The Influence of National Culture on the Relationship Between a Firm's Leverage and Investment across Manufacturing Companies

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ABSTRACT

Considering the growing competition on the markets, investment and diversification of the business are crucially important for any firms' growth.

The current research is conducted to determine the factors on the entity level that influence the investment decisions of the company and to what extent the investment decision depends on the leverage level. Moreover, the research is trying to identify the role of national culture in investment decisions and investment-leverage relation.

The results prove that there is a significant relationship between firm-level factors and corporate investment and that the national culture has a strong moderating effect on the leverage–investment relations.

Keywords: capital structure, national culture, investment decisions, leverage

1 INTRODUCTION

A range of researches have been conducted on the topic of influence of the debt ratio on the capital investments. While Aivazian et al. [1] in their paper disclosed results, indicating a negative relation between leverage and investment, there are a range of previous studies, showing that debt ratio is positively related to firm performance [4], [16]. At the same time, the research, conducted by Weill [23] in 7 European countries presented controversial results. According to the paper, the debt ratio is having a positive influence on the firm's performance in Spain and Italy, and negative in Germany, France, Belgium and Norway. Looking at the counties, it is seen that these countries and coming from different cultural backgrounds, and it leads to an assumption that these discrepancies might be related to cultural differences, and this gap can be considered as the research problem.

Besides, since the introduction of Divergence Theory, the topic of the role of national culture in the corporate finance and business has been discussed and explored by a range of authors. For example, different scientists [12], [3] have been trying to examine the effect of national culture on the entity's leverage by applying Hofstede's cultural dimensions [7]. These studies suggest that inter-country difference caused by some cultural varieties across groups of countries is an important determinant of the capital structure. Thus, considering information stated above, cultural factors might not only become a mean to explain the capital structure, but also identify the difference in capital structure - investment sensitivity of the firm across the countries.

The actuality of the topic comes from the fact the manufacturing industry growth across the countries is rather diverse. The statistics says that the North America and China altogether account for 39.20% of the total world manufacturing output growth, while East Asia in general accounts for 16.4% of the total growth [22]. In order for the company to grow and prosper, it needs to expand its business by introducing new lines of production and acquiring new capital, for which the business requires resources (equity or external capital). The current research is conducted to determine what are the factors on the entity level that influence the investment decisions of the company and to what extent the investment decision depends on the leverage level. Moreover, the research is trying to identify the role of national culture in investment decisions and investment-leverage relation.

The research aim is to critically assess the role of national culture in capital structure – corporate investment interaction in the Manufacturing Industry.

Novelty of current paper includes several moments. The first aspect of the novelty is the determination of the list of factors that impact the investment decisions in manufacturing industry. Another aspect is building a model, which serves to identify the impact of national culture on the investment level of the company. The final novelty of the research is determination of the role of national culture in capital structure – investment sensitivity.

2 LITERATURE REVIEW

Scanning the theoretical literature for the factors, effecting the corporate investment decisions, there have been found a range of theories, dating back to middle of the 20th century. As a result of the investigation, it was concluded that that the theories can be divided into two broad categories: those, describing the factors, influencing investment policy under ideal market conditions and those, affecting investment under imperfect conditions.

Modigliani and Miller [18] formed the basis of understanding the capital structure nowadays. The Modigliani–Miller (M&M) theorem states that under perfect market conditions, there is no relation between the financial structure and investment decisions of the company. Later it was supported and extended [6],[11]. According to the q-theory of Tobin [21] given the perfect

market conditions, such as no asymmetry of information, transaction costs and taxations and risk, investment depends on the ratio of the market value of a firm's capital stock to its replacement cost. A range of researches have questioned M&M theorem, that corporate world exists in imperfect market conditions with institution restrictions, agency costs and asymmetric information, which lead to two basic theories: "Underinvestment and the overinvestment theories", coming from Agency problems [10] and "Pecking Order Theory", based on asymmetry of information [19]. The underinvestment theory suggests that costs of employing external financing makes firms to invest less into capital, implying a negative interaction of debt ratio and investment. The overinvestment theory propose that leverage has a "disciplinary role", keeping managers from investment into negative NPV projects.

"Pecking Order Theory" implies that entities use hierarchical approach in choosing the funds: first - internal finance, second-external financing.

