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Master Thesis, Economics and Business

The Effect of Acquisition on Leverage of Target Firms

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Abstract

This study examines the casual relationship between acquisition and the leverage ratios of unlisted target firms in four European countries, Ukraine, Bulgaria, France and Sweden during the period 2010 to 2016. Propensity score matching is used to control for selection bias. The results suggest that firms experience a significant increase in leverage ratio after acquisition and the results also show that domestic acquired firms have a stronger increase in leverage ratio compared with foreign acquired firms.

Keywords: acquisition, leverage

1. Introduction

Despite an extensive set of studies related to mergers and acquisitions, unanswered questions remain. The existing literature mostly focusses on acquisition outcomes from the acquirers' perspective, with few of them studying target firms, and those that do study target firms are often restricted to test how acquisition affects a set of performance measures. In this study, I hope to contribute to the current literature by examining if acquisitions have an effect on target firms' leverage ratios. As Frank and Goyal (2008, p. 175) pointed out, "the best way to think about the relation between leverage and M&A activity probably deserves more attention".

In this thesis, Unlisted industrial companies are studied in Ukraine, France, Sweden and Bulgaria. Separate datasets are constructed for foreign acquired firms and domestic acquired firms. Moreover, randomized counterfactual years are created for non-acquired domestic companies since there is no such an acquisition year for these companies. Propensity score matching is employed to make sure the effect is caused by acquisition, instead of by other firm characteristics. To achieve this, five-nearest neighbor matching is used to create a matched sample in which each acquired company is matched with five non-acquired domestic companies with the same pre-acquisition firm characteristics. In this way, pre-acquisition firm characteristics are controlled and incorporated into one propensity score, derived from a logit model. And matching is based on the similarity of propensity scores between treatment and control groups. A balance test is implemented to see if the matching performs well or not. The result confirms the validity of matching.

After the matching is implemented, average treatment effects of the treated are calculated to show if there is an increase or decrease on leverage ratio for both foreign and domestic acquired firms in the acquisition year and two years afterwards. I find that there is a leverage ratio increase for foreign and domestic acquired firms in four countries in the acquisition year and two years afterwards, and the effect is stronger for domestic acquired firms, though not for all the four countries. A set of robustness checks are implemented to test the validity of the results above, including (a) different matching techniques, (b) ordinary least squares regression analysis, and (c) adding square terms of all the control variables to the logit model. The results utilizing different matching techniques and regression analysis are in line with the results obtained through propensity score matching, and adding square terms of all the control variables does not improve the logit model significantly.

The structure of the thesis is as follows. Section 2 gives an overview of the existing related literature on the topic. There I choose my hypotheses. Section 3 describes the data and

methodology. Section 4 describes the results and Section 5 provides the results from a set of robustness checks. Section 6 concludes with a brief discussion.

2. Literature review

2.1 Capital structure theories

Trade-off theory and pecking order theory are commonly used to explain capital structure. Trade-off theory implies that firm decision makers take the costs and benefits of debt financing plans into account to achieve the optimal capital structure. According to Kraus and Litzenberger (1973), there is a trade-off between the tax benefits of debt and the cost of bankruptcy reflected in the optimal capital structure. Intuitively, it makes sense for firms to increase their leverage levels after acquisitions given the resources and financing flexibility provided by the acquiring firms.

Pecking order theory stems from Myers (1984), in which internal financing is preferred above external financing and debt financing above equity financing. There are multiple explanations for this: (a) tax benefits from debt, (b) inherent risks in equity issuing, (c) cost of financing and (d) debt's advantage in solving agency problems. However, Myers (2003) argues that there is no such theory to explain all firms' capital structures in all circumstances. What matters to this study are the predictions these theories provide; however, theories themselves contradict with each other in some cases. Therefore, I am going to take an empirical approach to discuss the important factors which could affect capital structure.

In Frank and Goyal (2009), a sample of listed American firms between 1950 and 2003 is constructed to test which variables could explain firms' capital structures. Six core factors which are reliably important for market leverage are (a) industry median leverage, (b) tangibility, (c) profits, (d) firm size, (e) market-to-book assets ratio and (f) the expected inflation. The results are robust for both financially constrained and unconstrained firms. They also conduct the same analysis for book leverage measures and all the forward-looking variables—market-to-book assets ratio, expected inflation and firm size, all of which turn out insignificant. Moreover, profitability is negatively correlated with leverage, as predicted by pecking order theory. Tangibility is positively correlated with leverage. Since it is easier for investors to value firms with tangible assets, firms with a higher tangibility ratio would have easier access to debt financing resources, which corresponds to a higher leverage ratio. Frank and Goyal (2009) also find heterogeneous results for different industries.

Chittenden, Hall, and Hutchinson (1996) give evidence for some of the abovementioned factors in their study. They find that profitability, tangibility, firm size, age and capital market

accessibility can affect unlisted firms' capital structures. Especially profitability is negatively correlated with total debt, as well as with short-term debt and long-term debt. They also find that unlisted firms with a higher growth rate rely more on debt financing.

