital structures (Czerwonka & Jaworski, 2022). Similar to Nehrebecka and Dzik-Walczak (2018), in equation (4) also country, industry and year fixed effects are included to control for unobservable heterogeneity among different countries (resulting, e.g., from differences in legal frameworks or in financial systems), industries (e.g., mainly from differences in asset structures) and years (e.g., due to macroeconomic conditions). As Koralun-Bereźnicka (2018) noted among European companies the country effects as well as the industry effects can have even stronger impact on capital structure than company size. Macroeconomic conditions, especially banking sector health, economic growth and inflation rate, determine companies' accessibility of debt to firms (Białek-Jaworska, 2017). Also the benign credit cycle may influence the companies' choices of external financing (Altman & Kuehne, 2016), and this also can be captured by year fixed effects. Combining equations (3) and (4) the standard model of firm's scope of debt financing expands and yields the following panel data regression:

$$\begin{aligned} \Delta D_{it} = a + (a_1\, lnILLIQ_{it} + a_2\, lnAssets_{it} + a_3\, lnILLIQ_{it} \cdot lnAssets_{it} + \\ + a_4\, X_{it} + Country + Industry + Year)\, DEF_{it} + e_{it} \end{aligned} \quad (5)$$

where *Country*, *Industry* and *Year* denote country, industry and year fixed effects respectively. To avoid heteroskedasticity and cross-correlation of residuals resulting from unobservable heterogeneity among firms, standard errors are clustered at the firm level. According to the hypotheses, it is expected that $a_1 > 0$ (H1) and $a_3 < 0$ (H2); also, $a_2 > 0$ is expected.

3. Empirical results

First, all companies in the research sample are independently sorted into terciles of distribution of size ($lnAssets$) and liquidity ($lnILLIQ$) and assigned to one of 9 "portfolios" (3 x 3). Within each portfolio a companies' scopes for financial deficit through debt issuance (b_{PO}) are estimated in line with equation (3). b_{PO}s estimated among nine groups of companies are presented in Table 3. The values in Panel A of Table 3 show that the relationship between stock liquidity (as measured by the Amihud ratio) and the scope for financing deficit (negative or positive) through debt is different for small versus large companies. On average the largest firms in the sample exhibit the highest scopes for financing deficit through debt issuance (as measured by the b_{PO} – the Pecking Order Coefficient). Small and medium-sized companies finance their deficits using debt to a lesser extent.

Despite their lower creditworthiness and leverage small companies with illiquid stocks reveal a greater scope for financing deficit through debt than small companies with a higher level of stock liquidity. A similar and even more clearly visible relationship pertains for medium-sized companies. Low liquidity of a company's shares results in a smaller preference for financing deficit through equity issuance (Table 3). Surprisingly the reverse relationship is visible in large companies. In the case of the biggest firms in the sample companies with highly liquid shares prefer debt financing of their deficits more than companies with moderately liquid and illiquid shares.

Differences in estimated scopes for financing deficit through debt issuance among groups of companies of different stock liquidity are statistically significant. The results of the Chow F-test indicate that most of the differences among the values of b_{PO} are statistically significant. Only in two cases the Chow F-test fails to reject the null hypothesis that the coefficients among the two groups are equal. The first one is the case of small firms and the difference in b_{PO}s among the groups of companies with liquid and moderately liquid shares. Also the difference in b_{PO}s among the groups of large companies with moderately liquid and illiquid shares is statistically insignificant. Details on the p-values of the Chow F-test are available upon request.

