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Firm-Level and Institutional Determinants of Corporate Capital Structure in Poland: New Evidence from the Warsaw Stock Exchange*

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Abstract

This paper discusses how well major capital structure theories incorporate firm-level and institutional factors into short-term firm financing decisions in a specific context, that of a transition economy. Using a new dataset of non-financial companies quoted on the Warsaw Stock Exchange between 2007-2015, we argue that neither the trade-off nor the pecking order theories fully explain corporate debt policies in Poland. The results of dynamic panel data modelling highlight the importance of the strength of property rights and stock market capitalisation as driving forces behind corporate financing decisions.

1. Introduction

Dealing with the problem of access to external finance and budgetary constraints for loss-reporting state-owned companies were the core objectives of market reforms in transition economies (Dewatripont and Maskin 1995). While the latter may have been solved, at least to a degree, by elimination of cronyism between banks and firms, numerous institutional reforms did little to alleviate the problem of insufficient firm long-term financing in CEE countries. Poland, with its inefficient and underdeveloped markets, remains a perfect example of this. Seen through the western standards, corporate debt and equity markets have remained underdeveloped and inefficient: according to the latest data retrieved from the renown Global Financial Development Database[1] (Cihak, Demirguc-Kunt, Feyen, Levine 2012), stock market capitalization (understood as total value of all listed shares in a stock market) and domestic credit to private sector (understood as loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment) reached in 29.3% and 53.6% of GDP respectively. Even though these figures imply steady financial development in Poland since the 1990s, they still place it far behind the most advanced EU economies, such as Germany, where the credit to the private sector reached 77.95% and the total market capitalization exceeded 47% of gross domestic product in 2015.

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[1] We acknowledge that this paper is focused on the Polish economy, therefore the analytics of the National Bank of Poland would be most suitable, however, for the sake of comparability between Poland and other economies (e.g. Germany) mentioned in the introductory part of the text we resort to international databases.

The data also indicate that the development of financial markets in Poland occurred at the same time as a steady withdrawal of firms from external financing: while in 2009, 48.9% of all companies registered in Poland did not use external financing at all, in 2014 this figure rose to 64.3%. The withdrawal from external financing over the past decade seems to have been induced by firms themselves, as only 10.1% of loan applications made in 2014 were rejected. Moreover, small companies, whose access to external financing may be more limited, also turned to internal financing: in 2009 over 47% of such firms appeared to have a formal line of credit or a loan incurred at a financial institution, while in 2013, only approximately 26%. In the same year, only 9% of working capital of all firms surveyed, their size notwithstanding, was financed by bank-originated loans. Indeed, the share of firms which financed their investments from bank loans decreased at from 40.7% in 2009 to 30.6% in 2014. Polish businesses also reduced their use of open credit lines, from 50.1% in 2009 to 31.6% five years later.

Paradoxically, the data also suggest that access to external financing has become much easier for Polish firms, as, in 2009, 22% firms judged it as "difficult", while in 2014, it was only 15.6% of the surveyed entities for whom it appeared problematic. A case can be made that perhaps it was either the financial crisis that reduced the number of firms operating in the market or companies, which already had significant debt burdens, decided to deleverage due to uneasy business environment and uncertain future.[2] In the context of Poland, the so-called discouraged borrower problem and zero-leverage puzzle are discussed at length by Sawicka and Tymoczko (2014), whose evidence implied firstly that almost one in five Polish companies operated without any external financing, and secondly, that these firms usually enjoyed greater profitability and liquidity. While the limited credit use was often ascribed to short credit history (suggesting low creditworthiness) or inability to access finance via formal channels, the authors argued that the phenomenon was not an idiosyncrasy of Poland (or any transition economy for the matter) but a world-wide phenomenon.

Despite dynamic and sometimes contradictory evidence in transition economies, theoretical and empirical research on corporate capital structure have long focused on developed economies (e.g. Booth, Aivazian, Demirguc-Kunt, and Maksimovic 2001; Jensen and Meckling, 1976; Modigliani and Miller, 1963; Myers, 1977; Rajan and Zingales, 1995; Wald, 1999). Although there has been a trend towards emerging economies, these studies are still limited by the paucity of data, both at the firm- and country-level. Recently, more papers on the contemporary situation in CEE countries have appeared, but few have discussed the Polish economy in detail, with the few studies available focusing on immediately after the transition process or generalised debt ratios (Nivorozkhin 2004; Delcoure 2007; Kędzior 2012; Jõeveer 2013).

Given that much of the available literature on the subject at hand is somewhat outdated, this paper forms a contribution by examining the interplay between institutional factors and firm financing decisions. We argue that the empirical studies that deal with the subject, focused as they are on the early transition period, are less

[2] Political factors may have played a role, but they have been less important given the instability of the Polish political environment. However, Hasan et al. (2017) argued that the value of being politically-connected rose during the recent financial crisis, which may also have been the case in Poland.

relevant given that the institutional challenges in Poland were overwhelmed by the shock of transition. The progress that followed during the last two decades was more evolutionary than revolutionary in character, making it less desirable as a natural experiment but of more interest for "normal" firm functioning. Moreover, capturing institutional changes has remained problematic across economics, as the availability of internationally-comparable measures is still somewhat insufficient, especially in the case of economies such as Poland, for which long time-series data is often missing.

Using a new dataset encompassing firm-level, institutional, and macroeconomic variables in the period 2007-2015, this study assesses whether major modern capital structure theories can be applied to public companies in Poland, and – if so – then how macroeconomic and institutional variables shape these firms' debt policies across a number of proxies for debt. This paper's comparative advantage over the existing studies is twofold: firstly, it provides a localised analysis of the current situation of Polish listed companies; and, secondly it offers an in-depth look at disaggregated short-term debt categorised according to the origin of its source. Moreover, we resort to various measures of institutional progress (including both objective continuous measures, such as contract-intensive money, and discrete subjective indicators), contributing to emergent field of quantitative institutional economics. To the best of our knowledge, such an approach has never been taken in the context of firm financing policies in modern-day Poland, so our research makes a novel empirical contribution both to the institutional and financial literature on the subject and policymaking decisions regarding modernization of institutional and company growth.