Fischer, Heinkel, and Zechner (1989) introduce a model which can account for the negative relationship between profits and leverage. The model fits with dynamic trade-off theory. According to the Fischer et al. (1989) model, firms rebalance their capital structures when leverage is about to reach either the upper or lower boundary. Moreover, their model implies that higher leverage level will follow a firm's better performance, which could inevitably lead the firm to reach the rebalancing boundary. Graham (2000) also proves the positive relationship between debt financing and firm performance.

2.2 Acquisition

Why do firms get acquired? This problem can be tackled by various approaches. Haleblian, Devers, McNamara, Carpenter, and Davison (2009) summarize that value creation, value destruction, environmental factors and firm characteristic can broadly explain firms' acquisition activities. What happens after acquisition can just be considered as a process of reorganization. From a resource-based view, acquirers have incentives to help target firms to grow and become more cost-efficient (Penrose, 2009; Capron, 1999).

Yet no consensus can be found regarding the relationship between acquisitions and value creation. From the acquirers' perspective, acquisitions generally do not create value for them (Asquith, 1983; Dodd, 1980; Loderer & Martin, 1992), while the opposite holds for target firms (Asquith & Kim, 1982; Datta, Pinches, & Narayanan, 1992; Hansen & Lott, 1996; Malatesta, 1983). The acquisition-performance relationship for acquirers is unclear, too. Payment type, deal type, ownership structure, historical performance, firm size, and acquirer experience could all interplay with the acquisition-performance relationship for acquirers (Haleblian et al., 2009). Studies on the acquisition-performance relationship for target firms are scarce but it is straight-forward to understand why acquisitions bring value to target firms since acquirers pay a premium to targets during the acquisition process.

2.3 Institutional environment

Institutions could contain a set of formal and informal norms which decide the rights and obligations of firms' stakeholders (Capron & Guillén, 2009). In La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), forty-nine countries with different legal origins are studied to see how legal environments relate to firms' financing capabilities. They find that countries with French civil law origins have the lowest creditor rights, and German and Scandinavian are somewhere in the middle, with the common law countries being the highest.

In terms of capital markets, they also find that common law countries have a broader size of capital markets compared with countries with French and Scandinavian civil laws.

The trade-off theory implies that firms will keep a higher leverage level in countries with higher tax rates to benefit from tax shields. Yet empirical researchers face some problems when trying to detect to what extent taxes affect firms' capital structure decisions. Graham (2003) argues that nondebt tax shields can only affect firms' debt financing decisions when firms are profitable. Desai, Foley and Hines (2004) find that capital market and creditor rights conditions across countries are related to multinational firms' financing decisions. Multinational subsidiaries tend to rely less on external debt financing in countries with poor investor protection and less developed capital markets.

2.4 Hypotheses

The resource-based view suggests that there is a positive relationship between foreign ownership and firm performance as affiliates can enjoy the benefits of superior technological, managerial and financial resources from parent companies (Douma, George, & Kabir, 2006). From the perspective of agency theory, firms with foreign ownership tend to have better performance due to better monitoring and control (Jensen & Meckling, 1976; Thomsen & Pedersen, 2000). Douma et al. (2006) also indicate that domestic corporate acquirers have a stronger monitoring incentive and better skills and abilities, thus lead to a better performance. From an organizational learning perspective, acquisition experience will positively affect acquisition performance if acquirers draw on past experience for similar acquisitions (Haleblian & Finkelstein, 1999). There is also evidence to show that acquisitions do mitigate creditors' risk of target firms, as bondholders of target firms receive positive returns during acquisition announcements (Billet, King, & Mauer, 2004).

Jemison and Sitkin (1986) indicate that higher cultural distance between firms could lead to more conflicts during the post-acquisition period, which accounts for lower acquisition performance. Cultural distance, by Morosini, Shane, and Singh (1998), in the context of mergers and acquisitions, refers to different aspects of management that stem from both acquirer's and target's countries of origin. Besides cultural distance, cross-border acquirers also face other difficulties in terms of collecting sufficient and reliable information about the targets and "transplanting" domestic acquisition experience (Norburn & Schoenberg, 1994). Accordingly, Michel and Shaked (1986) use three types of market-based performance measures and find that multinational corporations don't perform as well as domestic corporations. Therefore, I choose my hypotheses as follows:

Hypothesis 1: Acquired firms will have a significant leverage ratio increase after the acquisition compared with non-acquired firms.

Hypothesis 2: Domestic acquired firms will have a significant leverage ratio increase after the acquisition compared with foreign acquired firms.

