Report on Bachelor / Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University

Student:	**Lukáš Tuček**
Advisor:	**Evžen Kočenda**
Title of the thesis:	**Marginal Effect of R&D Expenditures on Value of Technology Companies**

***OVERALL ASSESSMENT** (provided in English, Czech, or Slovak):*

Please provide your assessment of each of the following four categories, summary and suggested questions for the discussion. The minimum length of the report is 300 words.

Contribution

This thesis investigates the impact of the research and development (R&D) on a company value in technology industry where the R&D enters as means of efficiency improvement to existing production as well as means of production itself. Further, the thesis analyzes differences in the R&D impact on company value dependent on the company's product cycle nature. The innovative approach rests in an alternative approach to R&D intensity measure and its empirical application on the technology leaders company data over the period from 2013 to 2018. The R&D intensity is not easily measured due to various factors entering its construction as well as potential entry data contamination. The R&D intensity index in the presented thesis was innovatively constructed by employing principal component analysis (PCA), "relying on reported R&D intensity (reported research and development expenditures incurred in given year with no capitalization compiled from income statement item and accompanying notes as a fraction of total sales), fraction of intangible assets to total assets and lastly 'typical value' for R&D intensity as a fraction of operating costs among 3 groups of data collected, sorted into 'high', 'medium' and 'low' R&D intensity companies." Resulting first principal component captured 87 percent of variation that is more than enough to serve as an accurate proxy measure for the R&D intensity. The results of the analysis show that (i) overall results are mostly in line with those found in the existing literature and show diminishing returns to R&D intensity. However, new key results of the thesis rest in the evidence that (ii) there exists a negative effect between a company's R&D expenditures with respect those of the segment leader company; (iii) there does not exist a lag difference between the groups of companies with open and closed cycle product development.
The results of the thesis are based on a well-executed and detailed analysis, including also a brief case study. The thesis provides interesting insights and ranks favorably when compared to the theses defended at the IES.

Methods

The sample consists of the panel of yearly data on number of firm-specific financial items from a set of international companies. Initial list of 849 potential companies was carefully reduced to 62 companies deemed as suitable candidates for further analysis. Via the PCA, the innovative R&D intensity index is constructed.
The analysis is then performed as a fixed effects panel regression of the company market value where predictors are relevant firm-specific characteristics as well as the R&D intensity measure. This is a best practice in this area of research. The analysis is performed flawlessly and shows familiarity of a student with the field. No robustness checks are performed, though.
The tested hypotheses are developed in a thesis proposal, but they are not formally presented in the thesis itself.

Literature

The literature review section summarizes the current state of research in the field. It is quite exhaustive, and it is also conveniently divided into several parts. The section is not only a standard

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literature review, but it offers quite useful overview that provides further motivation and justifies the analysis. Literature is reviewed first from the theoretical perspective and tackles the issues of the delimitations of a technology company, position of the R&D in technology Industry, economies of scale, and time aspect of the R&D. The review also offers relevant literature with respect to empirical results. Hence, the literature is reviewed in a detail and covers all relevant papers and angles.

Manuscript form

The manuscript conforms to formal requirements for the master thesis. It reads well and the flow and grammar are fine. The results are presented with enough detail. Introduction is short but clear, to the point and it motivates well the researched topic. Data are fully described. Hypotheses are clearly stated in a proposal but not in the text; on the other hand, the null hypotheses are correctly specified in a negative form. Tables and figures are presented in an organized and legible manner. References are complete.

Summary and suggested questions for the discussion during the defense

The thesis represents a solid piece of empirical work on the subject of the R&D impact on technology company value. The results of the Urkund analysis do not indicate significant text similarity with other available sources. In my view, the thesis fulfills the requirements for a master thesis at IES, Faculty of Social Sciences, Charles University, and I recommend it for the defense and suggest a grade A.

SUMMARY OF POINTS AWARDED (for details, see below):

CATEGORY		POINTS
Contribution	*(max. 30 points)*	26
Methods	*(max. 30 points)*	27
Literature	*(max. 20 points)*	19
Manuscript Form	*(max. 20 points)*	19
TOTAL POINTS	*(max. 100 points)*	**91**
GRADE	**(A – B – C – D – E – F)**	**A**

NAME OF THE REFEREE: Evžen Kočenda

DATE OF EVALUATION:

Digitally signed (29.08.2020)
Evžen Kočenda

_____
Referee Signature

<u>**EXPLANATION OF CATEGORIES AND SCALE:**</u>

CONTRIBUTION: *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

METHODS: *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

LITERATURE REVIEW: *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

MANUSCRIPT FORM: *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

<u>*Overall grading:*</u>

TOTAL	GRADE
91 – 100	**A**
81 - 90	**B**
71 - 80	**C**
61 – 70	**D**
51 – 60	**E**
0 – 50	**F**