

CRAM's Research Group Baseline Structure for Academic Papers

(seminar-, project-, Bachelor-, Master-, PhD thesis)

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In the past, the Chair allowed students to follow a structure that was agreed upon with their supervisor.

Recently, students have approached the professor with the request to provide more guidance on a successful structure. The following structure is the Chair's baseline case. Deviations are of course possible, but need to be motivated well and carry the risk of being inadequate. Again, the philosophy is 'give the student a chance to shine' and 'be aware that Abschlussarbeiten are graded by a second professor who might know little about the topic. The Chair's baseline structure follows the structure of a research paper.

Abstract

State in less than two paragraphs, roughly 150 words, what is the research question of the thesis, and what you find. Do not pith nor market your findings. Focus on the facts only.

Chapter 1: Introduction

1st sentence of 1st paragraph: Motivate why your research question is important and relevant to the research community. Ideally, you cite some important research paper that supports your argument. Picture a reader who will ask "Why should I care reading that paper"). In his your job to convince the reader that your work is worth his/her time.

Remaining part of 1st paragraph: (i) summarize the open issues that you are addressing, (ii) the procedure, methodology, data, et cetera that you use to solve the open issue, (iii) and summarize the things that your research has accomplished and that you are most proud of.

2nd paragraph and onwards: State in more detail what exactly the thesis does, how it differs from the work of others and what you find.

The last paragraph says quickly a word on each chapter, such as chapter 2 does, chapter 3 analysis, et cetera.

Chapter 1.1: Related Literature

It is to be expected that this subchapter is very short for non-PhD and non-MA research papers. This subchapter summarizes the state of the literature and helps the reader to understand what is really new in your thesis and what is not. For a non-PhD research paper, the professor does not expect you to find new results. But, it is part of high quality research to show that you are aware of the most important papers that relate to your work.

The professor expects the assigned supervisor of the thesis to point the student to the most relevant research papers. As our research is quant in nature, the professor does not expect students to spend days to research out the literature. It is a matter of efficiency, that the supervisor reveals his know-how so that the student can focus on the quant work.

Chapter 2: Methodology

Explain the methods that you implement and any type of algorithm that is crucial for your analysis. The professor lists a couple of examples for you to better understand what to do. If your research question is to replicate a research paper, then you would explain the working of that research paper. If your task is to analyse data with some Machine Learning algorithms, then you would explain the Machine Learning algorithms. If your task is to manipulate data based on numerical or financial concepts to get something to work, then you would explain here the workings of these different manipulations. Important, every formula you state, every argument you make needs to be supported by a citation of an academic paper or book. It is unlikely that you are developing something from scratch. Even if you do, chances are high that some researcher has developed something similar. You need to give credit to that research. It is most important that an academic paper does neither convey personal opinions nor state unsupported claims. Hence, if you claim a relationship holds, you have to proof that in the appendix. The more efficient way is to cite a paper that contains the proof.

We do not do math research, but quant work relies on math concepts. Hence, explain the methodology as simple as possible. You do not get extra credit for showing many equations. But you will receive extra credit if you explain a methodology in a particular interesting and useful way. Make it a joy for the reader to follow your exposition. Use sub-chapters to divide the methodologies into logical sub-groups.

Chapter 3: Data

Most thesis work will be based on data. In this chapter, you explain in detail the (i) data source, (ii) data selection, and anything that allows the reader to replicate your data.

Chapter 4: Computer Programs

This chapter is missing in a PhD research paper. The professor advises non-PhD research papers to incorporate such a chapter. Depending on your thesis topic, that chapter can be short or long. The idea is to explain in detail how you implement the methodologies and the data work with software.

If you use software packages to e.g. fit a model to data (econometrically or based on machine learning), then, explain the software package.

If you structure a code project yourself, then explain here how you do that, which classes do you use, which functions etc. The functions execute part of the concepts from your methodology chapter. This allows you to double check whether you have talked about all methodologies in chapter 2.

The goal of that chapter is to give students a chance to shine and teach the reader how to replicate your analysis.

Chapter 5: Findings

Here, you provide a nicely readable summary of meaningful findings. Importantly: do not sell your findings and do not pitch anything. Stay with the facts. Report what you find, whether it is significant or not and how it relates to your original research questions and the broader literature (see your introduction).

You are not graded on what you find, but on whether you analyse the topic in a scientifically clean way.

Chapter 6: Robustness

Here, you collect different robustness tests. Most empirical work is subject to data mining and insufficient econometrics. The goal of the robustness section is to check the sensitivity of your results with regard to slight changes in the methodology or in the data.

When working with the code and data, you likely realize whether variations in the methodologies or data input have a sizeable effect on your outcome. Take that as a starting point for a robustness test. Consult the literature for standard robustness tests.

Ask the supervisor for suggestions on how to evaluate the robustness of your work.

Chapter 7: Conclusion and Outlook

Spend 3 paragraphs or less to summarize your research question and your findings. Do not copy the introduction, but add something new.

Spend 2 paragraphs or less on your outlook. For example, which questions could you not answer, which problems did you face that other thesis work could address, what are new research questions that your work has uncovered.

References

State the bibliography. Follow any standard and if in doubt, the supervisor will provide a template.

Appendix

Collect proofs, derivations and data manipulation work in the appendix.

Figures and Tables

Figures and tables go here. Make sure each table and figure is discussed in the text.