3. Data and Methodology

3.1 Country selection

Bamiatzi, Efthyvoulou and Jabbour (2017) selected two bank-based countries (Demirgüç-Kunt & Levine, 1999) in their study. Levine (2002) showed that financial structure measures have potential anomalies which can make the banked-based or market-based classifications invalid. Therefore, I use one of the financial development indicators supported by financial services views as explained in Levine (2002) to select the countries to be studied. Given the calculated finance-aggregate indicator values, I picked France and Sweden to represent the countries with a well-developed financial system; based on Männasoo and Mayes (2009), I picked Bulgaria as one of the "advanced transition countries", and Ukraine as one of the "less advanced transition countries".

3.2 Data sources

Data concerning acquisition transaction deals is taken from Zephyr. The sample period consists of seven consecutive years, 2010 to 2016. The target firms are all unlisted firms since the vast majority of firms in the database are unlisted. The deal type is targeted at only acquisition and all the deals are *confirmed-completed[1]* during the sample period. The deal value is equal to or greater than one million euros. Banks and insurance companies are excluded from the analysis due to compatibility issues on the financial accounts with industrial companies. Duplicated deals in the sample period are excluded, as well as deals that lack *target BvD* (Bureau van Dijk) *ID numbers. Deal announced dates* are used as the deal completion year (T_0).

Financial data (*consolidated*) is extracted from Orbis given the *BvD ID numbers* for each firm. The Orbis database is widely used for this type of studies and contains business and financial data of 150 million companies worldwide. *Relative years* are used to retrieve as much data as possible. But since Orbis only saves the latest ten years of data—and as research by the Organization for Economic Co-operation and Development (OECD) showed—small and medium-sized companies are underrepresented specifically in Orbis. As a result, the results

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[1] Options in Zephyr and Orbis are italicized for clarification.

may be biased to some extent. The extracted variables are deflated using the GDP deflator from the World Bank, with the base year varying by country. In that way all the lagged values are in a constant currency unit for each country.

3.3 Control Group

Since I employed one-year lagged values in my empirical analysis, and since I want to test the acquisition effects two years after the deal completion year, for the treatment group members only firms with complete data on all the variables of interest are included in the sample. The control group is formed in such a way that only the firms are included with domestic ultimate owners and who have not had any type of M&A deals in the sample period. I used counterfactual completion years for the control group members and required them to have complete data from 2009 to 2018 to capture as much financial data as possible. But there may be a problem to reproduce my study since these years are all randomized.

3.4 Variables

Based on Frank and Goyal (2009), I choose tangibility, profitability, firm size, and growth opportunity as my control variables. Industry dummies are also included, classified with BvD major sectors. Tangibility is calculated as fixed assets divided by total assets. Profit margin and gross margin are utilized as proxies for profitability. The natural logarithm of sales is calculated as a proxy for the firm size. As for the proxy for growth opportunity, even though market to book ratio is widely used in a large set of empirical studies, since the firms studied in this paper are all unlisted firms, it is impossible to collect data on the market value of assets. Therefore, I picked one of the pure financial statement-based measures (Majumdar, 2013) and in this case, growth in sales.

I also include leverage ratio and its square term as control variables to control for the heterogeneity in terms of their pre-acquisition leverage levels. Leverage ratio is measured by current liabilities divided by total assets, as suggested by Rajan and Zingales (1995). Current liabilities include loans, which are a measure of short-term debt, and include trade creditors and other current liabilities, such as pensions, taxes and borrowings from the parent company. It would be more straight-forward if the leverage ratio can be measured by a short-term debt or long-term debt proxy, though it is not feasible in this study given the limitations of databases.[2] Nevertheless, the leverage ratio proxy I use is still solid as a book leverage measure. All variables are transformed with (a) the natural logarithmic transformation when the variable

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[2] Ray and Hutchinson (1983) indicate that debt is not used among many small firms.

doesn't assume any negative values and (b) with the *neglog transformation* (Whittaker, Whitehead, & Somers, 2005) if it does. The neglog transformation is described by Formula 1.

Formula 1

The neglog transformation nl(X)

$$nl(X) = \begin{cases} -\ln(-X + 1) \text{ for } X \leq 0 \\ \ln(X + 1) \text{ for } X > 0 \end{cases}$$

3.5 Method

The propensity score matching technique is used in this study to conduct the analysis to control for selection bias. It contains three steps in total and at first, I start with a logit model to estimate propensity scores, with the psmatch2 command package created by Leuven and Sianesi (2003). Tangibility, size, profitability, growth opportunity, leverage ratio and its square term with the values one year before T_0 (that is, at year T_{-1}) are the independent variables, as well as the industry dummy variables. I don't include the year dummies because the years are randomly generated for the control group members, so it would not make much sense to control for heterogeneity of years in the analysis. The dependent variable is a dummy variable which takes value 1 if the firm falls into the treatment group and 0 if the firm is in the control group.

The second step consists of a balance test to test the hypothesis if the means for each variable between the treatment group and control group are the same after matching, as a way to see if the matching technique is robust. I also generate the propensity score graphs as an alternative way to test the matching technique. Five-nearest neighbor matching is implemented by Stata automatically with the psmatch2 command.

