

Table design

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L^AT_EX users generally seem unaware of current ideas on table design. The following table is a typical L^AT_EX production:

L ^A T _E X table design		
	1991	1992
Unemployment ($\times 1000$)	500	600
Balance of Payments (10^9 Hfl)	24	25

In a professionally-designed publication, the above table would probably look more like this:

Common sense table design

	1991	1992
Unemployment ($\times 1000$)	500	600
Balance of Payments (10^9 Hfl)	24	25

If you read a book on typography, e.g. [1] or [2]: you'll find that they use rules and boxes with far more restraint, and rely more on white space and variation in typefaces for organization.

The table examples in [3] were (I hope) merely intended to demonstrate techniques. However, their style was almost unanimously adopted by L^AT_EX users.

So I think that some design education is in order. I am not a design professional. However, many people never even think about table design; so if I set them thinking and they start reading books on typography by real professionals then this paper has served its purpose.

Note. This is not meant to be a technical exposition. [4] and [3] tell you most of the technical things you need to know. All the same, I have indicated here and there with what codes or constructs you might accomplish certain effects.

1 Basics of table design

A table should present its information as clearly as possible. Typographic means to organize this information includes rules, white space, choice of typefaces and appropriate headings and captions. But if a feature doesn't help to make a table clearer, it had better be left out.

Macroeconomic memoranda

1.	Karl Lausche, Maria Vader, Theo Zernike	Money illusion and savings illusion; an illusionistic look on neo-Hegelian monetary theory
2.	Hendrik Kooyker, Johan Zonderlink	BIGTHUMB, a software package for handling missing and politically incorrect data
3.	Anneke Draaijer	Consumer behavior, expectation formation and the long-term economic effects of risk-aversion

1.1 Rules and boxes

Rules have their uses. They can emphasize headings. They can also separate different items and unite the several data for one item, as in the table above. Vertical rules, as in the table below, would have the opposite effect and would be no help at all in making the table easier to read.

Macroeconomic memoranda

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But even in the earlier example one might wonder whether white space wouldn't have been more effective than rules.

A table may also be boxed to set it off from the surrounding text. But L^AT_EX users normally don't go through the trouble of wrapping text around tables and figures; therefore, there is little reason to box in a table.

In all cases, there should be enough space between rules and text. A rule too close to text interferes with readability and makes the text look cramped.

An alternative to rules or boxes is a shaded background, preferably in a second color. This is not supported by L^AT_EX as far as I know, although with PostScript some tricks are possible (see e.g. [4] section 11.6). This formatting device requires high output quality in order to look good.

1.2 Alignment and justification

A column of text labels can be left- or right-aligned, or centered. If the table has any length at all, a centered column can easily look sloppy. With left- or right-alignment there is at least one straight edge to give the column structure. Think twice before centering a column in a longer table.

A column of figures is usually decimally aligned (see under section 3 for some technical issues). If the figures are unrelated, you may consider right- or left-alignment instead.

Don't justify text inside a narrow column or you'll end up with large distracting holes between words. This is easier said than done, but see under Section 3.

1.3 Headings

Headings may get added emphasis by setting them bold, italic, at a larger point size or in a different typeface. Don't go overboard, though. The heading of a centered or decimally-aligned column may need some manual adjustment.

2 An example

We illustrate some of these points with a before-and-after example, see below. It is sufficiently complex to illustrate a number of points; I am not implying that it is any worse than other L^AT_EX tables I have seen. The 'before' table is a L^AT_EX remake of a table from [5]. At an earlier occasion, it has been used as a demonstration of L^AT_EX's table-making capabilities.

Example: before and after

Economic forecasts for 1992

variabele	forecast	
	Grecon	CPB (MEV '92)
	% mutations w.r.t. 1991	
real consumption (c)	1.1	1.25
price index consumption (p_c)	2.6	3.25
real investments (i_m)	1.4	-2.5
export price index (p_b)	3.5	3.25
real import of goods (m)	4.1	3
real output of goods (v')	2.5	2.1 ^a
real domestic production (b_{pr})	1.4	1.6
private employment (a)	0.32	0
wage rate (l)	4.0	4
government income (%) from output of goods (iso')	-0.1	- ^b
	absolute quantities	
unemployment ($\times 1000$ persons)	510 ^c	525
balance of payments (10^9 Hfl)	24.4	25.0

^aThe quantities v' and b_{pr} aren't given as such by the CPB. The CPB data presented here are computed using their GRECON definitional equations. For details, see appendix D.

^bNot available.

^cNot a model outcome: see text in par. 3.1 en 3.2.

The example table contains footnotes; therefore it is enclosed in a minipage environment.

2.1 Rules

The most conspicuous shortcoming of the 'before' example is the tight spacing between horizontal lines and text. I am not aware of a parameter which controls this distance; however, the '\l' command takes an optional length parameter, also in a \tabular environment.

In this case, as in most cases, the vertical rules are better left out. It is advisable to begin and end the column specification with @{\}:

```
\begin{tabular}{@{\l@{}}r@{\l@{}}l@{\l@{}}}
```

Without vertical rules, no white space needs to be reserved at the left- and righthand sides.

Actually, I used a tabular* environment, which allowed me to set the width to \linewidth: exactly the width of the minipage.

Another unfortunate detail is the footnote rule next to the bottom rule. I solved this by dropping the bottom rule. Also, I redefined in a separate style file several aspects of minipage footnotes: among others, the footnote rule now stretches across the width of the minipage.

