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**Review of the Ph. D. thesis prepared by Milad Zargartalebi titled:
„The Interdependence of Capital Structure and Business Performance -
- Financing Decisions among German Listed Companies”**

Under the scientific supervision of dr hab. E. Sokołowska, prof. UG

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Evaluation of the Ph. D. subject and its justification

The subject of the Ph. D. thesis is the financial determinants of capital structure. The subject refers to financial factors reflecting the company's growth in determining the capital structure. The Author focuses on the interdependence between financial determinants and capital structure. And this interdependence is investigated with a wide scope of methods and tools, e.g. artificial neural networks.

The research problem is significant as much research conducted since the 50ies of the XX century did not bring a conclusive indication of the set of significant factors. The lack of conclusive results was the main reason for developing many theories of capital structure (at least five meaningful) and for identifying many financial and non-financial factors determining capital structure. But still, issues of capital structure are called „puzzle pieces

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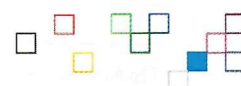
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difficult to match”¹.

The research problem is significant due to its theoretical and practical implications. Existing research do not show consistent conclusions on the impact of financial factors affecting capital structure. Conducting research on this relation would lead the Author to duplicate the existing research and not provide valuable results. The author’s attempt to find interdependence (and the impact of capital structure on financial standing) gives the opportunity for new findings and valuable conclusions. It seems that Author assumes that capital structure decisions might have been an important factor for current financial standing and future growth. This attitude proves that the Author is aware of the current scientific achievements in capital structure research. The research problem is also original – in terms of analyzed theoretical aspects, collected empirical materials, and implemented research methods.

Evaluation of the research goals and hypotheses

The main research aim is to assess the interdependence between financial standing and capital structure. Thus, the Author formulates two research questions referring to: 1) the impact of the financial factors on capital structure and 2) the impact of capital structure on financial standing. There are two research hypotheses that were later verified. These two hypotheses were presumed answers to research questions. However, these hypotheses were not explicitly written. But they are easy to be made out.

The procedure of research questions (and hypotheses) formulation is appropriate – the research questions were asked were formulated after a critical literature review. The research questions were also supported by existing research.

Evaluation of the structure and content of the Ph. D. thesis

The Ph.D. thesis dissertation consists of an introduction, three chapters, and summary, a reference list, an index of figures, and tables.

¹ DeAngelo, Harry. "The capital structure puzzle: what are we missing?." *Journal of Financial and Quantitative Analysis* 57.2 (2022): 413-454.



The introduction section includes a description of the main concept of the research: justification for the research subject, the main aim of the research, areas of research, research questions, and the structure of the dissertation.

The first chapter (contained on 42 pages) focuses on the description of the existing research on capital structure – approaches and theories. It is worth noting that the first theories on capital structure try to find the relationship between capital structure and company value. But recent theories of capital structure shifted away from this approach and focused on the attempt to explain the employed by companies' capital structures. The Author in a proper way identifies and classifies all approaches and theories. Additionally, the Author describes other theories and hypotheses that are used to explain capital structure decisions (e.g. asymmetry of information, signaling hypothesis, agency costs of free cash flow, behavioral). In this chapter, the Author describes in detail existing research on the relationship between financial factors and capital structure. The Author identifies also the main financial factors used to describe the financial standing of the company. The Author presumes that the company's growth is the background for financial factors' identification. This approach results in the specific research problem: a company's growth requires extra capital and thus affects the decisions on capital structure. The capital structure might affect the condition of future growth and financial firm performance. The Author reviews existing research on the company's growth within different theories (e.g. resource-based or market-based). Additionally, the Author identifies factors affecting the company's growth, measures, and financial ratios describing the company's growth.

The second chapter (contained on 30 pages) provides a description of the research plan: data collecting and processing, methods, and models. The Author analyses the role of financial reporting as the main source of information on financial categories describing growth and firm performance (subject scope of the research). Next, the Author describes the sampling process (object scope of the research). The Author defines the variables included in the research. But in Table 9, I believe, there is a minor mistake – it is not clear how the long-term debt ratio is calculated (to total assets or to total liabilities). Later, the Author describes



the pattern of data processing, including dealing with the outliers, descriptive statistics preparing and presenting, correlation matrix, and regression analysis for panel data (with fixed and random effects) for the whole sample but also for subsamples, comparing the subsamples (statistical tests of significance).

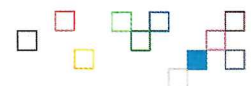
The third chapter (contained on 50 pages) includes a description of the findings. The Author presents descriptive statistics, correlation coefficients, and regression analysis results (stepwise forward regression analysis with fixed and random effects). All these methods were employed both for capital structure variables as dependent variables and for capital structure variables as independent variables with financial standing variables as dependent variables. Additionally, the regression analysis is conducted for the subsamples (depending on the sales growth, profits, size, and industry), and regression analysis results for the subsamples are presented. The Author compares the subsamples with statistical tests of significance in terms of their capital structure, financial standing. The Author implements an artificial neural network to explain the relationship between variables. In subchapters 4.6.1 and 4.6.2., the Author summarises the findings and synthesises the results referring to research questions but also discusses the findings of previous research.

The summary covers the research conclusions both theoretical and empirical with reference to the research aim.