The third step is the final stage in my analysis with the purpose to generate the average treatment effect for the treated (ATT). Since I want to test if there is a leverage ratio increase for both foreign and domestic acquired firms one year (T_1) and two years (T_2) after the acquisition, as well as in T_0, the outcome variables are the transformed (by the neglog transformation described above) leverage ratio changes in T_0, T_1 and T_2.

3.6 Descriptive statistics

Table 1 summarizes the number of foreign and domestic acquisitions and the number of pre-matched control observations per country and year. It shows larger numbers of foreign and domestic acquisitions in Sweden and France compared with Ukraine and Bulgaria. Table1 also shows that there are more foreign acquisitions than domestic ones in Ukraine and France, and the opposite for Bulgaria and Sweden. The control groups are quite big in four countries

which potentially guarantees a good matching for the analysis. Any trend of increase or decrease of foreign and domestic acquisitions with year for four countries are not clearly shown. Table 1 also shows that foreign acquisitions exceed domestic ones for France between 2010 to 2014.

Table 1

Counts of acquisitions and controls by year

	Ukraine			Bulgaria			Sweden			France		
Year	F	D	C	F	D	C	F	D	C	F	D	C
2010	2	1	661	1	0	140	7	19	724	17	16	344
2011	2	0	758	3	3	229	12	9	840	19	15	462
2012	6	5	691	1	4	213	12	15	824	15	13	456
2013	3	7	692	12	20	234	12	11	829	12	11	469
2014	2	2	730	18	31	223	8	9	880	19	14	491
2015	0	0	634	2	6	232	6	10	792	15	16	508
2016	2	1	643	3	2	135	4	18	826	6	5	466
Total	17	16	4809	40	66	1406	61	91	5715	103	90	3196

Note. F stands for foreign acquisitions; D stands for domestic acquisitions; C stands for controls.

Table 2 presents descriptive statistics of the main variables, while separating between three categories of firms; foreign-acquired firms, domestic-acquired firms and non-acquired firms which have domestic ultimate owners. It shows that acquired firms are bigger, less profitable than non-acquired firms. Except Sweden, acquired firms also have higher tangibility ratios than non-acquired ones. Target firms also exhibit higher growth potential before acquisitions, with foreign acquired firms in Sweden and target firms in France as exceptions. In terms of pre-acquisition leverage ratios, target firms present a higher debt level compared with domestic non-acquired ones; the opposite holds only for foreign acquired firms in Ukraine.

When comparing between foreign and domestic acquired firms, foreign acquired firms show a bigger size and lower leverage level than domestic acquired ones for four countries. It is also evident to see that foreign acquired firms contain bigger growth opportunities than domestic acquired firms, with Sweden as one exception. Furthermore, foreign acquired firms present a lower profitability ratio except for Ukraine, and lower tangibility ratios for Bulgaria and France, compared with domestic acquired firms.

Table 2

Descriptive statistics of the main variables

	Ukraine			Bulgaria			Sweden			France		
Variable	F	D	C	F	D	C	F	D	C	F	D	C
nl(Tangibility)	0.30	0.30	0.29	0.37	0.41	0.25	0.13	0.13	0.20	0.12	0.15	0.08
	(0.22)	(0.17)	(0.22)	(0.23)	(0.50)	(0.20)	(0.17)	(0.19)	(0.21)	(0.15)	(0.17)	(0.13)
nl(Size)	9.88	7.86	5.30	8.35	8.05	6.32	9.73	8.69	6.39	9.74	9.55	6.99
	(2.48)	(2.84)	(2.53)	(2.28)	(1.69)	(2.08)	(1.96)	(1.38)	(2.08)	(1.95)	(2.10)	(2.04)
nl(Profitability)	0.26	0.26	0.29	-0.05	0.02	0.07	0.01	0.05	0.09	0.02	0.03	0.13
	(0.18)	(0.32)	(0.24)	(0.22)	(0.25)	(0.21)	(0.18)	(0.13)	(0.19)	(0.17)	(0.17)	(0.21)
nl(Growth opportunity)	0.88	0.39	0.25	0.98	0.23	0.15	0.29	0.45	0.42	0.15	0.13	0.41
	(2.22)	(1.83)	(1.32)	(1.92)	(0.61)	(0.70)	(2.08)	(2.07)	(1.75)	(1.74)	(0.83)	(1.92)
nl(Leverage ratio)	0.22	0.50	0.34	0.31	0.40	0.26	0.38	0.39	0.28	0.38	0.40	0.28
	(0.16)	(0.43)	(0.37)	(0.22)	(0.36)	(0.21)	(0.18)	(0.15)	(0.17)	(0.21)	(0.20)	(0.18)
nl(Leverage ratio)^2	0.08	0.43	0.25	0.15	0.28	0.11	0.18	0.18	0.11	0.19	0.20	0.11
	(0.10)	(0.77)	(1.01)	(0.17)	(0.52)	(0.20)	(0.13)	(0.12)	(0.17)	(0.23)	(0.17)	(0.13)

Note. Columns report mean values. Standard deviations in parenthesis. F stands for foreign acquisitions; D stands for domestic acquisitions; C stands for controls.