It is widely agreed that large companies are more resilient to the negative effects of information asymmetry. If stock liquidity alleviates the adverse effects of information asymmetry (Jiang et al., 2017; Stereńczak & Kubiak, 2022), capital structure choices of companies with less information asymmetry concerns may be less affected by stock liquidity. Lower liquidity of their shares plausibly does not 'force' them to finance their deficit to a greater extent with debt than companies with higher stock liquidity. Variations in creditworthiness and resilience to the negative effects of information asymmetry may therefore account for differences in the way deficits are financed and the

Table 3. Pecking Order Coefficients in companies aggregated in terciles by size and liquidity

Panel A: All cases				
Size / liquidity	Average	Liquid	Moderately liquid	Illiquid
Small	0.197***	0.113***	0.131***	0.245***
	(16.38)	(3.709)	(6.609)	(11.52)
Medium	0.429***	0.324***	0.473***	0.592***
	(20.08)	(8.829)	(14.12)	(15.28)
Big	0.524***	0.693***	0.421***	0.342***
	(22.11)	(26.70)	(8.667)	(5.114)
Panel B: Surpluses				
Size / liquidity	Average	Liquid	Moderately liquid	Illiquid
Small	0.666***	0.614***	0.734***	0.636***
	(23.39)	(4.620)	(11.64)	(15.02)
Medium	0.695***	0.676***	0.745***	0.673***
	(28.25)	(12.76)	(21.21)	(13.12)
Big	0.738***	0.822***	0.705***	0.476***
	(25.98)	(22.31)	(12.51)	(4.278)
Panel C: Deficits				
Size / liquidity	Average	Liquid	Moderately liquid	Illiquid
Small	0.051***	-0.001	-0.002	0.095***
	(4.557)	(0.047)	(0.116)	(4.472)
Medium	0.220***	0.129***	0.241***	0.477***
	(8.146)	(3.226)	(5.533)	(7.261)
Big	0.311***	0.539***	0.178***	0.166**
	(9.653)	(11.63)	(3.309)	(2.240)

Note: The Table presents Pecking Order Coefficients (b_{PO} from equation (1)) for companies sorted independently by size and liquidity. Panel A presents the coefficients for all cases, Panel B presents the coefficients for cases of surplus (negative DEF), and Panel C contains the coefficients for cases of deficit (positive DEF). t-statistics with robust standard errors clustered at the firm level are given in the parentheses and asterisks denote the statistical significance at the 0.1 (*), 0.05 (**) and 0.01 (***) level.

Source: own work.

opposite relationship between stock liquidity and the extent to which deficits are financed by debt in companies of different sizes.

The above results provide partial support for hypothesis H1. It is only confirmed for small and medium-sized companies. The higher scope for issuing debt to cover a deficit in companies with less liquid stocks confirms a negative relationship between stock liquidity and preference for debt financing. Large companies do not exhibit a negative relationship between stock liquidity and scope for financing deficit through debt issuance, thus confirming hypothesis H2.

The results allow the statement that stock liquidity may be an alternative to debt in alleviating the adverse effects of information asymmetry in relatively smaller companies. In cases when they face low stock liquidity they rely on debt more than in cases when their stocks are more liquid. This should be particularly relevant when they face a deficit and need to raise funds. In the case of a surplus and repurchase of capital information asymmetry concerns should be of less importance. To check this the Pecking Order Coefficients are estimated separately for the surplus and deficit cases; the results are presented in Panels B and C of Table 3.

The behaviour of firms that experience financial surplus (negative values of DEF) differs from that presented by firms with a financial deficit (positive values of DEF). Consistent with previous findings by De Jong et al. (2010). Pecking Order Coefficients are higher for surpluses than for deficits which means that in the case of a surplus firms repay relatively more debt than firms with a deficit issue it. By repaying debt firms with a financial surplus increase their financial slack and debt capacity to finance future deficits.

In the case of a surplus no clear variation in Pecking Order Coefficients between groups of firms with different stock liquidity is visible. This means that the stock's liquidity does not differentiate the value of the debt repaid. In addition the Chow F-test suggests that only the differences in b_{PO}s among the groups of big companies with various levels of stock liquidity may be considered statistically significant at a reasonable confidence level. Details on the *p*-values of the Chow F-test are available upon request.

Results for the cases of deficit mimic those shown in Panel A of Table 3, both in terms of values of the b_{PO} coefficients and the statistical significance of their differences among groups of companies of different stock liquidity. This means that for relatively smaller companies greater debt issuance occurs in companies with low stock liquidity than in companies with more liquid stocks. For large companies the opposite relationship is observed. Large companies with less liquid shares are less likely to issue debt to cover their deficits than large companies with more liquid shares.