Further analysis of the firm-level investment decision determinants allowed to identify a list of factors that are mainly considered by the researches, when the corporate investment is investigated. As a result, seven key factors, influencing the investment were identified: Tobin's Q, leverage, cash flow, firm size, sales, profitability and liquidity. Most of the researches came to conclusion that all of these factors, except for the leverage are positively corralled with the investment. Meanwhile, leverage decreases the level of investment in the companies.

Over time, different researches provided different views and theories on the topic of influence of the national culture on management. Universality Theory is based on management behaviour theories are universal everywhere, and do not depend on the external factors, like industry, sector or culture (supported by Lubatkin et al. [15] and Mintzberg [17]. Ralston et al. [20] proposed Crossvergence Theory that stated that national culture and economic ideology influence values of the person. House et al. [9], supporting Divergence Theory thinks that while some convergence in management is inevitable, the stability of the cultural context makes the extent of such a process limited. According to House et al., the main idea behind Cultural immersion theory is that the parties, taking part in the development of any entity are influenced at the subconscious level by the norms and values of their social surrounding and, thus, their decisions, objectives and attitude depends on the cultural values.

Analysing the literature for the role of national cultural in the corporate finance, it was found out that most of the authors estimated the effect of national culture by applying Hofstede's cultural dimensions. Literature analysis shows that Masculinity and Individualism are positively related to the investment, while Uncertainty Avoidance and Power Distance have a negative impact on the investment level. Based on the literature analysis it was assumed that national culture has a moderating effect on the interaction between capital structure and investment decisions within the company.

3 RESEARCH DESIGN

For the current research the initial sample size was limited by the stock-listed manufacturing industry companies from 9 geographical regions. Since the investment level across different manufacturing sun-industries may vary substantially, in order to control for the industrial effect, the sample size was narrowed to the machinery production companies with GICS (Global Industry Classification Standard) code 201060.The firm-level data for the period 2008-2017 for the current investigation was extracted from the Bloomberg terminal with a help of Microsoft Excel software. The data included the general information, such as year, Bloomberg ticker, full company name, GICS sub-industry name and code, company's location (country); information from the balance sheet and income statement, and general ratios, such as Tobin's Q and Return on Assets (ROA). Using the Microsoft Excel programme, the variables, necessary for investigation were calculated.

Turning to the national culture factors, for the current research the 4 cultural dimensions of Hofstede's framework were applied: Power Distance, Individualism, Masculinity and Uncertainty Avoidance [7]. All scores for the counties of the initial dataset were collected from the Hofstede Insights website.

In order to estimate whether the dataset can be divided into several groups according to the cultural dimensions, it was applied the cluster analysis to the dataset, using the Hofstede's cultural dimensions and indexes per country. As the result of the cluster analysis in R Studio, the countries of the sample size were clustered in 3 cultural groups.

To analyse the impact of national culture on capital investment, a modified model investment regression [5] with an interaction term between leverage and Hofstede's dimensions as proxies for national culture, was applied:

$$INV_t^i = \beta_0^i + \beta_1 CF_{t-1}^i + \beta_2 Q_{t-1}^i + \beta_3 LEV_{t-1}^i + \beta_4 X + \beta_5 CULTURE_t^i + \beta_6 LEV_{t-1}^i \times CULTURE_t^i, \quad (1)$$

where INV_t^i - net investment ratio of firm i in the current period t;

CF_{t-1}^i – cash flow ratio of firm i in the previous period t-1;

Q_{t-1}^i – Tobin's Q of firm i in the previous period t-1;

LEV_{t-1}^i – leverage ratio of firm i in the previous period t-1;

β_0– intercept;

β_n– coefficients of the variables.

