Appendix for "The Impact of Foreign fighters on Civil Conflict Outcomes"

Tiffany S. Chu
School of Government & Public Policy
University of Arizona
tiffanychu@email.arizona.edu

Alex Braithwaite
School of Government & Public Policy
University of Arizona
abraith@email.arizona.edu

March 25, 2017

Introduction

This appendix provides materials in support of the main paper. This includes a brief description of variables and analyses discussed in the main paper

Foreign fighter variables

Foreign fighters are defined as individuals who enter conflicts as combatants with no apparent link to the conflict, are unpaid, and non-nationals (Malet 2013). We focus on civil conflicts, or a contested incompatibility between the government of a state and an armed non-governmental group that results in at least 25 battle-related deaths (Gleditsch et al. 2002; Melander et al. 2016). Therefore, our analysis does not include nor theoretically have expectations for foreign fighters that may enter interstate conflicts. In addition, the theoretical logic we propose applies to foreign fighters that join the non-governmental group of the conflict. Empirically, this is adequate given the vast majority of foreign fighters tend join the side of the rebel group and the side of the government. Particularly, non-nationals that fight for governments tend to be paid (such as mercenaries), which does not apply to the definition of foreign fighter that we employ and assumes these combatants are not paid individuals.

We employ two of Malet's typologies of foreign fighters. The first is *beyond neighboring*, which means that the foreign fighter entered a conflict in a country that is not neighboring to their country of origin. For instance, Spanish, Mexican, and Argentinians were documented to have joined Castro's M-26-7 that overthrew Bautista's regime. The second typology is *co-ethnic*, which is defined as an individual who joined a rebel group that shared the same ethnicity. An example of this are Armenian diaspora who joined Nagorno-Karabakh in their

incompatibility against Azerbaijan. The *beyond neighboring* and *co-ethnic* attributes are not mutually exclusive; some cases include foreign fighters that travel a long distance and are co-ethnics. For example, British Muslims joined Hamas in their struggle against Israel.

Dataset

We are interested in the impact of foreign fighter participation in support of a rebel group in civil conflicts. We felt it necessary to construct a dataset that reflected which rebel group the foreign fighters joined. This is particularly important for conflicts that included multiple dyads fighting against the government, with only some rebel groups receiving support in the form of foreign fighters. The unit of analysis of our dataset, therefore, is the rebel group-government dyad-episode. We include all civil conflicts from 1946-2013. The end date here is defined by the availability of data on key independent variables. This results in 192 conflicts and 497 dyads, as detailed in the UCDP's dyadic dataset v.4-2016 (Melander et al. 2016).

As defined by UCDP, a civil conflict is a contested incompatibility where the use of armed force between two parties, of which one is the government of a state and the other(s) are any non-governmental group of people having announced a name for their group, results in at least 25 battle deaths.

The Non-State Actor Data (Cunningham et al. 2009) provides information about the non-state actors involved in the civil conflict. We use the version 3.4 of the data, which was released in 2013.

Variables in dataset

- *SideA:* government side of the civil conflict
- *SideB:* non-state actor of the dyad
- *dyadep:* UCDP's dyad episode ID
- *ccode:* COW country code
- *ForeignFighters:* Dummy coded 1 if the rebel group had foreign fighter participation; 0 otherwise (Malet 2013)
- *beyondneighboring_ff:* Dummy coded 1 if the foreign fighters originated from a country farther than a bordering country; 0 otherwise (Malet 2013)
- *coethnic_ff:* Dummy coded 1 the foreign fighters who participated are co-ethnics of the rebel group they joined; 0 otherwise (Malet 2013)
- *outcome_nsa:* Dependent variable. Categorical variable of conflict termination, coded 1 for a peace agreement, 2 for a government victory, 3 for a rebel victory, and 4 if the conflict is ongoing, the rebel group ceased to exist, or fighting died out. (Cunningham et al. 2009)