The remainder of this paper is structured as follows: the following section provides a brief overview of relevant literature, Section 2 presents our data and econometric model. Section 3 offers preliminary insights regarding Poland's institutional development and its impact in the period under consideration. Section 4 presents the results of the analytics, while Section 5 provides brief conclusions and points the way to further research.

2. Literature Review

In this study we focus on the two most popular modern capital structure theories, the static trade-off theory and the hierarchy of financing sources theory. Seen from a current perspective, the word "modern" in the phrase "modern capital structure theories" seems misplaced, especially if we consider the fact that the majority of the most heavily-cited papers on the subject were produced in the last century. Nevertheless, we resort to these seminal papers as a starting point of our analysis before turning to more recent evidence.

The static trade-off theory argues that firm financing structure is neutral vis-à-vis firm value, with its predictions hinging on strong assumptions of market efficiency and non-existent taxation and agency costs. However, subsequent research has proven how these transaction costs do enter into firm decisions, with debt policy decisions associated with taxation and financial distress costs, agency problems, firm-specific and financial market features (Modigliani and Miller 1963; Jensen and Meckling 1976; Myers 1977).

The hierarchy of financing sources, however, implies that debt be the last-resort source of financing, ignoring issues with equity or bank financing, including negative share price changes, limited dividend pay-outs to ensure higher cash flows, and rationed access to loans to mitigate the cost of capital (Myers and Majluf 1984). Despite these shortcomings, the hierarchy of financing theory is supported by a considerable body of empirical research such as Booth et al. (2001), Delcoure (2007), Kędzior (2012), and Joeveer (2013). Joeveer (2013), for example, explains the negative relationship between corporate debt and profits via information opacity between internal and external stakeholders, suggesting that debt is indeed a last-chance source of financing.

These theories are often concentrate on firm-specific issues, but recent research also takes into account broader macroeconomic and institutional facets of an economy to describe firm financing decisions. These two aspects of the environment the firm faces, both internal and external, are examined below.

2.1 Firm-Level Characteristics

While modern capital structure theories present contrasting, if not directly conflicting, approaches to the influence of firm-level characteristics on corporate leverage, at times the two theories appear to complement each other. As Myers (2003) noted, different capital structure theories applied to firms depending on their circumstances, based on several firm-level factors (as shown in Harris and Raviv 1991). In particular, firm size, collateral, liquidity, growth opportunities, tax- and non-tax debt shields, and profitability all may alter the capital structure theory which is most appropriate for understanding a specific firm's decisions. This reality appears to be exacerbated in the transition context, where firm-specific attributes take on added importance in an environment in flux.

Firm size counts as a good example of this complementarity, as it may allow better access to external financing thanks to reduced information asymmetry enjoyed by large companies (Myers 1984); larger firms would then also appear to bear financial distress costs more easily. In transition economies, some companies are formerly state-owned companies, and as such, their chances of acquiring government guarantees and credit providers treating them favourably could be increased. Firm size could also approximate firm maturity, as such also implying a lesser risk of a firm defaulting on its debts.

These theoretical musings are underpinned by a considerable body of empirical evidence. For example, Delcoure (2007) argued that while the long-term leverage diminished with firm size, short and total debt appeared positively impacted by the size of a firm's total assets. Her research thus provided proof that elevated informational opacity and institutional weaknesses reflected both in underdeveloped corporate bond markets and ineffective legal regulations. A conclusion naturally followed that the weak institutional setting during the early transition period created elevated risk levels, forcing companies to favour short-term sources of financing.

Additionally, firm profitability is often mentioned in the presence of tax shields, whose attractiveness depends directly on the level of a firm's taxable income. In the transition context, such an analysis should be extended by inclusion of two important facts: firstly, due to institutions being in the state of flux, financial distress costs are

more acute. These (often expected) costs are usually included by the creditors in the process of external financing, making it costlier. Secondly, profits are more volatile in such an environment, thus making tax shields less useful. Empirical research has yielded mixed results in this context: contrary to theory, Delcoure (2007) showed a positive impact of tax-related shields in the early transition periods while Bauer (2004) and Kędzior (2012) failed to provide conclusive and robust evidence either way. Bauer (2004), Byoun (2008), and later Białek-Jaworska and Nehrebecka (2014) also made a case that firms achieve tax-shield-like benefits via other payments, such as depreciation and interest payments related to operational leasing procedures, which may actually limit debt-related tax benefits and discourage debt itself.

Firm liquidity may be considered as contradiction in itself: on the one hand, it is desirable as a firm's ability to service short-term payments increases and limits the risk of defaulting with more cash on hand. On the other hand, liquidity reserves serve as an internal source of financing, limiting its need for debt. As regards transition and emerging economies, Myers and Rajan (1998)'s early evidence, in line with the logic behind the hierarchy of financing sources, implied that trade credit rationing became more likely when liquidity-related agency costs ran high. Moreover, overly liquid firms may be perceived as mismanaged in regard to long-term investment decisions.

In addition to building up liquidity reserves, firms also mitigate their credit risk with tangible assets (at least in advanced economies). This obvious correlation becomes somewhat less obvious in the transition context, where we need to consider inefficient institutional frameworks to understand why contract enforcement is weak, if it exists at all. In such an environment, Nivorozkhin (2005) argued that the positive influence of firm tangible assets on debt may well become neutral, if not downright negative. He, and later Delcoure (2007), both made a case that if a default occurred, the costs related to the recovery of the collateral surpassed its market value. De Haas and Peters (2006)'s and Joeveer (2013)'s evidence also implied that substandard collateral was often used for financing, especially in the case of trade credit and long-standing relationships with suppliers. Such results also suggested that trade credit was a more accessible source of short-term financing.

Research on profits and firm growth in advanced economies usually recognise the opportunities related to future (or present) international presence. This particular facet of firm growth, which at the same time helps approximate the level of revenue sources' diversification is often found missing in the transition context. We assume that the greater the number of markets a company provides its goods to, the lower its probability of revenue contraction and better chance for profits (via diversification). It logically follows that such a company would enjoy greater creditworthiness and mitigated risk of default and is able to both raise equity and incur bank-originated loans on more favourable terms.