4. Results

The results of the logit models of the target group firms, distinguishing between foreign acquired firms and domestic acquired firms, are the inputs for the propensity score matching procedure, represented in Table 3. The results show that firms are more likely to be acquired with a bigger size, and the coefficients are all statistically significant under the 1%-level. Moreover, firms are more likely to be acquired by foreign investors with bigger size in Ukraine, Sweden and France, while the opposite holds for Bulgaria. Secondly, firms are less likely to be acquired with a higher profitability ratio in Bulgaria and France seeing from a statistically significant coefficient, and the higher absolute coefficient values under foreign acquisitions suggest that firms are less likely to be acquired by foreign acquirers than domestic acquirers. It is interesting to see that for Ukraine and Sweden, the coefficient signs are opposite for foreign and domestic acquired firms, but only the coefficient under foreign acquisitions in Sweden is significant. Although, tangibility and growth opportunity give an ambiguous result.

It is noteworthy to see that pre-acquisition leverage levels do not seem to be an important factor of acquisitions, except for domestic acquisitions in Ukraine and Sweden. Higher levels of leverage do increase the probability of domestic acquisitions in both Ukraine and Sweden. I also include the square term of leverage ratio to see if it adds any explanatory

power, and the coefficients are only positively significant for domestic acquisitions in Bulgaria and foreign acquisitions in France.

Table 3

Propensity score estimation

	Ukraine		Bulgaria		Sweden		France	
Variable	F	D	F	D	F	D	F	D
nl(Tangibility)	-0.147	1.206	3.212***	3.475***	-3.836***	-1.685**	-2.015**	0.441
	(0.925)	(0.382)	(0.001)	(0.000)	(0.002)	(0.047)	(0.038)	(0.613)
nl(Size)	0.830***	0.548***	0.562***	0.637***	0.676***	0.478***	0.593***	0.459***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
nl(Profitability)	-0.942	0.239	-3.744***	-2.634***	-3.477***	0.640	-2.955***	-1.611*
	(0.596)	(0.858)	(0.000)	(0.001)	(0.002)	(0.554)	(0.000)	(0.077)
nl(Growth opportunity)	-0.061	-0.081	0.472***	0.218	-0.097	-0.043	-0.077	-0.097*
	(0.615)	(0.629)	(0.000)	(0.155)	(0.106)	(0.409)	(0.105)	(0.074)
nl(Leverage ratio)	-1.958	2.087*	2.422	-0.132	1.681	4.864**	-1.708	-0.741
	(0.724)	(0.077)	(0.286)	(0.913)	(0.242)	(0.027)	(0.137)	(0.619)
nl(Leverage ratio)^2	-3.306	-0.376	-1.320	2.136***	0.182	-2.117	2.425**	2.408
	(0.689)	(0.395)	(0.621)	(0.009)	(0.826)	(0.380)	(0.048)	(0.115)
Constant	-7.677***	-8.227***	-8.018***	-5.809***	-9.963***	-22.462	-21.081	-6.168***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.974)	(0.977)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3870	4156	1354	1426	5484	5467	3299	3258
Pseudo-R^2	0.386	0.205	0.300	0.336	0.326	0.199	0.291	0.219

Note. Acquisition is a dummy variable that equals one for the treatment group members. Explanatory variables lagged by one year. Columns report estimated coefficients. Robust p-values in parentheses. ***, **, *indicate the significance levels at 1%, 5% and 10%, respectively. F stands for foreign acquisitions; D stands for domestic acquisitions.

I also conduct a balance test for five-nearest neighbor matching technique to see if the matching performs well, as can be seen in Table A1 in Appendix A. As none of the p-values are significant so that the results fail to reject the balancing hypothesis for all the variables included in the propensity score estimation, confirming that only homogenous firms are matched between target and control groups. As an alternative evidence, Figure A1 shows that the off-support treated members are quite rare for all the four countries, suggesting that almost all the treated group members are matched with control group members. Moreover, the red bars are more dispersed along the horizontal axis than the blue bars, indicating that acquired firms do receive higher propensity scores than the non-acquired firms.

Panel (a) of Table 4 shows the ATT of foreign acquisitions on leverage ratio changes. The results show that in the deal completion year and two years afterwards, foreign acquired firms experience a debt level increase in all the four countries, with only one exception in the completion year for Bulgaria. Only the amount of leverage ratio increase differs per year and country. Thus, Hypothesis 1 cannot be rejected. In T_0, the average treatment effect for the treated is 0.432 percentage point for Ukraine. This means that the leverage ratio is 0.432 percentage point higher in foreign acquired firms in the deal completion year than one year before. The effect is larger in T_1 and even larger in T_2, with a leverage ratio increase of 0.760 percentage point in T_1, although it is only statistically significant under the 20%-level, and 0.773 percentage point in T_2. The leverage increase effect is descending for France, and ATT is only marginally significant in the deal completion year.

