

A Latex tutorial using Latex

A Short Introduction

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Outline

- 1 What is Latex and why use it?
- 2 Use Latex in 3 steps
- 3 Basic Structure
 - Example of .tex file
 - Bibliography: Example of .bib file
- 4 Objects
 - Equations
 - Graphs
 - Tables
- 5 Final Tips

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What is Latex and why use it?

- \LaTeX is intended to provide a high-level language that accesses \TeX language to produce organised, clean and standard academic articles.
- Most academic articles in fields that use maths in some extent use \LaTeX : export your results from Stata, R, Sage/Python, etc to your paper with little effort and editing.
- Very handy for citations and references.
- It allows global **and** local control of layout, colour and fonts.
- No matter if you skip a line or hit the space bar twice by mistake, nothing changes in the final document.
- A portable PDF file is the final output.

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Use Latex in 3 steps

- 1 Install a \LaTeX editor. e.g. TeXnicCenter, Winedt etc.
- 2 If you use Windows, install Mik \TeX : Provides a set of tools necessary to prepare documents using the $\text{\TeX}/\text{\LaTeX}$ markup language. (It automatically patches to the \LaTeX editor) For Mac users, you will need Mac \TeX . For Linux users, you can use Mik \TeX , but need to make some adjustments.
- 3 Use the `simplest_article.tex` file as a template.

You may need to reverse 1 and 2 for some softwares.

Basic Structure: Example of .tex file

- The following slides dissect the components of a basic \LaTeX document.
- In order to produce a \LaTeX document, you need a .tex file and a .bib file.

Basic Structure: Example of .tex file

- This is an example of the structure of .tex file:

```
\documentclass{article}
\usepackage{natbib}

\begin{document}

\author{Alan U. Thor}
\title{The Effect of Price on Demand}
\maketitle

\begin{abstract}
Write your abstract here.
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}
\bibliography{simple}

\end{document}
```

Basic Structure: Example of .tex file

```
\documentclass{article} <= DEFINES THE KIND OF DOCUMENT YOU NEED.
\usepackage{natbib}

\begin{document}

\author{Alan U. Thor}
\title{The Effect of Price on Demand}
\maketitle

\begin{abstract}
Write your abstract here.
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}
\bibliography{simple}

\end{document}
```


Basic Structure: Example of .tex file

```
\documentclass{article}
\usepackage{natbib}      <= LOADS A PACKAGE YOU MAY NEED TO USE.

\begin{document}

\author{Alan U. Thor}
\title{The Effect of Price on Demand}
\maketitle

\begin{abstract}
Write your abstract here.
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}
\bibliography{simple}

\end{document}
```

Basic Structure: Example of .tex file

```
\documentclass{article}
\usepackage{natbib}

\begin{document}          <= EVERY DOCUMENT THAT BEGINS...

\author{Alan U. Thor}
\title{The Effect of Price on Demand}
\maketitle

\begin{abstract}
Write your abstract here.
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}
\bibliography{simple}

\end{document}          <= ...NEEDS TO END.
```

Basic Structure: Example of .tex file

```
\documentclass{article}
\usepackage{natbib}

\begin{document}

\author{Alan U. Thor}    <= OBVIOUS!
\title{The Effect of Price on Demand}  <= OBVIOUS!
\maketitle               <= OBVIOUS!

\begin{abstract}
Write your abstract here.<= OBVIOUS!
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}
\bibliography{simple}

\end{document}
```

Basic Structure: Example of .tex file

```
\documentclass{article}
\usepackage{natbib}

\begin{document}

\author{Alan U. Thor}
\title{The Effect of Price on Demand}
\maketitle

\begin{abstract}
Write your abstract here.
\end{abstract}

Write your paper here.

\bibliographystyle{econometrica}<= DEFINES THE KIND OF BIBLIGRAPHY STYLE.
\bibliography{simple} <= LOADS YOUR REFERENCES STORED IN "simple.bib".

\end{document}
```