2.2 Institutional and Macroeconomic Factors

We have already hinted at the fact that certain irregularities observed in the case of firm-level characteristics may often be explained by the differing impact of institutional and macroeconomic factors. Issues pertaining to legal regime, property rights development, and political stability have been researched thoroughly in the last few decades, mainly in cross-country comparative analyses. For example, La Porta et

al (1997, 1999)'s seminal papers suggested that weaker investor protection mechanisms tended to appear in countries with smaller financial markets. Pistor et al. (2000) and Buchanan and English (2007) highlighted the importance of the quality of theoretical frameworks in the financial development; moreover, Sarkar (2010)'s results showcased the superiority of common over civil law systems, as the former appeared less prone to become influenced by the legislature and so better guaranteed investors' rights.

The extant literature also acknowledges that even the best institutional regime requires a healthy and robust financial market to translate facilitation into economic growth (over both short and longer time horizons). Such sound development is only possible when financial markets are deep and liquid, so that the effects of informational opacity may be made less severe and costs of raising long-term external financing are lower (Beck and Levine 2008; Gupta and Yuan 2009, Hasan Wachtel and Zhou 2009, Hartwell 2014). Nonetheless, Hartwell (2014)'s evidence may serve as a warning against stock market domination, as it may actually either limit or reverse institutional reforms and weaken property rights. Additionally, although a competitive banking industry has been shown to limit borrowing costs (Demirgüç-Kunt, Maksimovic 1999), it needs to be noted that stock and banking markets, according to Yartley (2010)'s evidence, complement each other, as banks provide financing up to a certain point in economic development beyond which equity takes over.

Equity and banking markets, as well as institutional development, all require a modicum of macroeconomic stability to contribute to economic growth. This stability is usually the domain of the government or a central bank and is directly related to fiscal and monetary policies. Macroeconomic mismanagement (resulting in high and volatile inflation) has only one possible conclusion: elevated uncertainty during lengthy periods. Such an environment discourages not only borrowing but any kind of business activity short of speculation. A case can be made though that higher expected inflation may actually encourage greater debt, as borrowing terms become more favourable. On the other hand, stable and low inflation (as that experience by Poland during her transition) can be disregarded by firms in their financing decisions (Kędzior 2012).

All these factors we have so far discussed contribute to economic growth, but they do not capture the driving force behind firm performance. In this light, the hierarchy of financing suggests that more prosperous times may provide more resources, so that internal financing becomes more practicable. However, dynamic economic growth boosts investment opportunities and often leads to higher debts, incurred when money was cheap. In other words, even in relation to institutional and macroeconomic theories, traditional theories of firm financing offer no consensus. Establishing which operated better in the context of Poland is the goal of the rest of the paper.

3. Model and Data

To test the effectiveness of the traditional capital structure theories, we have compiled a new unbalanced annual dataset encompassing firm-level, institutional, and macroeconomic variables for 259 Polish non-financial entities from 2007 to 2015 (data obtained from NOTORIA SERWIS, a provider of firm-level financial data for listed

companies). The sample is diversified in terms of firm-specific characteristics, with the core criterion for inclusion of a firm in the sample being its continuous presence on the Warsaw Stock Exchange (WSE) from 2007 to 2015. We consciously decided to avoid differentiation in terms of firm size, growth, or profitability at this stage so that the firm-level data could present the fullest picture of Polish non-financial business sector.

Our database is supplemented with macroeconomic and institutional indicators obtained from the World Bank, the European Central Bank, and Stooq databases (see Table A1 in the Appendix for a full description of variables and sources). We focus on the total and short-term leverage ratios, the latter of which we further decompose into bank-originated and trade loans. Since long-term bank debt constituted on average 7% of total assets, we decided to focus on the dominant form of external financing. The corporate leverage is shaped by limited and costly access to long-term bank financing, therefore trade credit of both maturities often replaces the unavailable bank loans. To the best of our knowledge such approach has been absent in recent papers regarding Poland. Detailed decomposition of corporate debt in the observed period allows for a much more in-depth analysis and provides a novel contribution to the existing literature.

Given the pervasive endogeneity of variables in relation to each other, we employ a dynamic panel model controlling for firm heterogeneity, collinearity, and endogeneity. We estimate two versions of the model using a 2-step system general method of moments (SYS-GMM) estimator[3]. In the first model, we use all variables contemporaneously; however, given that our hypothesis is that firm capital structure is a function of firm-specific expectations about investments and market opportunities in future periods, our second model lags all right-hand variables to capture this effect. To capture unobserved time-related effects, we also experimentally introduce a time dummy and hope that this approach may also help alleviate possible endogeneity issues.

As the SYS-GMM estimator requires that variables be mean stationary, we performed appropriate tests on our data (see Table A3 in the Appendix for the unit root tests). As can be seen, the null hypothesis of presence of a unit root has been rejected for all the variables tested. Additionally, cross-sectional dependence, stemming from the fact that firms operate in a common environment, might occur within this dataset. Theoretically, cross-sectional dependence may be identified by application of the LM statistic by Breusch and Pagan (1980), but Pesaran (2004) and Pesaran, Ullah, and Yamagata (2008) all make a case the LM statistic is likely to have very poor size properties when N is relatively large, which is the case with our dataset. Ideally, to solve the issue of dependence, one would need to resort to spatial modelling or factor structural approach (e.g. Driscoll and Kraay 1998, which has the added problem of requiring a time series of $T>50$). However, Sarafidis and Wansbeek (2012) provide a sweeping overview of the relevant literature, concluding that, in the case of spatial dependence, standard panel data estimators can still provide robust inferences on the

[3] We also obtained preliminary results using a difference-GMM approach (DIF-GMM); however, given the scope of the paper and limited efficiency of the DIF-GMM estimator (the relevant literature, e.g. Baltagi 2013 recommends a less restrictive estimator), we have concentrated on using a system-GMM approach instead. Difference-GMM results are available upon request.

parameters. Thus, while we acknowledge the probability of cross-sectional dependence with our data, we believe that the numerous robustness checks serve as a preliminary corroboration of the stability of the obtained results.