- *fighting:* Dummy coded 1 if the rebel group is considered stronger or at parity with the government in fighting capacity (Cunningham et al. 2009)
- *mobilization:* Dummy coded 1 if the rebel group is considered stronger or at parity with the government in mobilization capacity (Cunningham et al. 2009)
- *eColdWar:* Dummy coded 1 if the conflict ended during the Cold War
- *e_post911:* Dummy coded 1 if the conflict ended after Sept. 11, 2001
- *numdyads:* Number of rebel groups fighting against the government in the same conflict, logged (Cunningham et al. 2013)
- *duration:* Number of years of the conflict (Cunningham et al. 2009).
- *lnduration:* Logged number of years of the conflict (Cunningham et al. 2009).
- *elogged_pop:* Logged population of the country at year_{t-1} of conflict termination; taken from Penn World Tables (Feenstra et al. 2015)
- *elogged_gdp:* Logged GDP of the country at year_{t-1} of conflict termination; taken from Penn World Tables (Feenstra et al. 2015)
- *epolity2:* Polity2 score of the country at year_{t-1} of conflict termination (Marshall et al. 2014)

Table A1 displays the summary statistics of all variables included in our main model specifications.

Table A1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Conflict outcome	638	3.105	1.181	1	4
Foreign Fighters	638	.199	.4	0	1
Beyond neighboring foreign fighters	638	.107	.309	0	1
Co-ethnic foreign fighters	638	.069	.254	0	1
Duration	638	1.375	1.866	0	15
Logged duration	638	.801	.921	0	3.714
Polity	638	-.641	6.057	-10	10
Logged GDP	638	10.751	2.035	5.857	16.643
Logged population	638	3.114	1.552	-.937	7.166
Number of dyads in conflict	638	7.287	6.827	1	26
Fighting capacity	638	.303	.46	0	1
Mobilization capacity	638	.39	.488	0	1
Cold War	638	.406	.491	0	1
Post-9/11	638	.248	.432	0	1

Models and Analyses

Multinomial logit

All analyses are run in Stata 13.0. We employ two types of regression in order to assess the effect of foreign fighters on rebel success. Since our dependent variable, *conflict outcome* is multi-categorical, we initially use a multinomial logistic regression. In order to ensure our data allowed for a correct specification of a multinomial logit, we test for the independence of irrelevant alternatives assumption (IIA).The IIA assumption states that the odds of choosing A over B should not depend on whether some other alternative C is present or absent. In other words, the odds of a conflict ending in a rebel victory over a government victory should not depend on whether some other alternative outcome, like a peace agreement, is present or absent. We conduct Hausman tests using the `mlogtest, iaa` command and do not find significant evidence that the IIA assuption is violated.

Table A2: Results of Hausman tests of IIA assumption, MNL Model 1

Outcome category	χ^2	df	$p > \chi^2$
Peace Agmt.	27.175	22	0.205
Govt. Victory	17.152	22	0.755
Rebel Victory	15.550	22	0.838
Other	25.653	22	0.267

Table A3: Results of Hausman tests of IIA assumption, MNL Model 2

Outcome category	χ^2	df	$p > \chi^2$
Peace Agmt.	25.764	24	0.365
Govt. Victory	16.703	24	0.861
Rebel Victory	17.002	24	0.849
Other	29.501	24	0.202

Competing risks regression

In order to also capture timing of the conflict outcome, we use Fine and Gray's (1999) competing risks regression. Studies of civil war duration and termination typically employ event history models in order to ensure covariates included in a model accurately capture the effect of elapsed time in our results. Essentially, a competing risks model asks at time t, what is the effect x has on y given n amount of time has already passed? Using the language of our research question, it is asking at year t, what is the effect foreign fighters have on the likelihood of a specific conflict outcome given n years of the conflict have passed?

The dependent variable for the competing risks is the same outcome variable. To time set the data, we use the duration of the conflict in years (unlagged). Other than that, all other regressors are the same as the multinomial logit. Tables A4 and A5 report the results from the various competing risks models. These models were used to create the cumulative incidence plots in the manuscript with the `stcurve` command.