After analysis of the literature for the factors, effecting the level of corporate investment, the base model was adjusted by adding the following firm-level control variables: Sales, Profitability, Firm Size and Liquidity, that is presented in Formula (2):

$$INV_t^i = \beta_0 + \beta_1 CF_{t-1}^i + \beta_2 Q_{t-1}^i + \beta_3 LEV_{t-1}^i + \beta_4 SALE_{t-1}^i + \beta_5 ROA_{t-1}^i + +\beta_6 SIZE_{t-1}^i + \beta_7 LIQ_{t-1}^i + \lambda^i + \mu_t + \varepsilon_t^i, \quad (2)$$

where $SIZE_t^i$ – size firm i in the current period t;

$SALE_{t-1}^i$ – net sales ratio firm i in the previous period t-1;

ROA_{t-1}^i – profitability ratio of firm i in the previous period t-1;

LIQ_{t-1}^i – liquidity ratio of firm i in the previous period t-1;

β_0– intercept;

β_n– coefficients of the variables;

λ^i– individual effect of the firm i;

μ_t – set of year dummies to control for time fixed effect.

Considering results of the studies of Cetenak et al. [2] and Lee [14] in order to identify the interaction effect of cultural variables on the relationship between firm's leverage and investments decisions, the first regression model was modified by adding the cultural variables to the firm that are taken from Hofstede's [8] measures of culture and as a result the following moderation model was proposed:

$$INV_t^i = \beta_0 + \beta_1 CF_{t-1}^i + \beta_2 Q_{t-1}^i + \beta_3 LEV_{t-1}^i + \beta_4 SALE_{t-1}^i + \beta_5 ROA_{t-1}^i + +\beta_6 SIZE_{t-1}^i + \beta_7 LIQ_{t-1}^i + \beta_8 POWD_t^i + \beta_9 INDV_t^i + \beta_{10} MASC_t^i + \beta_{11} UNCA_t^i + +\beta_{12} LEV_{t-1}^i \times POWD_t^i + \beta_{13} LEV_{t-1}^i \times INDV_t^i + \beta_{14} LEV_{t-1}^i \times MASC_t^i + \beta_{15} LEV_{t-1}^i \times UNCA_t^i + \varepsilon_t^i. \quad (3)$$

where $POWD_t^i$ - the degree of power distance of firm i in the current period t;

$INDV_t^i$ - the degree of individuality of firm i in the current period t;

$MASC_t^i$ - the degree of masculinity of firm i in the current period t;

$UNCA_t^i$ - the degree of uncertainty avoidance of firm i in the current period t.

4 RESEARCH RESULTS

A. Analysis of the Research Dataset

Initial sample contained data for 583 stock-listed companies from Manufacturing Industry for period 2008-2017 from 60 countries. Companies with not all data available for each of 8 years were dropped. Countries with less than 6 companies were also excluded from dataset. As a result, 219 companies from 19 countries were left for analysis, and this is 1752 company-year observations.

In order to understand the spread of the countries from the final sample size across the continents, it was decided to split the countries by geographical regions. Table 1 shows the distribution of companies by geographical regions.

Table 1

Number of companies by regions

Region	Final Sample	
	# of Countries	# of Companies
Africa	0	0
Central and Eastern Europe	1	10
East Asia	2	51
Middle East	2	17
North America	2	21
Northern Europe	3	23
South America	0	0
South Asia	1	6
Southeast Asia	3	27
Southern Europe	1	6
Western Europe	4	58
TOTAL	**19**	**219**

The cluster analysis resulted in geographically diagonally different countries belonging to one cultural cluster. Thus, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Greece, Hong Kong, India, Jamaica, Jordan, Kenya, Malaysia, Mexico, Morocco, Namibia, Nigeria, Pakistan, Peru, Philippines, Portugal, Qatar, Saudi Arabia, Serbia, Singapore, South Korea, Spain, Sri Lanka, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates and Vietnam fall under one cluster (Group #1). These countries are characterized by relatively high uncertainty avoidance and collectivism in the society, acceptance of unequal distribution of power and average level of masculinity, implying that the cultures are not as assertive as countries from Group #3. In the meantime, Groups # 2 is represented by Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Netherlands, Norway, and Sweden (representative of Northern European and Scandinavian countries). Cultures from this group are individualistic and independent, have low level of masculinity, flat hierarchical structure and risk takers. As for the Croup #3, consisting of such countries as Austria, Belgium, Britain, Canada, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Luxembourg, Poland, South Africa, Switzerland and United States of America represents very low power distance in the society, high value of high individualism and self-interests and assertiveness.