In addition to ensuring stationarity and mitigating cross-sectional dependence, certain other conditions need to be met to guarantee consistency of the results, namely no second-order correlation in the first-differenced residuals and no correlation between the chosen instruments and the residuals (Arellano, Bover 1995, Blundell, Bond 1998). Roodman (2009a, 2009b) warns against instrument proliferation, which may prevent elimination of endogeneity. However, the very issue of how many instruments exactly should be used is debatable. We discuss the quality of the obtained models in Sections 4 and 5, but we should expect to observe some differences in the results due to variations in econometric techniques (Doornik, Hendry 2013).

Our central equation is:

$$Y_{i,t} = \alpha + \beta * Y_{i,(t-1)} + \beta_F * X_{i,t}^F + \beta_I * X_t^I + crisis_t + \varepsilon_{i,t}, \quad (1)$$

where $Y_{i,(t-1)}$ is the one-period lagged appropriate leverage ratio; β_F stands for a vector of firm-level features described by $X_{i,t}^F$; β_I is a vector of institutional variables described by X_t^I and $\varepsilon_{i,t}$ is an error term incorporating firm-specific effects. All these variables, along with the ones included in the robustness checks, are described in Table A1 (see Appendix). Table A2 in the Appendix provides summary statistics of our variables. To minimize the presence of outliers we transform the data by setting all the outlying observations to the 1st and 99th percentiles. We also include a $crisis_t$ dummy to control for the impact of the Great Financial Crisis; in the literature, this is usually taken to encompass between 2007 and 2010, but, following the approach of Jackowicz et al. (2016), we set the crisis period in Poland as 2008 to 2011.

In addition to dynamic panel models, using lagged firm-level variables, we estimate two cross-sectional models using Ordinary Least Squares with standard errors consistent in the presence of heteroskedasticity (OLS SE) for the years 2008 and 2015. In doing so we realise that we lose the country-specific macroeconomic and institutional effects. These, however, we may gauge by observing if, and then how, the impact of firm-level variables changes throughout the period. The observed shifts may then be ascribed to changes in external conditions.

4. Institutional Setting

The main issue regarding the choice of the firm's debt ratio is the use of market versus book data. Since the former are more reliable approximations of future cash flows and risk, they should suit our analysis on corporate capital structure policy. Indeed, the use of market value is an optimal solution for advanced economies, where there are no issues in obtaining high-quality firm-level financial data. However, in transition and post-transition economies, the use of market value is more difficult, due to data scarcity, thus we choose to use book data instead. While book value may present its own set of problems, Polish book value has the advantage that all firms listed on the WSE need to conform to certain universal reporting standards. Therefore, we are fairly confident that our use of book value does approximate the "true" value of the debt.

Table A4 in the Appendix provides a snapshot of the annual averages of debt ratios in Poland, as well as information on the institutional data. The observed valued of debt ratios are relatively low throughout the whole period, suggesting firms faced constraints to external financing, especially in regard to institutional financial intermediaries. In fact, all of the financial system development indicators shown support this supposition. In particular, banking sector development in Poland lagged far behind advanced economies over the last years of the analysis and, given relatively low level of domestic credit (DCRED), it would be unsurprising if the impact of this variable were neutral (or even negative) in terms of shaping corporate debt policies (see Sawicka, Tymoczko 2014). Market capitalisation of domestic firms relative to Poland's GDP (MCAP) was low throughout the whole period, with a dramatic drop in the mean value of total assets in 2008 (a likely lagged result of the financial meltdown observed globally). The recorded values imply a rapid stock market recovery, whose reflection we hope to observe on corporate capital structure.[4]

The WDI strength of legal rights indicator for Poland (SoLR) did not diverge substantially from other CEE economies (Doing Business Reports 2007-2015) and implied medium debt contract-enforceability combined with limited access to credit. Given the empirical results provided by Nivorozhkin (2004; 2005), we hypothesize that the impact of firm collateral may be neutral. We also analyse two alternative continuous measures of institutional efficacy: contract-intensive money (CIM) and WGI Rule of Law (RoL). All three followed a similar path. In particular, the WDI indicator recorded a discrete jump between 2009 and 2010 and stabilised thereafter; CIM and RoL rose continuously throughout the period and reached their respective maxima of 88.14% and 82% in 2014. Shortening of the period of enforcing contracts from 980 to 830 to 685 days documented advancement in institutional framework firstly by implementation of stricter rules of procedure and then by amendment of the civil procedure code and appointment of more judges to commercial courts. As a result, Poland moved closer to the OECD high-income frontier of 553 days. These legislative manoeuvres regarding property rights, insolvency resolution, and contract enforcement seem to be getting better and closer to EU standards. On the other hand, the lagging development of the financial sector places the economy far behind the standards set by advanced economies.

5. Results

The quality of each model specification is to our satisfaction: the independent variables are jointly statistically significant at the 1% level and we observed no second-order correlation; the Sargan test results suggest that the application of lagged variables as instruments was a correct choice. Since the selection and viability of instruments is crucial, and Roodman (2009b) warns about the over-proliferation of instruments, we limited the number of instruments so that they matched the number of variables. All models were estimated using finite sample corrected standard errors (Windmeijer 2005) and are presented in Table 1 below:

[4] An additional plausible explanation for these low debt ratios is also that Polish companies tend to replace bank loans with trade credit from their suppliers and contractors; there is evidence (Petersen, Rajan 1997, Nivorozkhin 2004) that this has in fact been the case in Poland in the past.