Table A4: Competing risks results of foreign fighter involvement

	Peace Agmt.	Govt. Victory	Rebel Victory	Other
Foreign Fighters	0.043	-1.251**	-0.045	0.109
	(0.320)	(0.398)	(0.297)	(0.185)
Polity	0.038†	-0.022	-0.075*	-0.005
	(0.022)	(0.021)	(0.030)	(0.010)
GDP (logged)	-0.064	0.208*	-0.361***	0.051
	(0.102)	(0.105)	(0.090)	(0.044)
Population (logged)	-0.287*	-0.205†	0.138	0.103*
	(0.140)	(0.111)	(0.129)	(0.052)
Number of dyads	-0.025	-0.103***	-0.009	0.036***
	(0.028)	(0.023)	(0.015)	(0.009)
Fighting capacity	-0.395	0.704**	2.274***	-0.668***
	(0.319)	(0.263)	(0.635)	(0.201)
Mobilization capacity	0.606*	-0.513†	1.222***	-0.390*
	(0.290)	(0.293)	(0.336)	(0.158)
ColdWar	-1.570***	0.941***	0.704**	-0.002
	(0.339)	(0.257)	(0.265)	(0.141)
Post-9/11	-0.626*	-1.434*	-0.980	0.414***
	(0.298)	(0.657)	(0.657)	(0.118)
N	638.000	638.000	638.000	638.000
Log-likelihood	-621.7021	-596.3011	-285.5038	-2254.269
AIC	1261.404	1210.602	589.0077	4526.538

† $p < 0.1$,*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table A5: Competing risks results of foreign fighter involvement

	Peace Agmt.	Govt. Victory	Rebel Victory	Other
Beyond neighboring FF	-0.375	-0.615†	-0.135	0.117
	(0.463)	(0.330)	(0.461)	(0.157)
Coethnic FF	0.502	-0.719	0.623	-0.049
	(0.422)	(0.569)	(0.559)	(0.265)
Polity	0.040†	-0.020	-0.073*	-0.006
	(0.021)	(0.021)	(0.030)	(0.010)
GDP (logged)	-0.074	0.194†	-0.381***	0.052
	(0.102)	(0.103)	(0.104)	(0.044)
Population (logged)	-0.268*	-0.189†	0.139	0.101†
	(0.135)	(0.113)	(0.136)	(0.053)
Number of dyads	-0.022	-0.108***	-0.008	0.038***
	(0.029)	(0.023)	(0.015)	(0.009)
Fighting capacity	-0.360	0.696**	2.313***	-0.667***
	(0.317)	(0.259)	(0.626)	(0.200)
Mobilization capacity	0.612*	-0.521†	1.204***	-0.388*
	(0.285)	(0.286)	(0.332)	(0.158)
ColdWar	-1.580***	0.979***	0.750*	-0.014
	(0.342)	(0.246)	(0.292)	(0.149)
Post-9/11	-0.604*	-1.410*	-0.976	0.411***
	(0.297)	(0.648)	(0.660)	(0.117)
N	638.000	638.000	638.000	638.000
Log-likelihood	-620.7165	-599.5798	-285.0129	-2254.377
AIC	1261.433	1219.16	590.0258	4528.754

† $p < 0.1$,*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

References

Cunningham, David E., Kristian Skrede Gleditsch, and Idean Salehyan. 2009. “It Takes Two: A Dyadic Analysis of Civil War Duration and Outcome." *Journal of Conflict Resolution* 53(4): 570–597.

Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer. 2015. “The Next Generation of the Penn World Table." *American Economic Review* 105(10): 3150–3182.

Gleditsch, Nils Petter, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and HÃĕvard Strand. 2002. 11Armed Conflict 1946-2001: A New Dataset." *Journal of Peace Research* 39(5): 615–637.

Kreutz, Joakim. 2010. “How and When Armed Conflicts Ned: Introducing the UCDP Conflict Termination Dataset." *Journal of Peace Research* 47(2): 243—250.

Malet, David. 2013. *Foreign Fighters: Transnational Identity in Civil Conflict.* Oxford University Press.

Melander, Erik, Therése Pettersson, and Lotta Themnér. 2016. “Organized violence, 1989-2015." *Journal of Peace Research* 53(5): 727–742.

Melander, Erik, Therése Pettersson, and Lotta Themnér. 2016. “UCDP/PRIO Dyadic Dataset v.4-2016." *Journal of Peace Research* 45(5): 697–710.

Marshall, Monty G., Ted R. Gurr, and Keith Jaggers. 2014. “Polity IV Project: Political Regime Characteristics and Transitions, 1800–2013. *Center for Systemic Peace* `www.systemicpeace.org`.