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Supervisor: Name

Master thesis, Economics and Business Administration

Major: Business Analytics

NORWEGIAN SCHOOL OF ECONOMICS

This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible – through the approval of this thesis – for the theories and methods used, or results and conclusions drawn in this work.

Acknowledgements

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Norwegian School of Economics

Bergen, December 2018

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Abstract

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1 Introduction

1.1 This is a heading

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2 Background

I am here citing one of my sources ([James et al., 2013](#)).

3 Data

4 Methodology

5 Analysis

6 Discussion

7 Conclusion

References

James, G., Witten, D., Hastie, T., and Tibshirani, R. (2013). *An introduction to statistical learning*, volume 112. Springer.

Appendix

A1 Test

Figure A1.1: NHH logo

NHH



8 Tips and tricks to get you started

This is just a few notes to help you get started with your \LaTeX project. The idea behind this template is to give you a good starting point from where you can build your thesis or report. \LaTeX has many possibilities and you can do almost anything you like. First I recommend reading all three parts of this introduction if your are new to the program: [https://www.overleaf.com/learn/latex/Free_online_introduction_to_LaTeX_\(part_1\)](https://www.overleaf.com/learn/latex/Free_online_introduction_to_LaTeX_(part_1))

8.1 Adding chapters or sections

To get a good overview of the document this template is divided into different sections/subfile where each section/subfile represents a chapter. This gives the possibility to compile a single section at a time and is a nice way to structure the document. If you want to add new sections just rightclick on the chapters folder and choose *New File*. In this file add to following code:

```
\documentclass[../Main.tex]{subfiles}
\begin{document}

% Write stuff here

\biblio
\end{document}
```

Also add the filepath of that new section to *Main.tex*. The sections will be ordered in the final pdf the way you order them in *Main.tex*. Here is one example where the section/subfile is named *NewSection.tex* and is in the *Chapters* folder:

```
\section{Name of section}
\subfile{Chapters/NewSection}
```

8.2 Headings and subsections

Within each section one creates heading by using the command `\subsection{Heading here}`. The subsections you create will automatically be added to the table of contents. One can have different levels of headings using

`\subsubsection{}` or `\paragraph{}`. The different headings will be marked X.1 for subsections, X.1.1 for subsubsections and X1.1.1 for paragraphs, where X represents the chapters.

8.3 Figures, tables and equations

One of my favourite things in \LaTeX is how it handles figures, tables and equations. Here are some examples of how to implement it in your document with code examples.

8.3.1 Figures

Figures and images are added using the the following environment:

```
\begin{figure}[H]
  \centering
  \caption{NHH-logo}
  \includegraphics[width=0.2\columnwidth]{Images/nhhlogo2.png}
  \label{fig:logo}
\end{figure}
```

The code above will produce Figure 8.3.1. One can use many fileformats here including pdf, png, jpeg, jpg etc. The caption can be placed above or below the image and appear in the compiled pdf according to where you place it. The `\label{}` command has to come after the caption and is used for referencing the figure later in the document with the `\ref{}` command. The numbering of figures, tables and equations will change according to chapter. E.g. Figure 3.1, Table 2.4, Equation 6.2. All of them have separate counters so one can have Table 4.2 and Figure 4.2 in the same document.

Figure 8.3.1: NHH logo

 The logo consists of the letters 'NHH' in a bold, blue, sans-serif font.


8.3.2 Tables

Tables can be designed any way you like. Tables are numbered the same way as figures and can also be referenced directly if you give them a label. There are several \LaTeX table generators online, for example <https://www.tablesgenerator.com/>, which work very well. There is also a package in R called `xtable` which transforms R-tables to \LaTeX tables/code. This can be very helpful and save a lot of time if you are working with R. The following code produces Table 8.3.1.

```

\begin{table}[H]
\centering
\caption{Variables in datasett}
\begin{tabular}{rr}
\hline
\hline
Variable name & Type of variable\\
\hline
Postal code & Categorical \\
Date of birth & Date \\
Municipality & Categorical \\
Type of car & Categorical\\
Registration date & Date \\
Sex & Categorical\\
Age & Numerical \\
\hline
\hline
\label{tab:Variables}
\end{tabular}
\end{table}

```

Table 8.3.1: Variables in datasett

Variable name	Type of variable
Postal code	Categorical
Date of birth	Date
Municipality	Categorical
Type of car	Categorical
Registration date	Date
Sex	Categorical
Age	Numerical

8.3.3 Equations

Equations are something that could be a problem in many other programs which creates documents, e.g. Word. \LaTeX is used by many researchers which writes a lot of equations because it's clean and easy for this purpose. There are code strings for Greek letters, special symbols, mathematical symbols etc. Equations are normally numbered. To create numbered equations one uses an equation environment, see below. The environment/code chunk displayed creates equation 8.1. The numbering of equations also follow the chapters. One can also write inline equations in a paragraph using two dollar signs, \$\$, and writing inside the dollar signs. E.g. `$x+x=y$` will produce $x + x = y$.

```
\begin{equation} \label{equ:test}
\hat{f}(x) = \sum_{b=1}^B \lambda \hat{f}^b(x)
\end{equation}
```

$$\hat{f}(x) = \sum_{b=1}^B \lambda \hat{f}^b(x) \quad (8.1)$$

8.3.4 Appendix

In the appendix the numbering is changed. Every subsection is number A1, A2, A3 etc. Figures, tables and equations are numbered according to their subsection, Figure A1.3, Table A3.5 etc.

8.4 References

Referencing in L^AT_EX can be done many different ways, with many different packages. In this template the package *natbib* and the the *apa* style is used for referencing. Most referencing packages have a similar setup. In the Reference.bib file you can find several examples of how to add a source to the document. After a sources has been added to the .bib file one can cite it in the text using several commands. I recommend reading the following link for more information regarding citation using natbib: https://no.overleaf.com/learn/latex/Natbib_citation_styles. Another common package for referencing and citation is *biblatex*. Only sources that are cited within the text will appear in the reference list. One can use a command called nocite to list all references in the .bib file, even the ones not cited in text. If you find your source on Google scholar you can get the code chunk needed to add the source to your L^AT_EX .bib file directly. This is done by clicking the citation button and choosing *BibTex* in Google scholar.

If you are using this template in English do not touch the apaeng.bst file as this is necessary for proper citation and a proper reference list. The apaeng.bst file ensures citation in the APA style. If you wish to use another style I would recommend the following site: https://www.overleaf.com/learn/latex/Natbib_bibliography_styles. If you want to change the citation style all you have to do is switch from "apaeng" in line 71 and 72 of the Main.tex file, to one of the style names mention in the link. The apaeng.bst file is added to this template to make it more stable.

8.5 Some useful notes

Commenting in latex is done by adding a percentage sign in front of what you want to comment. Only that specific line will become a comment. If you want to write an actual percentage sign in your text you have to add a backslash before the percentage sign like this, $\%$. One also has to add a backslash in front of a dollar sign, like so $\$$, to produce a dollar sign. This because the symbol is used for inline equations.

One can quickly convert text to italic or bold by marking the wanted text and pressing ctrl+i (cmd+i for Mac) or ctrl+b (cmb+b).

All labels have to be unique for crossreferencing purposes. As mentioned earlier

`\ref{labelName}` will produce the number of the figure/table/equation and the command `\pageref{labelName}` will produce the page where the figure/table/equation is located.

There are lots of sources online where you will find answers to most, if not all, of your question regarding \LaTeX . Google is your friend!

Last, but not least, good luck with your thesis!