Table 1 Baseline Estimation Results

Explanatory variables/Y=	*Total liabilities*	*Current liabilities*	*Current bank liabilities*	*Current trade liabilities*
	1	*2*	*3*	*4*
Total liabilities (t-1)	0.89751 (0.12050)***	-	-	-
Current liabilities (t-1)	-	0.80524 (0.14880)***	-	-
Current trade liabilities (t-1)	-	-	-	0.143415 (0.11060)
Current bank liabilities (t-1)	-	-	0.69041 (0.15290)***	-
Size	-0.04473 (0.02171)**	-0.04453 (0.02407)*	-0.00175 (0.00988)	-0.04101 (0.02187)*
Collateral	0.24486 (0.16660)	0.14864 (0.14830)	0.01856 (0.03964)	0.20575 (0.21120)
Profitability	-0.00049 (0.00427)	-0.00282 (0.004588)	-0.00321 (0.00278)	0.00129 (0.00092)
Liquidity	0.00001 (0.00001)	-0.00001 (0.00002)	-0.000003 (0.000004)	-0.00001 (0.00001)
Growth	0.00005 (0.00002)**	0.00008 (0.00002)***	0.00001 (0.00001)	0.00002 (0.00002)
Internationalisation	-0.17105 (0.07464)**	-0.15154 (0.08719)*	-0.07558 (0.03764)**	-0.07079 (0.06941)
Tax shield	-0.00012 (0.00002)***	-0.00010 (0.00003)***	-0.00006 (0.00001)***	-0.00004 (0.00001)***
Non-tax debt shield	0.06118 (0.00611)***	0.05373 (0.00625)***	-0.00036 (0.00515)	0.03309 (0.00995)***
WIBOR 3M	-0.18579 (0.45980)	-0.20419 (0.50280)	-0.06867 (0.30780)	-0.08402 (0.41350)
Strength of legal rights	0.04704 (0.01140)***	0.04449 (0.01086)***	0.01184 (0.00517)***	0.01395 (0.00856)*
Market capitalisation	-0.00176 (0.00057)***	-0.00155 (0.00053)***	-0.00041 (0.00027)	-0.00092 (0.00026)***
Domestic credit	-0.09735 (0.1725)	-0.10814 (0.17430)	-0.04966 (0.06591)	0.06742 (0.12710)
GDP growth	0.57024 (0.4769)	0.57113 (0.51890)	-0.14488 (0.17220)	0.32065 (0.43200)

Crisis	-0.02477 (0.01029)**	-0.01891 (0.01133)*	-0.00496 (0.00429)	0.03384 (0.01113)***
Constant	0.26721 (0.24080)	0.31149 (0.29330)	-0.00259 (0.11790)	0.44792 (0.22780)**
Number of observations	1792	1792	1792	1792
Number of variables	16	16	16	16
AR (1)	-3.938 ***	-3.499 ***	-3.473 ***	-1.571
AR (2)	0.5118	0.5058	-0.7176	0.2051
Wald – joint	1417. ***	1246. ***	964.2 ***	234.0 ***
Wald - dummy	1.231	1.128	0.0004808	3.868 **
Sargan test	182.6	183.5	180.9	185.6

Notes: 1 authors' own calculations; ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively. Where possible, the results have been rounded up to the fifth decimal place.

Firstly, we observe a somewhat self-evident correlation between current and lagged firm debt ratios. Contrary to our expectations, the firm current debt appears to be negatively correlated with firm size. We conjecture, based on this finding, that preferential treatment of large companies of a certain "social status" (leftover from the pre-transition period) is limited. Alternatively, this can be taken as evidence that as firms grow and their opacity decreases, companies may substitute short-term external financing with internal funding or turn to equity. At this stage, we observe a neutral impact of collateral, which lends viability to the results from Nivorozkhin (2004) on the neutral or negative correlation between tangible assets and leverage.

It further appears that firms veer towards other forms of financing as their revenues increase – though we have scant proof that they switch to bank financing, we conjecture that greater revenues translate into greater creditworthiness. We also observe a miniature shift in the corporate debt structure– with every 1% of its sales growth, the total current debts grow by a minute 0.00008%. The obtained results also suggest a staggering difference in the strength with which the firm's degree of openness correlates with the total debt and total short-term debt: while a 1% change in the firm's international presence may bring about a 0.07% decrease in its current bank liabilities, it also appears to precipitate 0.17% and 0.15% drops in its total and total current debt levels respectively. While the disparity in the sheer force of impact remains puzzling, the general result aligns with the logic behind the hierarchy of financing sources. It is probable that such firms either depend on retained profits as source of financing or procure funds from providers beyond the domestic credit market more often than companies which operate nationally.

Surprisingly, the current results also seem to confirm the somewhat doubtful attractiveness of tax shields in the transition business climate. In this light, we could make a case that although the recent financial crisis may not have hit Poland's economy with full force, it did destabilise Polish listed firms' profits and predicted more uncertainty in the following years – statistics retrieved from Notoria Serwis imply that profits, measured as ROA dropped from the 12% on average in 2007 to 0.36% in 2010 and wavered between 3% and 2% in the last two years of our timeframe. Moreover, it appears that corporate ROE performed even less spectacularly – in 2007 it reached an average of only -49%, skyrocketing to 27% in 2009 and evening out at around 9% afterwards.

If considered as a measure of how securable a company's assets are (Bradley et al. 1984), growth in a depreciation shield by 1% appears to boost a firm's debt ratios by a maximum of 0.06% (depending on which debt ratio is being considered). This also points, if somewhat indirectly, to the quality (and availability) of assets used to collateralise debts.

The inverse relationship between the equity market development and the firm's total and short-term leverage ratios appears to also confirm that, even in the transition context, deeper stock markets encourage companies to issue their own stocks in place of incurring new long-term debts (provided that equity markets are taken as the highest form of financial sector development (Goldsmith 1969). Additionally, the development and size of the banking sector proved insignificant, a point highlighted earlier by Jõeveer (2013). Given that the Polish banking sector can be described as not only inaccessible but also reliant on relatively uncomplicated activities, the outcome of the current analysis is unsurprising. As a final note, at least as far as this part of the

analysis is concerned, it seems that while the crisis may have had a positive impact on trade credit, making it a go-to means of financing, the business cycle's impact appears have been already captured by growth opportunities and market capitalization. Even though Poland has made substantial institutional progress as part of its transition, the observed neutral effects of collateral and the growing number of bankruptcies indicate that changes in legal reforms did not influence firms' policies significantly.

Estimation using lagged variables

As a preliminary robustness check we lagged all right-hand variables to better avoid possible endogeneity issues. We discuss the obtained results, presented in detail in Table 2 below, by comparing them with the baseline estimation outcomes.

