

Portfolio : Event history models

Fortna 2015

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Fortna (2015) studies the strategic dilemma faced by terrorist groups. While terrorism may undermine their political goals, it may also help their survival as an organization. This portfolio focuses on her H_3 (with a few references to H_2).

You'll find the replication data in `fortna.rda`. The variable `timeatstate` reports the duration of the conflict in days at the end of the study period. Some of these spells end in an event (`warends`). The data furthermore include the variables `startdate` and `enddate2009` that are useful for defining your outcome variable in `Surv()`. R read dates as the number of days since/before 1970-0101. In other words, if you convert R dates to a numeric variable, you have a count number of days.

1. Summarize the argument that the author makes and explain how the theory justifies the choice of model. Focus on H_2 and H_3 on the connection between length of conflict and terrorism. What is/are the outcome(s) of interest?
2. Describe the data structure and explain why we end up with such a structure. You can draw on the overview provided by Ward and Ahlquist (2018).
3. Explore the distribution of the dependent variable(s) for the purpose of communicating its/their content and relevance to H_2 and H_3 . Since this is event history data, it will require some imagination and data wrangling.
4. Replicate the Cox proportional hazard model reported in Table 2 (p 540). Begin by a simple model where you only report the effect of terrorist groups on civil war duration. Then expand the model to the full set of predictions.

Fortna did her analysis in Stata. Therefore, she uses “breslow” ties. She also clusters standard errors by country. This can be done directly in the `survival` package in R. If you specify the `origin=` argument in your estimation to the date when Fortna starts her study, you will find it easier to make predictions using `ggpredict`. You can see my attempt in table 1.

Fortna follows common conventions in her literature and reports the *hazard ratios* instead of the raw coefficients (log hazard ratio). How would you present her findings?

Once you have verified that your results are similar – if not identical – to Fortna’s, you do not have to replicate her choices. Instead, choose how you want to present the model results in the table, in the text and in figures.

5. Interpret the effect of terrorism on the duration of war using (as far as possible) plain-English language.
6. Plot the survival curve against duration for both your baseline model and the one including controls. Add the confidence/prediction intervals to your plot. What happened and why?
7. Assess the proportional hazard assumption. Does it hold? If not, what are the possible solutions?

Bibliography

- Fortna, Virginia Page. 2015. “Do Terrorists Win? Rebels’ Use of Terrorism and Civil War Outcomes.” *International Organization* 69 (3): 519–56. <https://doi.org/10.1017/S0020818315000089>.
- Ward, Michael D., and John S. Ahlquist. 2018. *Maximum Likelihood for Social Science: Strategies for Analysis*. Analytical Methods for Social Research. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781316888544>.

Table 1: Terrorism and the duration of war (Cox PH model)

	<i>Dependent variable:</i>
	Log hazard (s.e.)
HCTrebels	−0.917*** (0.336)
o_rebstrength	0.175 (0.208)
demdum	−0.715 (0.457)
independenceC	−0.653* (0.349)
transformC	−0.784*** (0.295)
lnpop	0.010 (0.096)
lngdppc	0.050 (0.201)
africa	−0.402 (0.351)
diffreligion	0.345 (0.321)
warage	−0.016 (0.017)
Observations	566
R ²	0.060
Max. Possible R ²	0.648
Log Likelihood	−277.775
Wald Test	50.230*** (df = 10)
LR Test	35.093*** (df = 10)
Score (Logrank) Test	33.601*** (df = 10)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01