So far the results partially confirm hypothesis H1 and fully confirm hypothesis H2. According to this firms with less liquid shares tend to issue more debt to cover their financial deficit. This is visible in small and medium-sized com-

panies which are affected by more information asymmetry concerns and are more vulnerable to its adverse effects. However, it is still possible that previous results are driven by other factors that correlate with either company size or with stock liquidity. To alleviate this concern model (5) in which the firm's scopes for debt financing of the deficit are allowed to vary with several characteristics is estimated. As Breusch-Pagano and White's tests fail to reject the null hypothesis that the variance of residuals is constant among the panel units to avoid the adverse effects of heteroskedasticity estimated standard errors are clustered at the firm level. Meanwhile Durbin-Watson statistics suggest a possible autocorrelation of residual in the models. However, according to Petersen (2009), additional clustering of standard errors by time units would gain only marginal profit as the number of time clusters in the regressions is small. To further alleviate this concern bootstrap *t*-statistics (not tabulated) are also estimated and the results remain qualitatively unchanged. Estimated coefficients are provided in Panel A of Table 4.

Columns (1)–(2) present coefficients for models without control variables and fixed effects. Columns (3)–(7) present the estimated coefficients for models with control variables and/or fixed effects for country, industry and year. VIF and BKW (Belsley et al., 1980) statistics suggest a potential collinearity problem resulting from including country, industry and year fixed effects in regressions. However, the estimated coefficients, both in terms of magnitude and statistical significance, are similar among models with and without effects

Table 4. Stock market liquidity, company size and the scope for debt financing

Panel A: All cases							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
a	–0.003*** (7.922)	–0.003*** (8.262)	–0.003*** (7.010)	–0.002*** (6.611)	–0.002*** (6.750)	–0.002*** (6.698)	–0.002*** (6.695)
a_1	0.015*** (4.149)	0.024*** (4.457)	0.012*** (2.717)	0.019*** (2.905)	0.016** (2.464)	0.013* (1.947)	0.032*** (3.188)
a_2	0.063*** (21.79)	0.063*** (21.81)	0.049*** (10.14)	0.080*** (9.286)	0.074*** (8.059)	0.072*** (7.889)	0.079*** (8.535)
a_3		–0.002** (2.017)					–0.003** (2.395)
Control variables	No	No	Yes	Yes	Yes	Yes	Yes
Country effects	No	No	No	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes	Yes	Yes
Time effects	No	No	No	No	No	Yes	Yes
Number of obs.	9,238	8,304	8,190	8,190	8,190	8,190	7,518
Adjusted R^2	0.403	0.421	0.446	0.480	0.496	0.501	0.521

Table 4 continued

Panel B: Surpluses							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
a	–0.005*** (9.982)	–0.004*** (8.876)	–0.004*** (9.719)	–0.002*** (4.802)	–0.002*** (4.686)	–0.002*** (4.733)	–0.002*** (4.731)
a_1	0.050*** (10.87)	0.082*** (8.711)	0.035*** (7.060)	0.0004 (0.053)	–0.0005 (0.072)	–0.002 (0.274)	0.001 (0.049)
a_2	0.078*** (26.33)	0.076*** (25.37)	0.049*** (10.93)	0.020** (2.251)	0.017* (1.752)	0.015 (1.482)	0.015 (1.457)
a_3		–0.005*** (3.185)					–0.0003 (0.242)
Control variables	No	No	Yes	Yes	Yes	Yes	Yes
Country effects	No	No	No	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes	Yes	Yes
Time effects	No	No	No	No	No	Yes	Yes
Number of obs.	4,382	4,382	4,019	4,019	4,019	4,019	4,019
Adjusted R^2	0.424	0.434	0.472	0.532	0.541	0.548	0.548
Panel C: Deficits							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
a	0.015*** (14.90)	0.015*** (16.58)	0.014*** (13.51)	0.013*** (14.44)	0.012*** (13.93)	0.012*** (13.62)	0.011*** (13.89)
a_1	–0.001 (0.282)	0.003 (0.607)	–0.002 (0.427)	0.014** (2.111)	0.012* (1.743)	0.009 (1.281)	0.026*** (2.674)
a_2	0.039*** (11.11)	0.039*** (11.57)	0.031*** (6.106)	0.065*** (6.927)	0.060*** (6.026)	0.059*** (5.956)	0.066*** (6.592)
a_3		–0.001 (0.856)					–0.003** (2.120)
Control variables	No	No	Yes	Yes	Yes	Yes	Yes
Country effects	No	No	No	Yes	Yes	Yes	Yes
Industry effects	No	No	No	No	Yes	Yes	Yes
Time effects	No	No	No	No	No	Yes	Yes
Number of obs.	3,922	3,922	3,499	3,499	3,499	3,499	3,499
Adjusted R^2	0.144	0.144	0.180	0.228	0.251	0.259	0.262