Table 4

The impact of acquisitions on acquired firms' leverage ratios.

Panel (a): Foreign acquisition/Leverage ratio change							
	Ukraine		Bulgaria		Sweden		France
	<u>ATT</u>		<u>ATT</u>		<u>ATT</u>		<u>ATT</u>	
0	0.432	(0.235)	-0.001	(0.084)	0.061	(0.049)	0.060[*]	(0.045)
1	0.760[*]	(0.352)	0.082	(0.075)	0.090	(0.068)	0.043	(0.050)
2	0.773	(0.290)	0.033	(0.126)	0.087	(0.057)	0.023	(0.063)
N	16		38		58		101	

Panel (b): Domestic acquisition/Leverage ratio change							
	Ukraine		Bulgaria		Sweden		France
	<u>ATT</u>		<u>ATT</u>		<u>ATT</u>		<u>ATT</u>	
0	0.086	(0.140)	-0.195[****]	(0.066)	0.057	(0.055)	0.094[**]	(0.062)
1	0.614	(0.470)	0.109	(0.079)	0.123[***]	(0.058)	0.067	(0.060)
2	0.936	(0.773)	0.163	(0.111)	-0.026	(0.056)	0.188[*]	(0.133)
N	16		62		87		89	

Note. Five-nearest neighbor matching. ATT denotes average treatment effect on the treated. N denotes the number of matched treatment targets. Bootstrap Standard errors in parenthesis. [****], [***], [**], [*] indicate the significance levels at 1%, 5%, 10% and 20% respectively.

Panel (b) of Table 4 presents the ATT of domestic acquisitions on leverage ratio changes. Except for T_0 in Bulgaria and T_2 in Sweden, all the other effects are positive, indicating a continuous leverage increase. It is not so clear to tell if foreign acquired firms or domestic ones increase leverage level more during the three years for Ukraine and Sweden, but it is quite clear to see that leverage ratio increases more for domestic acquired firms than foreign acquired firms for the complete three years in France, with ATT of 0.094 percentage point in

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T_0 (significant at the 10%-level), 0.067 in T_1 and 0.188 in T_2 (significant at the 20%-level), as well as in T_1 and T_2 for Bulgaria, which supports Hypothesis 2.

It is noteworthy to see that in the case of Ukraine, the average treatment effects for the treated are all larger than for the other three countries, both for foreign acquired firms and domestic acquired firms, with only one exception if we compare domestic acquisition effect with France in T_0. And this difference is prominent as for instance, the ATT is 0.760 percentage point in T_1 of foreign acquisitions in Ukraine, which is quite big when comparing with other countries horizontally. This interesting phenomenon could probably be explained by the political risk and a higher inflation rate in Ukraine during the sample period, as shown in Figure 1. As argued in Desai et al. (2004), both political risk and high inflation can make multinationals rely more on external debt financing.

Figure 1

Inflation, consumer prices (annual %) in Bulgaria, France, Sweden and Ukraine. Sources: International Monetary Fund, International Financial Statistics and data files.
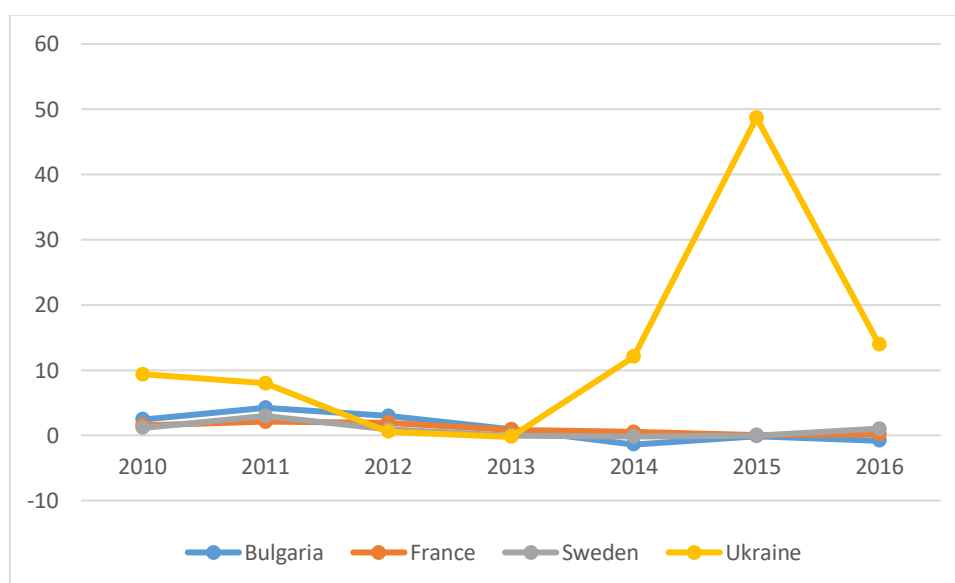
5. Robustness check

I perform alternative matching techniques to assess the robustness of the above findings, including the one-to-one nearest neighbor matching and Epanechnikov kernel matching. The results obtained from these tests are very similar with the results using five nearest neighbor matching, thus I don't include the relevant tables in this thesis. Moreover, I also include the square terms for all the control variables in the logit model to see if they add some explanatory power. The evidence shows that adding these square terms doesn't improve the model significantly.