Table 2 reports the descriptive statistics of the variables of the researches' final sample in form of the overall observations, such as standard deviation, average, minimum, and maximum values. As it is seen from the table that there is a high variation of investment among the listed firms of investigated markets. The average of investment rate is 0.68, while its standard deviation is 22.126, which is about thirty-two times higher than average value. It should be mentioned however that while maximum investment index is 924, the 75th percentile is 0.103, meaning that 75% of data is companies from sample have a rather small investment index.

As for the Tobin's Q, it is interesting that almost 75% of companies have a Market to Book value above 1.05 that

according to Lang [13] eliminated the possibility of overinvestment. As for the Leverage, it is seen that the Mean and Median rather similar, that makes the distribution of the data normal, and standard deviation accounts for 0.19. Most of the companies (75%) have a leverage below 0.66, which means that they are not highly leveraged, and try to finance their business with the equity. The minim value for Long-Terms leverage is 0, meaning that some companies do not reply on the long-term liabilities, but have short-term ones. In terms of liquidity, 75% of the companies are very liquid, and have a value of above 1.56, that means that companies are secure in the short-run, and they can meet their short-term liabilities if they come due. As for cultural indexes, it should be mentioned that 75% of the samples size has a Power Distance Index below 58, meaning most of the countries from the samples size do not have strictly hierarchical societies. As for Uncertainty Avoidance, it is seen that 75% of the companies are from societies with this index above 46 that implies that these companies are risk-averse and try to mitigate any uncertainty.

Table 2

Descriptive statistics of the key variables

	N	Mean	Std. dev.	Min.	25%	Median	75%	Max.
INV	1752	0.678	22.126	-0.997	-0.044	0.017	0.103	924.000
CF	1752	0.093	3.600	-49.729	-0.013	0.025	0.090	138.000
Q	1752	1.531	0.726	0.443	1.047	1.335	1.756	5.672
SIZE	1752	9.067	2.686	1.904	7.216	8.559	11.132	16.749
SALES	1752	3.116	30.946	0.039	0.553	1.052	2.245	1269.000
ROA	1752	5.161	7.033	-56.539	2.025	4.794	7.931	44.271
LEV	1752	0.525	0.188	0.051	0.404	0.539	0.660	1.331
LEV.LT	1752	0.195	0.129	0.000	0.087	0.185	0.280	0.689
LIQ	1752	1.949	1.281	0.053	1.240	1.556	2.180	16.974
POWD	1752	49.507	20.246	11.000	34.000	54.000	58.000	95.000
INDV	1752	52.913	24.110	17.000	25.000	55.000	68.000	91.000
MASC	1752	56.032	23.964	5.000	42.000	62.000	70.000	95.000
UNCA	1752	63.132	19.508	29.000	46.000	64.000	80.000	93.000

In order to see the difference of the indicators across the countries, the average cultural dimensions for each country were evaluated. Some countries have outstandingly high indexes. For instance, Masculinity level in Japan is 95. It means that Japan has a high inequality in society. At the same time, managers from Japan are expected to be very assertive and competitive, so there is expected that Japanese tend to follow aggressive investment policy. The highest Power Distance value (95) is in Saudi Arabia. It means that the organisations in this country are hierarchical, and members from the lower level of hierarchy should respect. However, the Uncertainty Avoidance in this society is also high meaning the cultures prefer stability. Thus, it is expected that investment level in the Saudi Arabia is low.

B. Impact of Culture on the Interaction Between the Leverage and Corporate Investment

This section is dedicated to the results of the regression analysis run, using formulas, presented in previous section of the current research. We conduct the Hausman specification test to compare the fixed effect and the random effect models. The results suggest that the fixed effect model is most appropriate in estimating the investment equation.

Table 3 shows the regression results for all 3 models. It should be emphasized that the is observed a positive relation between the long-term leverage and investment decisions. It implies that presence of the long-term debts is perceived as less risky by the mangers and less urgent, and thus, they tend to increase their investments into new projects or fixed assets. Moreover, in these models, the cultural variables become more prominent and their impact over the investment or relation of long-term leverage with investment becomes more significant. The results suggest that managers of companies in Philippines, Saudi Arabia, Spain, Sri Lanka, Taiwan, Thailand, and Vietnam (cultural group #1) with high uncertainty avoidance, low individualism and low masculinity invest more into the fixed capital, then representatives of cultural group #3. Besides, it was found that the representatives the cultural group # 2 (Finland, Norway and Sweden), characterized by high individualism and low uncertainty avoidance highly rely on the long-term liabilities, when making their investment decisions.