The Table presents the estimated coefficients of the model (5). Control variables are: *Leverage*, *M-BV* and *Z*-Score. presents the coefficients for all cases, Panel B presents the coefficients for cases of surplus (negative *DEF*), and Panel C contains the coefficients for cases of deficit (positive *DEF*). *t*-statistics with robust standard errors clustered at the firm level are given in the parentheses and asterisks denote the statistical significance at the 0.1 (*), 0.05 (**) and 0.01 (***) level.

Source: own work.

and hence it can be concluded that potential collinearity is not a severe concern. As the models in columns (2) and (7) include the interaction between size and liquidity the observations with $DEF = 0$ are dropped to further alleviate the collinearity concerns. In line with the expectations a_1s are significantly positive and a_3s are significantly negative regardless of the model specification. In models not including the interaction between the size and stock liquidity a_1s are visibly of lower magnitude than in models including the interaction which is not surprising due to negative a_3s. Significantly positive a_1s mean that firms with less liquid shares (i.e., higher values of $lnILLIQ$) tend to issue more debt to cover their financial deficits. Negative a_3s (Table 4) indicate that this relationship is less pronounced in bigger firms, which are less vulnerable to the adverse effects of information asymmetry.

The effect of stock liquidity on firms' scope for debt financing of the deficit is not only statistically significant but also economically meaningful. One standard deviation increase in $lnILLIQ$ (which denotes the deterioration in stock liquidity) results in an increase in the firm's scope for issuing debt (as measured by b_{PO}) by 3.93%–6.21%. However, taking the soothing effect of firm size on liquidity effects on b_{PO} (models (2) and (7)) into account an increase in the firm's scope for debt financing due to a one standard deviation increase in $lnILLIQ$ is 7.85%–10.47%.

To verify if stock liquidity is equally important to firms facing a deficit and facing a surplus model (5) is estimated separately for the surplus and deficit cases and the results are presented in Panels B and C of Table 4. The results seem to confirm earlier conclusions from the results presented in Table 3, i.e., stock liquidity is important to firms especially when they face a deficit and need to raise capital. This is confirmed by significantly positive a_1s though it is statistically significant only if control variables and fixed effects are included in the models. In a case of a surplus a_1s become insignificant if other firm characteristics and fixed effects are controlled for which suggests that stock liquidity is not important to the firm's decision on how to repay the capital.

Interestingly adjusted R^2s are higher for models estimated for surplus cases than for models estimated for deficit cases. This suggests that the pecking order theory better explains firms' behaviour when they face a surplus rather than a deficit. This implies that when a firm faces a surplus it repays the debt to maintain its financial slack which can be used to finance potential future deficits.