Basic Structure: Example of .tex file

- Then, if you type this set of commands in a \LaTeX editor and typeset it...

```
\documentclass{article}

\usepackage{natbib}

\begin{document}

\author{A. U. Thor\thanks{I would like to Odin for very helpful comments. Any errors are mine.
a.u.thor@sms.ed.ac.uk} \ \ Department of Economics \ \ University of Edinburgh}
\title{The Effect of Price on Demand}
\date{}
\maketitle

\begin{abstract}
This paper analyses the effect of a price rise in a demand function.
\end{abstract}

\section{Introduction}
My paper is based on \cite{Smith1776}, \cite{Keynes1936} and \cite{Becker1968}.
% (Details on citations below! Ignore the equations for a while.)

\section{Model}

$$Q = \alpha + \beta P + \epsilon$$

% (Ignore the equations for a while.)

\subsection{Solution}

$$\frac{dQ}{dP} = \beta < 0$$


\section{Conclusion}
The effect is negative.

\bibliographystyle{econometrica} % (Details on bibliography below!)
\bibliography{simple} % (Ignore these for a while.)
\end{document}
```

Basic Structure: Example of .tex file

- ... you will get a document like that:

The Effect of Price on Demand

A. U. Thor*
School of Economics
University of Edinburgh

Abstract

This paper analyses the effect of a price rise in a demand function.

1 Introduction

My paper is based on Smith (1776), Keynes (1936) and Becker (1968).

2 Model

$$Q = \alpha - \beta P + \epsilon$$

2.1 Solution

$$\frac{dQ}{dP} = \beta < 0$$

3 Conclusion

The effect is negative.

References

BECKER, G. S. (1968): "Crime and Punishment: An Economic Approach,"
Journal of Political Economy, 76, 169-217.

KEYNES, J. M. (1936): *The General Theory of Employment, Interest and Money*. Palgrave Macmillan.

SMITH, A. (1776): *An Inquiry into the Nature and Causes of the Wealth of*

Basic Structure: Example of .tex file

- Notice that the text written after % does not appear in the final document.
- `\\` makes it skip a line.
- If you tried to run this code (it is advisable to finish reading this presentation first) and didn't use the simple.bib file, you will get an error message. Actually, it is not unlikely you will get it even if you used the .bib file and (you thought) you did everything correctly. This seems to be a hurdle to overcome, but it is actually a helpful device to point out your (generally silly) mistakes: what happened and in which line. [Final Tips](#) section has more on this.

Basic Structure: Example of .bib file

- When you are writing in \LaTeX , you need an additional file to include you references.
- In the previous example, a file with extension .bib should be in the same folder.
- You simply type the following in any text processing editor (notepad will do):

Bibliography

```
@ARTICLE{Becker1968,  
title = {Crime and Punishment: An Economic Approach},  
author = {Becker, Gary S.},  
year = {1968},  
journal = {Journal of Political Economy},  
volume = {76},  
pages={169-217},  
}
```

```
@Book{Smith1776,  
author={Adam Smith},  
title={An Inquiry into the Nature and Causes of the Wealth of Nations},  
publisher={London: W. Strahan and T. Cadell},  
year=1776,  
edition={},  
}
```

```
@Book{Keynes1936,  
author={John Maynard Keynes},  
title={The General Theory of Employment, Interest and Money},  
publisher={Palgrave Macmillan},  
year=1936,  
edition={},  
}
```

Basic Structure: Example of .bib file

- And save as .bib (you type that, as this extension will probably not be available)
- In the present example, name it “simple”.
- After typesetting once, run Bib Tex in your \LaTeX editor, then typeset **twice**.
- Again, you don't need to type all that. Those codes are available online for most papers.
- With these two files saved in the same folder, you are now ready to come back to section [Basic Structure](#) and run the code.

