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Module 12 Discussion

I mentioned this in another reply, but (*Note: the rest of this paragraph is a repost from my other discussion reply*) I believe that there's a typo in the original discussion prompt regarding the log-log link function. The textbook seems to say it's $\ln[-\ln(1-p)]$, and if you think about it, this should be true. The reason is that the inner log function take the natural log of a probability between 0 and 1, which would result in some negative value (excluding 1). Then, trying to take the natural log of a negative number would result in NaN's within R.

In your discussion about the logit function, you seem to be saying that it maps the domain of input values to a range between 0 and ∞. I tried to check if this was the case, and I am not sure that I agree. Perhaps I misunderstand your statement. Looking at [1], it describes the logit function as mapping the domain of probabilities $[0,1]$ to $(-\infty, \infty)$. This is essentially the inverse of what the sigmoid function does, and in fact it also says that the inverse-logit is the sigmoid function.

You make also the interesting point how both logit and probit are symmetric about $-\beta_0/\beta_1$. I think it is interesting that this is the case. Plotting simply the link functions doesn't seem to show this interesting property, only that they are symmetric around $y = 0$ and $p = 0.5$. However, looking at your plot from the textbook, I would have to guess then that the intersection at which they meet is $\hat{\pi} = 0.5$ on the vertical axis and $x = -\beta_0/\beta_1$ on the horizontal axis.

I also feel that the link functions in general are quite similar. The textbook mentions that the difference only becomes apparent when the sample size is large. I wish that the authors would provide more detail as to what case would best suit one over the other, if such a case does exist. Or at least provide some detail as to how to determine which could in anyway be preferable over another.

Reference:
[1] https://en.wikipedia.org/wiki/Logit