All the results confirm both hypotheses. Companies with more liquid shares prefer financing their financial deficit through equity issuance more than firms with less liquid shares which is suggested by positive a_1 coefficients. The negative relationship between stock liquidity and the scope for financing deficit through debt is more pronounced in relatively smaller companies which is evidenced by negative a_3 coefficients. As smaller companies are more vulnerable to the adverse effects of information asymmetry the existence of stronger ef-

fects of stock liquidity on a firm's debt financing suggests that stock liquidity may substitute debt issuance in alleviating the adverse effects of information asymmetry. Thus, companies can mitigate information asymmetry concerns not only by issuing debt when they need to raise external financing but also by taking actions aimed at enhancing the liquidity of their shares.

4. Robustness tests

As Amihud's (2002) ratio used in the baseline study to measure stock liquidity reflects only the price impact dimension of stock liquidity (resiliency) the robustness of the results presented in Section 4 is tested by taking the remaining liquidity dimensions into account. To this end stock liquidity is measured with alternative measures reflecting various liquidity dimensions. In particular Percent Quoted Closing Spread (Chung & Zhang, 2014) that reflects tightness, Liu's (2006) measure to reflect immediacy and the turnover ratio to measure market depth are used. Then the analyses from Section 4 are repeated for each of the alternative liquidity measures. For the sake of brevity the results are not presented but available upon request. The results are qualitatively similar to those presented in Section 4 hence the conclusions remain unchanged if other liquidity proxies are considered. It can thus be concluded that the results are unbiased by the choice of liquidity measure and that all dimensions of stock liquidity affect companies' preferences for debt financing of their deficits.

As Polish companies constitute over half of the research sample the sample is split into two subsamples: Polish and non-Polish companies. This allows a check to be made as to whether the results are not driven by patterns observed solely for Polish firms. For the sake of brevity the detailed results are not presented but are available upon request. To sum up the subsample analysis suggests that the results and conclusions are not driven by Polish companies.

Conclusions

This paper aimed to answer whether firms of different sizes and stock liquidities differ in the choice of external sources of financing in companies listed in CEE countries. In general the study presents that companies with less liquid shares prefer debt financing of the financial deficit more than companies with more liquid shares. The magnitude of this relationship varies according

to the company size. The findings are also in line with Frank and Goyal (2003) who revealed that large firms are more likely to follow a pecking order while small firms rely more on equity financing. However, despite smaller companies being less creditworthy and less leveraged the negative relationship between stock liquidity and scope for financing deficit through debt is more pronounced in these firms. The relationship between stock liquidity and the scope for financing deficit through debt is particularly relevant when firms face a deficit and need to raise capital. In the case of a surplus and repurchase of capital, information asymmetry is a less concerning issue which makes the relationship under scrutiny less visible.

This study does not contradict recent evidence on the relationship between stock liquidity and capital structure but complements it. Lipson and Mortal (2009), Nadarajah et al. (2018) and Dang et al. (2019) prove that firms with more liquid shares are less leveraged. This study suggests that this may be due to the lower preference for debt financing of the deficit in these companies. Also Chen et al. (2020) attribute the lower debt usage by firms with more liquid shares to information asymmetry which is also evidenced here although based on a different capital structure theory. Again based on the trade-off theory of capital structure Lipson and Mortal (2009) find that firms with more liquid shares prefer equity financing when raising capital and this study generates similar conclusions based on the pecking order theory. Thus, this paper proposes different mechanisms driving the relationship between stock liquidity and a company's capital structure.

The study results suggest that liquidity can substitute debt issuance in reducing the adverse effects of information asymmetry especially in relatively smaller companies. Thus, liquidity-enhancing actions may influence the choice of funding sources. Based on this research the reasons for the differences between companies of different size in the relationship between stock liquidity and the scope for financing deficit through debt can be traced to variations in creditworthiness and resilience to the negative effects of information asymmetry.

The findings may be interesting to managers, policymakers and investors. Because stock liquidity is capable of substituting the issuing of debt in alleviating the adverse effects of information asymmetry managers may find support in this research for taking liquidity-enhancing actions as this can give the company benefits by increasing the information content of share prices and lowering the adverse selection costs. This concerns in particular small firms. Such liquidity-enhancing actions may include disclosing more information of high quality and attracting more investors to increase the number of shareholders (Amihud & Mendelson, 2000; Pham et al., 2023).