Equations

- In a \LaTeX document, it is very handy to write equations:

$$Q = \alpha + \beta P + \gamma I + \epsilon \tag{1}$$

$$1 + 2 + \dots + n = \frac{n(n+1)}{2} \tag{2}$$

Equations

- The previous equations would come up if you type:

```
\begin{equation}
  Q = \alpha + \beta P + \gamma I + \epsilon
\end{equation}
```

```
\begin{equation}
  1 + 2 + \cdots + n = \frac{n(n + 1)}{2}
\end{equation}
```

- This can get messier for more complicated equations. However, most \LaTeX editors have easy-to-click buttons. You just click on the Greek letter or notation you need and it types it for you.
- If you are using softwares like Sage/Python, you can translate any equation to latex and just past it in your code. A useful resource for more complicated but frequently used equations is [Wikipedia](#). It has all equations written in \LaTeX code. Just look for the source of the corresponding web page.

Graphs

Maybe a graph is necessary to make a point.

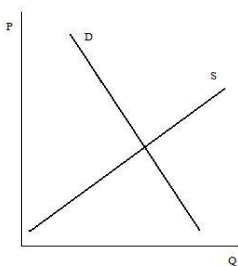


Figure: Supply X Demand

Graphs

Corresponding code:

```
\begin{figure}  
  \includegraphics [width=4cm] {market.jpg} \\  
  \caption{Supply X Demand}  
\end{figure}
```

- Your picture/graph (in this case: market.jpg) must be in the same folder. (Or you type a path for a alternative folder)
- Compatible files: pdf, png, jpg, etc
- Again, most \LaTeX editors have easy-to-click buttons for that too. You just click on a button and it types this code for you.

Tables

Table: Demand Function Estimation

	(1) Demand	(2) Demand	(3) Demand (Domestic)
Constant	0.87** (0.41)	0.71** (0.27)	0.91*** (0.00)
Price	-0.87*** (0.21)	-0.71*** (0.17)	-0.60*** (0.00)
Income		8.11*** (2.20)	9.34*** (0.00)
Observations	5435	5435	2319
R^2	0.90	0.92	0.91

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Tables

Corresponding code:

```

\begin{table}\footnotesize
\begin{center}
\caption{Demand Function Estimation} \label{tab:demand}
\begin{tabular}{lccc}
\toprule
& (1) & (2) & (3)\\
& Demand & Demand & Demand\\
& & & (Domestic)\\
\hline
& & & \\
Constant & 0.87** & 0.71** & 0.91*** \\
& & (0.41) & (0.27) & (0.00)\\
Price & -0.87*** & -0.71*** & -0.60*** \\
& (0.21) & (0.17) & (0.00)\\
Income & & 8.11*** & 9.34***\\
& & (2.20) & (0.00)\\
& & & \\
\midrule
Observations & 5435 & 5435 & 2319\\
R2 & 0.90 & 0.92 & 0.91\\
\bottomrule
\multicolumn{4}{l}{*** p<$0.01, ** p<$0.05, * p<$0.1} \\
\end{tabular}
\end{center}
\end{table}

```


Tables

- Once again, most \LaTeX editors have easy-to-click buttons for that too. You just click on a button and it types a template for you.

Avoid Common Mistakes

- Command starting with `\begin{ }` need to end with the the corresponding `\end{ }`.
- Look for unmatched `)] }` etc.
- Put figures and bib files in the same folder or write a well defined path.
- As seen above some characters have a special meaning and can't be typed directly. To use `# $ % ^ & _ { } ~ \`, you need to type, respectively:

```
\# \$ \% \textasciicircum{} \& \_ \{ \} \~{} \textbackslash{}
```

Don't fear Error Messages

- This is enough to start writing a paper in \LaTeX . However, it must be clear that mistakes *will* happen and error messages *will* show up.
- There is a excellent Wikibook on \LaTeX (<http://en.wikibooks.org/wiki/LaTeX>) to help you to find out what went wrong.
- But before doing anything, you need to dismiss the error (or warning) message. \LaTeX Wikibook has an entire section on this issue, but the more common way to say to your \LaTeX you are aware about the problem and will do something about it is to type x and hit enter.
- Then read the message and look for the mistake in the indicated line number. (“Ctrl+=” makes the numbers of the lines to appear.)