I also perform ordinary least squares regression analysis with the matched samples to test my hypotheses. The dependent variables are the outcome variables as in propensity score matching analysis, which are the neglog of leverage ratio change of T_0, T_1 and T_2. The independent variables include the acquisition dummy variable and all the control variables as stated above, except leverage and its square term. The results are shown in Table A2 in Appendix A.

As Table A2 shows, the results are in line with the propensity score matching analysis results as most of the coefficients of acquisition are positive with only a few exceptions, which indicates that acquired firms experience a higher leverage ratio change than non-acquired firms. The deficiency of regression analysis is that it is not clear to see if the change is positive or negative. Furthermore, it does not give a robust result in terms of acquisition effects on firms' leverage ratio levels since acquisition dummy variable is only one of the many control variables.

6. Discussion and conclusions

This study builds on earlier work by Bamiatzi et al. (2017). Interestingly, I reach the opposite results compared to their findings. In their study, a set of financial account data of acquired and non-acquired firms in Italy and Spain are selected within the sample period between 2002 and 2010. Propensity score matching was implemented to control for selection bias and one-year lagged data was utilized to first estimate the propensity scores of acquisitions. In the probit model, productivity, scale, age, capital to labor ratio, two leverage ratio proxies and their square terms are the independent variables. In the second step, five-nearest neighbor matching was conducted to calculate the average treatment effects of the treated for the deal completion year and three years afterwards. The results suggest a reduction in leverage ratio for foreign acquired firms in both countries in the deal completion year and three years later but a mixed result for domestic acquired firms. The result is the opposite in my study. Here I conducted propensity score matching for four countries: Ukraine, Bulgaria, France and Sweden to represent European countries with different levels of financial development. In general, there is a leverage ratio increase for foreign and domestic acquired firms in four countries in the deal completion year and two years post-acquisition, and the effect is stronger for domestic acquired firms, though not for all the four countries.

There are a few directions future researchers can take. Firstly, the theoretical mechanism behind this topic is not fully established yet, even given the efforts I have put in this thesis. It would be of great importance if future researchers could further explore the

motivations behind the findings above. Secondly, I have only chosen four representative countries in this study. But does this effect apply to more countries in Europe, and if so, does the effect vary over time? Thus, it is also helpful to examine the effect with a larger geographical scope and broader time span. Thirdly, acquirer type is not touched upon in this study, but it would be interesting to see if the effect holds for different types of acquirers.

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THE EFFECT OF ACQUISITION OF LEVERAGE OF TARGET FIRMS

Appendix A

Table A1

Balancing tests for matched sample

Panel(a)

		Ukraine				Bulgaria			
		Mean		t-test		Mean		t-test	
		T	C	|t|	p>|t|	T	C	|t|	p>|t|
Foreign Acquisition	nl(Tangibility)	0.300	0.282	0.24	0.810	0.369	0.378	-0.20	0.842
	nl(Size)	9.783	9.891	-0.13	0.900	8.295	8.255	0.07	0.944
	nl(Profitability)	0.248	0.258	-0.17	0.865	-0.047	-0.043	-0.08	0.940
	nl(Growth opportunity)	0.950	0.895	0.07	0.944	0.713	0.677	0.09	0.927
	nl(Leverage ratio)	0.226	0.265	-0.57	0.572	0.307	0.332	-0.51	0.612
	nl(Leverage ratio)^2	0.078	0.114	-0.79	0.438	0.140	0.151	-0.30	0.766
Domestic Acquisition	nl(Tangibility)	0.301	0.277	0.36	0.725	0.357	0.366	-0.22	0.827
	nl(Size)	7.861	7.626	0.24	0.814	7.954	8.214	-0.69	0.490
	nl(Profitability)	0.262	0.293	-0.32	0.754	-0.004	0.002	-0.18	0.861
	nl(Growth opportunity)	0.394	0.618	-0.34	0.740	0.246	0.289	-0.24	0.811
	nl(Leverage ratio)	0.500	0.537	-0.23	0.821	0.400	0.385	0.24	0.813
	nl(Leverage ratio)^2	0.425	0.520	-0.26	0.795	0.286	0.277	0.09	0.928

Panel(b)