Not all the factors that affect stock liquidity are controlled by the issuing company and especially in the CEE policymakers may be encouraged to implement systemic solutions to support stock liquidity and improve access to

credit enhancement programmes for smaller enterprises which may indirectly result in a better allocation of resources. The systemic solutions supporting stock liquidity are not limited to shaping appropriate regulations but may also consist of implementing new, more cost-efficient trading technologies which speed the trading and make it more frequent (Amihud & Mendelson, 2000). Another important factor is a general interest in investing in capital markets. Policymakers should provide conditions attracting various types of investors: individual and institutional, short- and long-term, domestic and foreign as investor heterogeneity improves stock liquidity (Chan et al., 2022). Investors who analyse the capital structure of companies can understand the potential reasons for the variation in the degree to which companies of different sizes finance their deficits through debt issuance.

Although the presented results quite clearly indicate that stock liquidity is capable of substituting for the issuing of debt in alleviating the adverse effects of information asymmetry this capability should be further investigated. A comparative study on the relationship between stock liquidity and the choice of external financing source among the markets of different levels of development, investors' protection rights and the strength of legal and political institutions could be of great interest. Although country effects were included in the research there is certainly a need to examine them in more detail. Another possible extension of the research would be a study using a more accurate proxy for information asymmetry.

References

Altman, E. I., & Hotchkiss, E. (2006). *Corporate financial distress and bankruptcy* (3rd ed.). John Wiley & Sons. https://doi.org/10.1002/9781118267806

Altman, E. I., & Kuehne, B. J. (2016). Credit markets and bubbles: Is the benign credit cycle over? *Economics and Business Review*, *2*(3), 30–31. https://doi.org/10.18559/ebr.2016.3.3

Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time series effects. *Journal of Financial Markets*, *5*(1), 31–56. https://doi.org/10.1016/S1386-4181(01)00024-6

Amihud, Y., & Mendelson, H. (2000). The liquidity route to a lower cost of capital. *Journal of Applied Corporate Finance*, *12*(4), 7–25. https://doi.org/10.1111/j.1745-6622.2000.tb00016.x

Bakri, M. A., Nordin, B. A. A., Tunde, M. B., & Theng, L. W. (2020). Moderating role of financial market development on the relationship between stock liquidity and dividend. *Asian Academy of Management Journal of Accounting and Finance*, *16*(2), 77–99. https://doi.org/10.21315/aamjaf2020.16.2.4

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: Does firm size matter? *Journal of Finance*, *60*(1), 137–177. https://doi.org/10.1111/j.1540-6261.2005.00727.x

Belsley, D. A., Kuh, E., & Welsch, R. E. (1980). *Regression diagnostics. Identifying influential data and source of collinearity*. John Wiley & Sons. https://doi.org/10.1002/0471725153

Berger, A. N., & Udell, G. F. (1998). The economics of small business finance: The role of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance*, *22*(6–8), 613–673. https://doi.org/10.1016/S0378-4266(98)00038-7

Bhama, V., Jain, P. K., & Yadav, S. S. (2015). Does firms' pecking order vary during large deficits and surpluses? An empirical study on emerging economies. *Procedia Economics and Finance*, *30*, 155–163. https://doi.org/10.1016/s2212-5671(15)01279-4

Białek-Jaworska, A. (2017). Do Polish non-financial listed companies hold cash to lend money to other firms? *Economics and Business Review*, *3*(4), 87–110. https://doi.org/10.18559/ebr.2017.4.6

Butler, A. W., Grullon, G., & Weston, J. P. (2005). Stock market liquidity and the cost of issuing equity. *Journal of Financial and Quantitative Analysis*, *40*(2), 331–348. https://doi.org/10.1017/S0022109000002337

Chaklader, B., & Padmapriya, B. (2021). Impact of cash surplus on firm's capital structure: Validation of pecking order theory. *Managerial Finance*, *47*(12), 1801–1816. https://doi.org/10.1108/MF-08-2020-0417