Under this specification, it appears that firm size limits its need for total debt, as its impact is greater than the initial result: a 1% change in firm size brings about a drop of 1.58% in corporate total debt. However, larger companies appear to have more use for trade credit, even though the changes caused by a 1% growth of firm total assets results in a very slight upward change in trade credit (a minute +0.0046%). Previously, we observed a neutral impact of collateral, which appeared to underpin the hypothesis regarding the supposed institutional weakness regarding contract enforcement. Currently, tangibility seems to play an important and positive role in shaping firm financing decisions, at least as far as total and current banking liabilities are concerned. Interestingly, we note that its direction and magnitude of impact change, when we consider firm trade credit, in which case a 1% growth in firm tangibility results in a slight downward shift of trade credit (of about 0.0258%). These results, taken together with the initial model specification may be grounds for further in-depth analysis of the role and quality of firm collateral in corporate financing decisions. While not pointing exactly to the weakness of contract enforcement procedures, the current outcome does not corroborate fully Poland's institutional progress (at least not to the point it is theoretically declared – see Section 3 for details).

Firm profits recorded in the previous year turn out to boost its credit demand: while the general liabilities ratio appears to be the most sensitive to profitability changes (as it grows by 0.195% with every one percent change in firm profitability), shifts in short-term non-bank financing (as evidenced by trade credit) go up only slightly (by 0.045%). We note one more significant difference, as far as firm-specific variables are concerned, namely a negative impact of firm depreciation shield on trade credit – it's influence may be classified as slight, with only a 0.06% drop in trade credit with every 1% of growth in depreciation shield benefits but we conjecture it enough to render this particular result inconclusive and requiring more further in-depth analysis.

Moving on to firm-external factors, we begin by discussing the influence of institutional strengths of the Polish economy, which, in this model specification appears as relatively strong (a +2.27% growth in firm liabilities for every one percent change in contract enforcement and strength of legal rights), albeit limited only to firm total liabilities. Next, market capitalization seems to mitigate firm demand for total current liabilities (already recorded in the previous model specification), but it also seems to boost firm demand for short-term non-bank financing, however slightly. As a final comment, based on the results we conjecture that the lagged crisis dummy generally mitigated firm desire for trade credit – the outcome is not entirely unexpected

given the fact that the previous specification (using current variables) highlighted the negative impact of the past occurrences related to the financial crisis in firm financing decisions.

Estimation using OLS SE

We now turn to the OLS SE estimation procedures which we performed for the years 2008 and 2015 using lagged firm-level variables. The results of this exercise are presented in Tables 3 and 4 below. It appears that firm size correlated positively with total and bank liabilities in 2008 but in 2015 it started to dampen firm demand for external financing (at least as far as total and current liabilities were concerned). On the other hand, in 2015 larger companies appeared to have greater use for trade credit. It is worth noting that firm collateral mitigated corporate demand for current liabilities and remained neutral towards other liabilities ratios in 2008, however, we captured its negative impact on trade credit in 2015. The shift from natural to negative may reflect deterioration in "realised" contract enforcement and weakening of institutional structures. The results for firm profitability turned out less controversial, as throughout 2008 more profitable firms found more use for total, current and trade liabilities, limiting their use of short-term bank financing. This tendency reappeared in 2015, albeit in a limited form: more profitable companies incurred higher total and current debts with the exception of trade credit, which they seemed to avoid. It follows that more profitable companies might have been able to obtain cheaper external financing as they appeared more as more reliable. On the other hand, it seems that in 2008 firm liquidity directly mitigated corporate demand for external financing, an effect which appeared to wane as time progressed as in 2015 only trade credit appeared limited by firm available liquid resources. Nonetheless, such an outcome steers us towards the hierarchy of financing sources theory, contrary to the majority of results obtained for firm profitability. As a final comment at this stage, a positive correlation between firm non-tax debt shield and total, current, and short-term bank liabilities may serve as a tentative confirmation of the previously obtained results and of the quality of collateral used in debt contracts.

Table 2 Baseline Results – Lagged Variables, SYS-GMM Estimator

	Coefficients (standard errors)			
Explanatory variables/Y=	*Total liabilities*	*Current liabilities*	*Current bank liabilities*	*Current trade liabilities*
	1	*2*	*3*	*4*
Total liabilities (-1)	0.77524 (1.14400)	-	-	-
Current liabilities (-1)	-	0.01310 (0.68140)	-	-
Current bank liabilities (-1)	-	-	3.24520 (4.15800)	-
Current trade liabilities (-1)	-	-	-	0.68312 (0.03752)***
Size(-1)	-1.58933 (0.86840)*	0.43093 (1.55000)	-0.41160 (0.63530)	0.00467 (0.00210)**
Collateral(-1)	2.47294 (1.10900)**	2.41804 (5.21800)	7.61988 (4.12000)*	-0.02587 (0.00820)***
Profitability (-1)	0.19516 (0.11450)*	-0.01553 (0.37200)	0.04597 (0.08010)	0.00454 (0.00130)***
Liquidity (-1)	0.00112 (0.00140)	-0.00078 (0.00140)	-0.00004 (0.00050)	0.00001 0.00001
Growth (-1)	0.000601 (0.0029)	0.00049 (0.00130)	-0.00067 (0.00140)	-0.00003 0.00005
Internationalisation(-1)	1.438370 (1.15000)	1.06453 (4.72400)	-2.94756 (2.51900)	-0.02433 (0.00690)
Tax shield(-1)	-0.00164 (0.00100)	-0.00191 (0.00260)	0.00036 (0.00270)	-0.00003 (0.00031)
Non-tax debt shield(-1)	-0.74599 (1.75200)	0.27304 (1.08000)	-0.32796 (1.15800)	-0.06999 (0.02960)**
WIBOR 3M(-1)	-0.08725 (0.12670)	-3.84435 (2.35900)	-0.52609 (1.12100)	-0.02435 (0.02670)
Strength of legal rights(-1)	2.27145 (1.37400)*	0.72536 (1.59200)	0.65343 (0.78040)	-0.00519 (0.00360)
Market capitalisation(-1)	0.16468 (0.14090)	-3.67943 (2.11200)*	-0.31403 (0.44210)	0.01234 (0.00550)**
Domestic credit (-1)	0.67350 (0.54720)	-3.44217 (6.84500)	-1.31430 (1.78400)	0.07454 (0.11680)