In conclusion, it is applicable to state that on firm level, such factors as Tobin's Q, Leverage (both long-term and total), Sales and Liquidity play a big and crucial role in determining the investment level. As for culture, the model proved that the national culture does affect the investment level and the relations between corporate structure and investment. Such variables as Individualism, Masculinity and Uncertainty Avoidance were proved to play role in the corporate investment decisions. Nevertheless, it is recommended for owners of the firms to account such challenges and factors, when assigning a manager to the

foreign headquarter, or when looking for new foreign investors to expand the business.

Table 3

The regression results for 3 models using different estimators

	Model 1 - Fixed Estimator	**Model 2 - Random Effect Estimator**	**Model 3 - Random Effect Estimator**
1	2	3	4
(Intercept)	-4.2186***	-2.9190	-1.7626
t-test	-3.14	-1.49	-0.83
CF	-0.0954*	2.4280***	-0.0505
t-test	-1.88	8.79	-0.99
Q	-0.3744***	1.5555***	-0.2737**
t-test	-2.65	2.75	-1.96
LEV.LT	3.8740***	4.5232*	4.5217
t-test	4.24	1.83	0.71
SALES	0.7401***	0.3616***	0.7349***
t-test	128.45	11.90	125.89
ROA	0.0093	-0.3474***	-0.0020
t-test	0.78	-4.88	-0.16
SIZE	-1.0004***	-0.1089	-0.1799**
t-test	-6.62	-1.15	-2.26
LIQ	0.6258***	0.7076***	0.6148***
t-test	5.86	3.32	6.18
POWD		0.0258*	-0.0103
t-test		1.81	-0.57
INDV		-0.0219	-0.0661***
t-test		-1.41	-3.78
MASC		-0.0028	-0.0267*
t-test		-0.23	-1.72
UNCA		0.0066	0.0878***
t-test		0.42	4.52
LEV.LT:POWD			0.0580
t-test			1.08
LEV.LT:INDV			0.1267**
t-test			2.34
LEV.LT:MASC			0.0497
t-test			1.15
LEV.LT:UNCA			-0.2097***
t-test			-3.67
R-Squared	0.9904	0.85768	0.98826
Adj. R-Squared	0.9890	0.85012	0.98816
LM Test	Normal = 50.362, p-value < 2.2e-16	Normal = 49.991, p-value < 2.2e-16	Normal = 48.513, p-value < 2.2e-16

*** - coefficients are statistically significant at 1% level; ** - coefficients are statistically significant at 5% level; * - coefficients are statistically significant at 10% level

5 CONCLUSIONS

The investigation of the effect of firm-level factors on the corporate investments resulted it the following results. Cash flow, Size and Profitability turned out to be statically insignificant determinates of corporate investment in manufacturing companies. However, it was interesting to find out that Tobin's Q has a negative impact on the corporate investment. It means that the manufacturing company is overvalued on the market, then it would invest less into the fixed capital. Total leverage showed a negative sign, implying inverse relation between the total leverage and investment. As for sales and liquidity, these indicators turned out to have a positive impact on the investment.

After introducing the cultural dimensions to the model, the impact of the firm-level factors on the investment did not change. Power Distance and Individualism turned out to be statically insignificant, meaning that their impact on

investment is minimum. However, Masculinity and Uncertainty Avoidance appeared to have negative and positive affect over the investment respectively. It means that manufacturing companies from highly feminine and high uncertainty avoidance societies, like Spain or Israel are more engaged in the investments into the fixed capital than societies with High Masculinity and low uncertainty Avoidance.

Analysing the interaction term between the national culture and total leverage, it was concluded that Individualism and Masculinity have a negative and Uncertainty Avoidance has a positive moderating effect on the relation between leverage and investment. All in all, it leads to a conclusion that in such countries as Britain, Canada, Austria, United Sated, Switzerland and Japan, where the members of the society are independent and individualism - oriented and masculine, leverage plays a crucial role in determining the level of investment, and Hight proportion of debt in the capital structure will keep managers from investments.

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