Chan, K., Cheng, S., & Hameed, A. (2022). Investor heterogeneity and liquidity. *Journal of Financial and Quantitative Analysis*, *57*(7), 2798–2833. https://doi.org/10.1017/S0022109022000217

Chen, Z., Gao, K., & Huang, W. (2020). Stock liquidity and excess leverage. *Finance Research Letters*, *32*, 101178. https://doi.org/10.1016/j.frl.2019.04.034

Chung, K. H., & Zhang, H. (2014). A simple approximation of intraday spreads using daily data. *Journal of Financial Markets*, *17*(1), 94–120. https://doi.org/10.1016/j.finmar.2013.02.004

Czerwonka, L., & Jaworski, J. (2021). Capital structure determinants of small and medium-sized enterprises: Evidence from Central and Eastern Europe. *Journal of Small Business and Enterprise Development*, *28*(2), 277–297. https://doi.org/10.1108/JSBED-09-2020-0326

Czerwonka, L., & Jaworski, J. (2022). Capital structure and its determinants in companies originating from two opposite sides of the European Union: Poland and Portugal. *Economics and Business Review*, *8*(1), 24–49. https://doi.org/10.18559/ebr.2022.1.3

Dang, T. L., Ly Ho, H., Dzung Lam, C., Thao Tran, T., & Vo, X. V. (2019). Stock liquidity and capital structure: International evidence. *Cogent Economics and Finance*, *7*, 1587804. https://doi.org/10.1080/23322039.2019.1587804

De Jong, A., Verbeek, M., & Verwijmeren, P. (2010). The impact of financing surpluses and large financing deficits on tests of the pecking order theory. *Financial Management*, *39*(2), 733–756. https://doi.org/10.1111/j.1755-053X.2010.01090.x

Dutta, S. R., Sen, S. S., & Mukherjee, T. (2022). Stock liquidity and capital structure: Evidence from NSE listed top 100 non-finance Indian firms. *Orissa Journal of Commerce*, *43*(1), 38–54. https://doi.org/10.54063/ojc.2022.v43i01.04

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies*, *15*(1), 1–33. https://doi.org/10.1093/rfs/15.1.1

Fang, V. W., Noe, T. H., & Tice, S. (2009). Stock market liquidity and firm value. *Journal of Financial Economics*, *94*, 150–169. https://doi.org/10.1016/j.jfineco.2008.08.007

Frank, M. Z., & Goyal, V. K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics*, *67*(2). https://doi.org/10.1016/S0304-405X(02)00252-0

Halov, N. (2006). *Dynamics of asymmetric information and capital structure*. https://pages.stern.nyu.edu/~nhalov/Halov.pdf

Hasan, I., Jackowicz, K., Kowalewski, O., & Kozłowski, Ł. (2017). Do local banking market structures matter for SME financing and performance? New evidence from an emerging economy. *Journal of Banking and Finance*, *79*, 142–158. https://doi.org/10.1016/j.jbankfin.2017.03.009

Ho, L., Lu, Y., & Bai, M. (2021). Liquidity and speed of leverage adjustment. *Australian Journal of Management*, *46*(1). https://doi.org/10.1177/0312896220918913

Jiang, F., Ma, Y., & Shi, B. (2017). Stock liquidity and dividend payouts. *Journal of Corporate Finance*, *42*, 295–314. https://doi.org/10.1016/j.jcorpfin.2016.12.005

Koralun-Bereźnicka, J. (2018). Firm size and debt maturity as indirect determinants of capital structure: Evidence form European panel data. *Applied Economics Letters*, *25*(18), 1319–1322. https://doi.org/10.1080/13504851.2017.1420869

Kumar, S., Sureka, R., & Colombage, S. (2020). Capital structure of SMEs: A systematic literature review and bibliometric analysis. *Management Review Quarterly*, *70*, 535–565. https://doi.org/10.1007/s11301-019-00175-4