GDP growth (-1)	-0.02665 (0.04230)	-2.05976 (4.39900)	-4.90929 (3.14000)	-0.01162 (0.02310)
Crisis(-1)	-0.10905 (0.37710)	-7.6402 (5.86800)	-1.20137 (0.99840)	-0.01624 (0.00740)**
Constant	1.22441 (1.74100)	0.48229 (0.82380)	0.43514 (0.56920)	0.03155 (0.02603)
Number of observations	1783	1783	1783	1783
Number of variables	15	15	15	15
AR (1)	-1.420	-1.370	-1.000	-1.242*
AR (2)	-1.420	-1.359	-1.003	-2.148
Wald – joint	0.000015***	26.34**	87.17***	0.000301***
Wald – dummy	0.000017***	3046.***	1425.***	0.000001***
Wald – time	106.7***	7.044	5.236	25.27***
Sargan test	2072	32.32	50.32	173.5

Notes: 2 authors' own calculations; ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively. Where possible, the results have been rounded up to the fifth decimal place.

Table 3 Additional Estimations Using OLS SE for the Year 2008

Explanatory variables/Y=	*Total liabilities*	*Current liabilities*	*Current bank liabilities*	*Current trade liabilities*
	1	*2*	*3*	*4*
Size	0.02413 (0.00799)***	0.01122 (0.00715)	0.01646 (0.00343)***	-0.00454 (0.00666)
Collateral	0.00026 (0.06308)	-0.09362 (0.05641)*	-0.02745 (0.02707)	-0.04311 (0.05255)
Profitability	0.12080 (0.01780)***	0.11697 (0.01592)***	-0.01281 (0.00764)*	0.13032 (0.01483)***
Liquidity	-0.00495 (0.00093)***	-0.00420 (0.00083)***	-0.00075 (0.00039)**	-0.00275 (0.00077)***
Growth	-0.00003 (0.00019)	0.00001 (0.00017)***	0.00006 0.00008	-0.00001 (0.00016)
Internationalisation	-0.06375 (0.06822)	-0.04215 (0.06100)	0.05839 (0.02927)**	-0.10916 (0.05683)*
Tax shield	0.00036 (0.00075)	0.000125 (0.00067)	-0.00047 (0.00032)	0.00056 (0.00063)
Non-tax debt shield	-0.34707 (0.34880)	-0.4880 (0.31190)	0.24438 (0.14970)	-0.42917 (0.29050)
Constant	0.13407 (0.09768)	0.21751 (0.08735)**	-0.14671 (0.04192)***	0.28425 (0.08137)***
Number of observations	256	256	256	256
Number of variables	9	9	9	9
R^2	0.25899	0.26079	0.16134	0.27981
Adj.R^2	0.23499	0.23685	0.13417	0.25648
F(8,247) =	10.79 ***	10.89 ***	5.94 ***	12***

Notes: 3 authors' own calculations; ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively. Where possible, the results have been rounded up to the fifth decimal place.

Table 4 Additional Estimation Using OLS SE for the Year 2015

Explanatory variables/Y=	*Total liabilities*	*Current liabilities*	*Current bank liabilities*	*Current trade liabilities*
	1	*2*	*3*	*4*
Size	-20.3091 (3.15700)***	-15.9283 (2.47600)***	-0.116084 (0.17430)	0.0176131 (0.00525)***
Collateral	-26.8322 (27.62000)	-22.2447 (21.66000)	-3.43171 (1.52500)	-0.0986837 (0.04592)**
Profitability	8.34054 (2.92100)***	6.52358 (2.29100)***	0.0106466 (0.16130)	-0.0101903 (0.00486)**
Liquidity	-0.57072 (0.59440)	-0.450235 (0.46620)	-0.0117808 (0.03282)	-0.00217466 (0.00099)**
Growth	-2.39297 (3.40100)	-1.82901 (2.66700)	0.146799 (0.18780)	-0.00534453 (0.00566)
Internationalisation	16.9073 (23.99000)	13.4810 (18.81000)	0.665142 (1.32500)	-0.0450722 (0.03989)
Tax shield	-0.109691 (0.75510)	-0.0850387 (0.59220)	0.00212730 (0.04169)	0.000149895 (0.00126)
Non-tax debt shield	124.510 (8.21800)***	128.089 (6.44500)***	90.5457 (0.45370)***	-0.00367144 (0.01366)
Constant	258.743 (39.5300)***	201.689 (31.00000)***	-2.02810 (2.18300)	-0.0678525 (0.06573)
Number of observations	251	251	251	251
Number of variables	9	9	9	9
R^2	0.60238	0.70031	0.99444	0.10093
Adj.R^2	0.58923	0.69041	0.99426	0.07121
F(8,247) =	45.83***	70.69***	5414***	3.396***

Notes: 4 authors' own calculations; ***, **, * indicate statistical significance at the 1%, 5% and 10% levels respectively. Where possible, the results have been rounded up to the fifth decimal place.

5.1 Robustness Checks

To maximize the robustness of our analysis, we expand the baseline equation estimated with the SYS-GMM estimator by adding three macro variables capturing the size of the national government (government subsidies and other transfers), and institutional changes regarding insolvency resolution and liquidation of a company (recovery rate). Furthermore, we replace the initial discrete institutional measure with either contract-intensive money (CIM) or the World Governance Indicators (WGI) Rule of Law measure. Given the results of the preliminary robustness check discussed above, we only use current variables (non-lagged). Tables A5-A8 in the Appendix present the results.

Total Liabilities

Both the direction and statistical significance have been retained for all the firm-level variables except for the company's internationalisation. Similarly, macroeconomic variables remain unchanged in terms of their impact and statistical significance. CIM impacts total debt positively, corroborating our earlier results and indicating that property rights enable more debt financing. Substituting CIM with the WGI indicator has little impact on our variables of interest, although international macroeconomic conditions turn statistically significant (and their impact on total debt is negative, as expected). In contrast, the domestic market capitalisation becomes insignificant (Table A5 Column 6 in the Appendix).