The rule under the title is not part of the \tabular-environment, but is constructed as a '\rule'-rule. This made it easy to give it a custom thickness. Again, the length was set to \linewidth.

Economic forecasts for 1992

	Grecon	CPB ^a
<i>mutations w.r.t. 1991</i>		
real consumption (c)	1.1	1.25
price index consumption (p_c)	2.6	3.25
real investments (i_m)	1.4	-2.5
export price index (p_b)	3.5	3.25
real import of goods (m)	4.1	3
real output of goods (v')	2.5	2.1 ^b
real domestic production (b_{pr})	1.4	1.6
private employment (a)	0.32	0
wage rate (l)	4.0	4
government income (%) from output of goods (iso')	-0.1	- ^c
<i>absolute quantities</i>		
unemployment ($\times 1000$)	510 ^d	525
balance of payments (10^9 Hfl)	24.4	25.0

a. MEV '92

b. The quantities v' and b_{pr} aren't given as such by the CPB. The CPB data presented here are computed using their GRECON definitional equations. For details, see appendix D.

c. Not available

d. Not a model outcome: see text in par. 3.1 en 3.2.

2.2 Headings

As to the various headings: the word *forecast* repeated information from the table header and was dropped. The word *variable* could also safely be omitted.

Aligning the Grecon- and CPB headings at the bottom instead of the top would have been an improvement, but moving the text ‘*MEV ’92*’ to a footnote was even better. Their horizontal positioning was adjusted by hand, adding ‘~’ here and there.

The ‘*% mutations...*’ and ‘*absolute quantities*’ headings looked rather jarring in the figures columns, and were moved to the left column.

2.3 Fonts

Sans serif faces are especially appropriate for tabular material. At small sizes serifed faces easily look fussy, especially if the output quality is not top notch. Sans serif faces suffer much less from scaling down. A sans serif face also helps to set off the table from the surrounding text.

Several sizes and weights are used (typographers talk about an italic *weight*; the T_EX community should realize that they entertain rather off-beat ideas about font families). And hyphens are replaced by proper minus-signs.

3 Technical issues

Some things in L^AT_EX are harder than they should be. Two notorious examples are table-related: aligning a column of figures on the decimal point, and setting text in a table cell ragged right.

3.1 Decimal alignment

There are at least three ways in L^AT_EX to accomplish decimal alignment:

- If all numbers have the same number of digits after the decimal point, decimal alignment coincides with right alignment, since in most fonts all digits have the same width.
- Split the numbers right before the decimal point, i.e. put an ampersand ‘&’ before the decimal point (or after the number, if it has none). The column formatting for the resulting two columns should be `r@{ }l`: right-align the part before the decimal point, left-align the remainder, and put no white space in between.
- Use the `dcolumn` package by David Carlisle. This is documented in [4] section 5.5.1.

3.2 Ragged right justification

You may have noticed that `\raggedright` simply doesn’t work in a tabular environment. Again, let me suggest a couple of brute-force workarounds.

- Divide the text manually between rows. Of course, this is practical only in very simple cases.
- Put a `parbox` around the text, e.g. `\parbox{1in}{\raggedright text...}`
This is simple enough, but not very elegant since

it involves specifying column widths outside the `\begin{tabular}` command.

For a more sophisticated solution, see [4] section 5.3.1, ‘*Typesetting Narrow Columns*.’ As in the last of the above two workarounds, it adds code to make `\raggedright` operational again.

4 The trouble with L^AT_EX

It took me a lot of time to prepare the examples in this paper. Even the standard L^AT_EX `\tabular` environment has plenty of quirks, and extension packages such as `array` or `tabularx` only add to them. Too often, it was a matter of trial and error what would work and what wouldn’t, and that might depend on the package used. In the end I didn’t use any of the table extension packages for this paper.

In L^AT_EX, some aspects of layout and typography can be controlled by changing a few parameters or by replacing some simple code out of a style file. But there are quite a few rough spots: sometimes the code is too cryptic for easy modification and sometimes the code is not in the style file at all. When typesetting tables one tends to run into such rough spots.

Besides L^AT_EX, I use high-end wordprocessors and low-end desktop publishing software. I am exceedingly frustrated that simple things that you just do in a commercial program, require hours or days of study and experimentation in L^AT_EX.

Still, L^AT_EX can’t be beat (yet) for long documents or for automation. It remains robust and efficient whatever the size and complexity of the job. So I keep using it for certain types of work.

I hope that (L^A)T_EX developers are seriously addressing L^AT_EX’s shortcomings. What is really needed is a more accessible basic L^AT_EX system, which doesn’t require wizardry to tailor to one’s own preferences, and which can put an end to the current proliferation of style files to patch up its defects.

Finally I want to mention that [4] was a great help in preparing this paper, even though the solutions proposed there didn’t always work out.

References

- [1] Treebus, K. F. *Tekstwijzer*. SDU 1982.
- [2] McLean, Ruari. *Typography*. Thames and Hudson 1980.
- [3] Lamport, Leslie. *L^AT_EX, A Document Preparation System*. Addison-Wesley 1986.
- [4] Goossens, Michel, Frank Mittelbach, Alexander Samarin. *The L^AT_EX Companion*. Addison-Wesley 1994.
- [5] Dietzenbacher, H.W.A., W. Voorhoeve. *Het model GRECON 91-D. Septembervoorspellingen voor 1992*. Onderzoeksmemorandum no. 450. Economics Department, Groningen University 1991.