Lipson, M. L., & Mortal, S. (2009). Liquidity and capital structure. *Journal of Financial Markets*, *12*(4), 611–644. https://doi.org/10.1016/j.finmar.2009.04.002

Liu, W. (2006). A liquidity-augmented capital asset pricing model. *Journal of Financial Economics*, *82*(3), 631–671. https://doi.org/10.1016/j.jfineco.2005.10.001

Martinez, L. B., Scherger, V., & Guercio, M. B. (2019). SMEs capital structure: Trade-off or pecking order theory: A systematic review. *Journal of Small Business and Enterprise Development*, *26*(1), 105–132. https://doi.org/10.1108/JSBED-12-2017-0387

Matuszak, P. (2020). What determines the scale of state ownership in enterprises? Some evidence from post-socialist countries. *Economics and Business Review*, *6*(4), 95–117. https://doi.org/10.18559/ebr.2020.4.6

Moritz, A., Block, J. H., & Heinz, A. (2016). Financing patterns of European SMEs—an empirical taxonomy. *Venture Capital*, *18*(2), 115–148.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221. https://doi.org/10.1016/0304-405X(84)90023-0

Nadarajah, S., Ali, S., Liu, B., & Huang, A. (2018). Stock liquidity, corporate governance and leverage: New panel evidence. *Pacific-Basin Finance Journal*, *50*, 216–234. https://doi.org/10.1016/j.pacfin.2016.11.004

Nehrebecka, N., & Dzik-Walczak, A. (2018). The dynamic model of partial adjustment of the capital structure. Meta-analysis and a case of Polish enterprises. *Zbornik Radova Ekonomskog Fakultet au Rijeci*, *36*(1), 53–79. https://doi.org/10.18045/zbefri.2018.1.55

Neville, C., & Lucey, B. M. (2022). Financing Irish high-tech SMEs: The analysis of capital structure. *International Review of Financial Analysis*, *83*, 102219. https://doi.org/10.1016/j.irfa.2022.102219

Nguyen, T., Alpert, K., & Faff, R. (2021). Relative bond-stock liquidity and capital structure choices. *Journal of Corporate Finance*, *69*, 102026. https://doi.org/10.1016/j.jcorpfin.2021.102026

Nguyen, T. D. K., & Ramachandran, N. (2006). Capital structure in small and medium-sized enterprises: The case of Vietnam. *ASEAN Economic Bulletin*, *23*(2), 192–211.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, *22*(1), 435–480.

Pham, T. P., Singh, H., & Vu, V. H. (2023). The impact of bank loan announcements on stock liquidity. *International Review of Economics and Finance*, *86*, 848–864. https://doi.org/10.1016/j.iref.2023.02.009

Qu, W., Wongchoti, U., Wu, F., & Chen, Y. (2018). Does information asymmetry lead to higher debt financing? Evidence from China during the NTS reform period. *Journal of Asian Business and Economic Studies*, *25*(1), 109–121. https://doi.org/10.1108/jabes-04-2018-0006

Rashid, A., & Mehmood, H. (2017). Liquidity and capital structure: The case of Pakistani non-financial firms. *Economics Bulletin*, *37*(2), 675–685.

Shen, C. H. (2014). Pecking order, access to public debt market, and information asymmetry. *International Review of Economics and Finance*, *29*, 291–306. https://doi.org/10.1016/j.iref.2013.06.002

Shyam-Sunder, L., & Myers, S. C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, *51*(2), 219–244. https://doi.org/10.1016/S0304-405X(98)00051-8

Stereńczak, S., & Kubiak, J. (2022). Dividend policy and stock liquidity: Lessons from Central and Eastern Europe. *Research in International Business and Finance*, *62*, 101727. https://doi.org/10.1016/j.ribaf.2022.101727

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, *71*(3), 393–410.

Wang, X., & Wei, S. (2021). Does the investment horizon of institutional investors matter for stock liquidity? *International Review of Financial Analysis*, *74*, 101648. https://doi.org/10.1016/j.irfa.2020.101648