Current Liabilities

Unfortunately, the model specification for current liabilities performs very poorly across each combination of variables. Inclusion of CIM (Table A6, Columns 1-3) yields low explanatory power, implying that some of Williams and Siddique (2008)'s arguments may be accurate. The WGI indicator performs better, and, with the exception of firm internationalisation, all the company-level variables remain unchanged relative to the initial results. Indeed, the impact of the rule of law remains uniformly positive and significant, with the exception of the last equation. which yields a relatively poor model fit. In none of the six versions estimated for the current liabilities ratio are the new control variables significant.

Current Bank Liabilities

Next, we turn to current bank liabilities (Table A7). In tandem with CIM (Columns 1-3), the firm's growing profits appear to diminish its demand for external financing It seems that increased growth opportunities demand more short-term financial support. The negative influence of the tax shield persists, its magnitude unchanged. Domestic equity market becomes a significant source of financing, although the result is fragile and should be treated with care – indeed, when we replace CIM with the WGI indicator (Columns 4-6), it loses its impact altogether. It seems that government subsidies might play a role in shaping the demand for short-term bank financing regardless of the institutional measure applied (Columns 2 and 5). This issue requires both careful interpretation and, in light of the mostly neutral results obtained in this paper, further research clarifying its impact on company debt policies.

Trade Credit

Shifting from the discrete to the continuous measure of property rights causes the previously-neutral firm's profitability and growth opportunities to have a positive influence on the trade credit ratio (Table A8). At the same time, the firm's size loses its initial impact, with only the last specification (Table A8, Column 3) indicating its influence. We note that government subsides might indeed be a significant factor shaping not only the firm's demand for bank-originated by also trade credit. With the trade credit being less demanding in terms of procedures and contract enforcement, and veering toward relationship lending, it is unsurprising that the impact of the country's institutional development becomes slightly less pronounced. Evidence from Marzec and Pawłowska (2012) supports these results, as their analysis provided proof that firms indeed substitute bank loans with easier manageable trade credit.

The above exercise confirms that institutional changes have a lasting influence on the firm's debt (although CIM as a proxy for property rights appears slightly inferior to the both subjective indices, a trait we ascribe to low frequency of the data used to calculate the ratio). Firm international presence, as well as general domestic and international macroeconomic conditions seem to shape the demand for debt of any kind only marginally, especially when compared to the robust impact of institutional development. We surmise that this is a reflection of the limited international presence and low debt levels of Polish listed companies. In either case, institutional indicators appear to dominate in terms of significance and size of their effect.

6. Conclusion

This paper analysed the institutional and microeconomic determinants of total and current debt over the period 2007 to 2015 in Poland. Using a new dataset of macroeconomic, institutional, and firm-level annual variables gathered for over 200 public companies quoted on the WSE, we provided new evidence on changes in the determinants of internal and external corporate capital structure. Our results highlighted that Polish firms still favoured short-term over long-term external funding and continued to choose trade credit over bank loans. The dataset allowed us to divide short-term debt according to its source, and the empirical analysis showed differences in the strength and direction of impact of these various determinants of capital structure.

Despite transitioning successfully from a centrally-planned to a market economy, Poland has retained some of its traits from the early 1990s. Among these, the most prominent were the questionable efficiency of the firm's collateral in shielding lenders from debt-related agency conflicts and a negligible impact of both short-term interest rates and the development of the banking sector on capital structure. In fact, an inverse relation between tax shields and leverage pointed to expected volatility if not downright uncertainty of profits. While we could probably ascribe this phenomenon to the financial turmoil observed within our timeframe, this in itself was testimonial of Poland's lingering transition-like traits. We therefore supported the claim that firm-level variables impacted various debt ratios differently.

Even though empirical research has suggested that firm passive behaviour in terms of incurring loans (the discouraged borrower phenomenon) may be more characteristic of small and medium companies, our results suggest that in the recent

period the discouraged borrower attitude may have appeared among listed entities. Looking at the presented analysis we hypothesize that this may be caused by at least two issues. Firstly, even though listed companies are expected to be better-managed in terms of growth and investment, the transition reality and the current evidence on firm profits proves that it is not always the case. Secondly, as far as firm-external factors are concerned, company cooperation with credit institutions may be a contributing factor. Given the neutral role of the banking sector in financing decisions we might conjecture that too short a credit history and/or non-existent relationship with banks could be a significant obstacle in obtaining external financing. The reason for such insufficient cooperation should not be always ascribed to firms and their low creditworthiness, but also – and in the transition context especially so – to weak and ineffective institutional frameworks, insufficient contract enforcement, and the costs these factors generate.

Institutional development, so far disregarded by empirical studies concerning Poland, emerged as a highly important determinant of corporate capital structure, especially the development and sophistication of equity markets and the legal system. The evolution of property rights, captured by three various indicators, affected the debt ratios positively, but their effects appeared to be so far too weak to transform assets into effective instruments used in debt contracts. Our evidence also suggested that the rate of recovery during insolvency resolutions and the number of bankruptcies remained irrelevant to corporate debt levels.

In terms of non-results, monetary policy expectations, the development of the banking sector, and government subsidies to the private sector appeared to have little to no influence on corporate debt policy choices. The neutrality of the short-term interbank interest rate might be explained by the scarcity of credit ratings among companies and their inactivity in issuing corporate securities, hence the inter-bank rates impacted their capital structures to a very limited extent. If combined with the (mostly insignificant) effect of GDP changes, it appeared that the economic situation in Poland was stable enough to vitiate the influence of economic growth, interest rate changes, and inflation on firm debt. The afore-mentioned insignificance of the banking sector could be associated with a number of reasons, among which we discussed earlier the documented low demand for bank loans and a generally weakly developed banking system are most likely.

As a final note, we acknowledge that several issues require further in-depth analysis. Firstly, empirical results remain unconvincing and therefore inconclusive regarding firm tangibility and depreciation shields. Secondly, this paper has focused on publicly-traded companies. There are numerous ways in which our research could inspire further analyses, either by using higher-frequency data or constructing a sample encompassing both public and private firms during a longer period. This paper has attempted only to examine a small slice of the corporate structure pie in Poland, and much more can be done.

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