		Sweden				France			
		Mean		t-test		Mean		t-test	
		T	C	|t|	p>|t|	T	C	|t|	p>|t|
Foreign Acquisition	nl(Tangibility)	0.125	0.134	-0.31	0.757	0.125	0.115	0.49	0.624
	nl(Size)	9.462	9.441	0.06	0.956	9.699	9.716	-0.06	0.955
	nl(Profitability)	0.012	0.024	-0.38	0.701	0.022	0.015	0.34	0.735
	nl(Growth opportunity)	0.056	0.146	-0.27	0.790	0.151	0.354	-0.64	0.523
	nl(Leverage ratio)	0.377	0.372	0.14	0.889	0.377	0.393	-0.55	0.581

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	nl(Leverage ratio)^2	0.177	0.172	0.17	0.865	0.182	0.191	-0.33	0.738
	nl(Tangibility)	0.130	0.142	-0.42	0.679	0.147	0.147	-0.00	0.999
	nl(Size)	8.617	8.705	-0.31	0.757	9.500	9.685	-0.57	0.570
Domestic	nl(Profitability)	0.053	0.060	-0.36	0.716	0.035	0.034	0.01	0.993
Acquisition	nl(Growth opportunity)	0.468	0.426	0.13	0.900	0.132	0.143	-0.04	0.967
	nl(Leverage ratio)	0.386	0.390	-0.16	0.872	0.399	0.412	-0.45	0.655
	nl(Leverage ratio)	0.173	0.180	-0.29	0.769	0.198	0.205	-0.28	0.780

Note. The test examines the balancing hypothesis for all variables included in the propensity score, based on their pre-acquisition values. T stands for treated group; C stands for control group.

Table A2

Regression results for leverage ratio changes

Panel (a): leverage ratio change (T_0)

	Ukraine		Bulgaria		Sweden		France	
	F	D	F	D	F	D	F	D
Acquisition	0.288	-0.030	0.014	-0.228****	0.049	0.065	0.052*	0.102**
nl(Tangibility)	0.322	-0.179	0.045	0.158*	0.136	0.242*	0.105	-0.009
nl(Size)	0.007	-0.031	0.020*	0.009	0.001	-0.007	-0.027***	-0.014*
nl(profitability)	0.303	0.268	-0.106	0.160	-0.106	0.046	-0.080	0.018
nl(Growth opportunity)	0.065**	0.010	0.002	-0.019	0.014	0.011	-0.002	-0.009*
Constant	-0.014	0.406**	-0.099	-0.117	0.086	-0.020	0.877**	0.154*
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.145	0.087	0.085	0.145	0.051	0.039	0.064	0.041
n	76	94	172	243	272	456	448	436

Panel (b): leverage ratio change (T_1)

	Ukraine		Bulgaria		Sweden		France	
	F	D	F	D	F	D	F	D
Acquisition	0.599*	0.551	0.018	0.046	0.092*	0.132***	-0.018	0.031
nl(Tangibility)	0.237	-0.989*	0.239	0.087	0.258**	0.169	-0.266**	-0.070
nl(Size)	-0.022	-0.083	-0.012	-0.009	-0.012	-0.011*	-0.013	-0.000
nl(profitability)	-0.136	1.009**	-0.050	-0.000	0.483****	0.004	-0.167	0.083
nl(Growth opportunity)	0.058*	0.009	0.004	-0.026*	-0.002	-0.015***	0.002	0.005
Constant	0.294	0.725*	0.095	0.092	-0.093	0.213*	-0.043	-0.001

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Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.126	0.221	0.074	0.038	0.083	0.065	0.046	0.047
n	76	94	172	243	272	456	448	436

Panel (c): leverage ratio change (T_2)

	Ukraine		Bulgaria		Sweden		France	
	F	D	F	D	F	D	F	D
Acquisition	0.424*	0.889	0.001	0.159**	0.096**	-0.055	0.008	0.174*
nl(Tangibility)	0.198	-1.475*	-0.032	-0.131	0.240**	-0.160	0.039	0.325*
nl(Size)	0.002	-0.119	-0.062*	-0.059***	-0.010	-0.007	0.005	-0.025
nl(profitability)	0.044	1.250*	-0.088	-0.070	-0.063	-0.011	-0.004	-0.430**
nl(Growth opportunity)	0.102***	-0.020	0.018	0.055*	-0.000	0.001	-0.006	0.003
Constant	0.108	0.978	0.443*	0.476**	-0.099	0.039	0.992*	0.158
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.135	0.181	0.057	0.087	0.077	0.024	0.045	0.071
n	76	94	172	243	272	456	448	436

Note. Acquisition is a dummy variable that equals one for the treatment group members. Explanatory variables lagged by one year. Columns report estimated coefficients. ****, ***, **, *indicate the significance levels at 1%, 5%, 10% and 20% respectively. F stands for foreign acquisitions; D stands for domestic acquisitions.

Figure A1

Propensity score graphs

Ukraine	Bulgaria

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	Sweden	France
Foreign Acquisition		
Domestic Acquisition		