The structure of the Ph.D. thesis is logical and the work is completed. The content of the Ph.D. thesis is contained on 141 pages. The content is consistent with the subject of the research and the aims of the research. The content of each chapter is proper and reflects the research plan.

Evaluation of sources of information and data

The Author based his research on more than 300 literature sources, including monographs and research papers in scientific journals. The literature is in foreign languages (English and German) and refers to capital structure, company growth, and financial standing. Some of the literature items come from the 50ies, 60ies, 70ies or 80ies of the XX century but



this does not mean that they are „old”, I would call them „classical” for the capital structure or company’s growth issues. Generally, the literature used in the research is current and strictly connected with the research subject.

The Author collects empirical data covering financial data from more than 300 companies over 12 years (2008-2019). The sample allows to collect more than 4,000 firm-year observations. The description of the sampling process is detailed and sufficient. The collected empirical data lead to the development of a database that is applicable in scientific research and allows the Author to verify the research hypotheses and to conclude.

The sources used in the theoretical and empirical parts are diversified and current. The choice of sources is adequate to conduct the research.

Evaluation of research methods

In the theoretical part, the Author implements the method of the literature critical analysis on the research subject: the concept and role of capital structure, financial standing, and the relations between these items. This allows the Author to systematic ordering and grouping of the analyzed issues grounded in the existing theories and research.

The Author implements research methods specific to each step of the research. At the data-collecting stage, the Author adopts a way of dealing with outliers and a lack of data. Next, the Author evaluates the quality of the data by checking the Variance Inflation Factor and Tolerance. At the main stage of data processing, the Author employs correlation coefficients analysis, regression analysis for panel data (with fixed and random effects) for the whole sample and subsamples (developed under several criteria, e.g. size), artificial neural network models for the whole sample and subsamples, statistical tests of significance when comparing the subsamples.

The choice of the research methods and the scope of the data collected supports the achievement of the research goals and the verification of the hypotheses. The Author carefully chose the methods of empirical data processing. The Author widely described the implemented methods.



The Author implements different methods of presenting the data and findings of empirical research – tables and figures. The data and findings were presented in a clear and meaningful way.

It is worth noting that the Author brings his own contribution to a big extent in the theoretical and empirical research. The Author collects, orders, and groups the data on his own. Additionally, the Author choose the research methods of data processing on his own, employs the methods, and presents the findings. What is more, when presenting the results, the Author discusses them with existing findings of previous research.

Evaluation of formal aspects of Ph. D. thesis

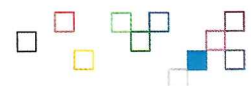
The Ph.D. dissertation contains 173 pages, including 141 pages of the main part and 32 pages of the list of references. The volume of the dissertation is appropriate. In the Ph.D. dissertation, the Author uses 37 tables and 10 figures. Tables and figures broaden the ways of presenting the content.

The Author presents the subject and the research in a clear way. The Author uses language appropriate to the Ph.D. level. The dissertation contains vocabulary and terminology within the economics and finance discipline. The Author knows how to write scientific papers.

The Ph.D. dissertation is prepared carefully without big mistakes in text editing. However, there are minor spelling and grammar mistakes. But these mistakes do not affect the substance of the dissertation.

The general evaluation of the Ph. D. thesis, its advantages and discussion

There is much research on capital structure but this one is original and reflects the current view on the inconsistency in capital structure research. The dissertation attempts to find interdependence between capital structure and financial standing by using specific methods (artificial neural networks) but also presents a new attitude towards capital structure as the factor affecting a company's growth. Although the Author did not find one or several



factors affecting the capital structure decisions, the scope of research, quality, and quantity of the collected data, applied statistical methods, and obtained results constitute a good quality Ph.D. dissertation.

Summing up, the Ph.D. dissertation deserves a positive evaluation.

The advantages of the Ph.D. dissertation are as follows:

- accurately identified the research problem and the scope of research,
- originality of the research subject and correctly formulated research aims,
- the long list of references,
- empirical data properly ordered and clearly presented,
- advanced statistical methods adequately implemented,
- findings clearly presented,
- results and conclusions properly formulated.

However, there are some disadvantages of the dissertation:

- lack of explicitly formulated hypotheses.

This shortcoming is easy to be eliminated and does not diminish the value of the Ph.D. dissertation. This research gives a good ground for future research and attempts to find answers to several new research questions, e.g.:

- what is the order of capital collection of growth companies (does the increase in capital follow the pecking order theory or follow the rule of optimal capital structure)?
- to what extent the decisions on capital structure are affected by individual behavioral biases of managers and to what extent by the strategy and behavior of peer companies in the industry/country?
- how capital structure is affected by the positive/negative effects of financial leverage (coming from the difference between equity profitability and assets profitability)?

I believe that Mr. Milad Zargartalebi represents an adequate level of theoretical knowledge and methodological skills in the research area. The Author proves that is capable to conduct research. I believe that from theoretical and methodological points of view, the research is properly completed: research aims are achieved and research questions are answered.



Final conclusion

Taking into account all the above remarks, I declare that the Ph.D. dissertation by Milad Zargartalebi titled „The Interdependence of Capital Structure and Business Performance - Financing Decisions among German Listed Companies” meets all formal and customary requirements for the doctoral dissertations and I am applying for admission of Mr. Milad Zargartalebi to the next stages of the Ph.D. procedure.

Zargartalebi

