Explanatory Memo:

Measuring Extraordinary Rendition and International Cooperation

Rebecca Cordell*

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Enclosed files

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*Postdoctoral Research Associate | School of Politics and Global Studies | Arizona State University | Email: Rebecca.Cordell@asu.edu

1 Dataset

Title: Flight Data 10082014 [1]

Original data: Blakeley and Raphael (2013)'s Rendition Project Flight Database represents the world's largest collection of public flight data possibly related to rendition.[2] The dataset contains 14,950 flight records for the period 2001–2012 with flights landing at a total of 136 countries. The dataset is compiled by gathering flight data from several European intergovernmental investigations, government and parliamentary inquiries, Non Governmental Organisations and investigative journalists. The original data result from numerous Freedom of Information requests made to air navigation organisations (such as Eurocontrol and the Federal Aviation Agency) showing the flight plans of aircrafts suspected of being used for extraordinary rendition purposes.

New data: Cordell (2017) flight data applies comprehensive preprocessing to Blakeley and Raphael (2013)'s Rendition Project Flight Database (10082014) and includes a number of new variables (see Table 1 below for a description of all variables in the dataset). The data contains 10,967 individual flights and excludes duplicate observations, artificial records, flights with missing dates and International Civil Aviation Organization (ICAO) codes and one classified rendition circuit (10 individual flights) that has not yet been made public in the Blakeley and Raphael (2013) data.[3]

Note: Removing this confidential rendition circuit from the data produces slightly different results when running the syntax file (see syntax file for more details).

[1] This data was shared privately via email to rcorde@essex.ac.uk on 10/08/2014. The data has been date stamped at the point of recieving the data following an agreement with Blakeley and Raphael (2013). Since then, the Rendition Project has made numerous further discoveries relating to the Rendition Detention and Interrogation programme, including further matches between flights and Central Intelligence Agency prisoners not contained in this version of the dataset. For example, see here: https://www.thebureauinvestigates.com/projects/cia-torture

[2] See here for the public version of the database: https://www.therenditionproject.org.uk/flights/flight-database.html.

[3] The *Companies* and *Source* variables cited in Cordell (2017) Appendix 1 have been omitted from the data, following an agreement with Blakeley and Raphael (2013). However, this does not affect the reproduction of results as neither variables are used during the analysis.

Table 1: New flight data variables.

Variable	Description
Flight identification (ID):	Unique flight ID
Flight registration:	Aircraft registration number
Year:	Year that the flight took place
Date:	Date of flight
Date maximum:	Only circuit start and end dates are given
Departure time:	Flight departure time
Arrival time:	Flight arrival time
Departure International Civil Aviation Organization (ICAO):	ICAO code for departure airport
Arrival ICAO:	ICAO code for departure airport
Departure country:	Country that the flight departs from
Arrival country:	Country that the flight arrives in
Departure city:	City that the flight departs from
Arrival city:	City that the flight arrives in
Departure airport:	Airport that the flight departs from
Arrival airport:	Airport that the flight arrives in
Circuit ID:	Unique Circuit ID
Circuit code:	Unique Circuit ID (flight registration-circuit start-circuit end)
Circuit continues:	Flight directly continues from previous flight (dummy variable)
Circuit total:	Total number of flights in the circuit
Circuit start:	Start date of the circuit
Circuit end:	End date of the circuit
Parallel flight*:	Inconsistencies in flight data
Circuit category*:	Classification of rendition circuit
Circuit notes*:	Additional comments on flight
Flight notes*:	Additional comments on circuit
Detainees*:	Detainees suspected to be on board flight
Detention site:	Flight lands in close proximity to a secret detention site (dummy variable)
Staging actual:	Flight lands at a frequently used staging post for renditions (dummy variable)
Staging post:	Circuit contains flight that lands at a frequently used staging post (dummy variable)
Rendition aircraft:	Aircraft previously used for rendition purposes (dummy variable)
Washington actual:	Flight lands at Washington Dulles International Airport (dummy variable)
Washington Dulles:	Circuit contains flight that lands at Washington Dulles International Airport (dummy variable)
Known rendition:	Flight identified by Blakeley and Raphael (2013b) as a rendition flight (dummy variable)
Non-rendition:	Flight identified by Blakeley and Raphael (2013b) as nonrendition flight (dummy variable)
Rendition flight:	Flight identified by my analysis as a rendition flight (dummy variable)
Rendition circuit:	Circuit contains a flight identified by my analysis as a rendition flight (dummy variable)

*Variable constructed by Blakeley and Raphael (2013)

2 Syntax file

Date: December 08 2016

Description: Replication file for Cordell (2017)

Data input: Flight Data 10082014

Software: RStudio 0.98.1091, © 2009-2014 RStudio, Inc.

Machine: Mac OS X Version 10.9.5

Required Packages: MatchIt, RColorBrewer, rworldmap, countrycode, rgeos, cshapes, geosphere, caret, klaR, e1071

Figures and Tables:

Table 3: Results from matching (Cordell (2017) p. 184).

Method: Exact matching.

Treatment: Known rendition flight ((Blakeley and Raphael, 2013)).

Covariates: Detention site, Staging post, Rendition aircraft, Washington Dulles (see Cordell (2017) Table 2).

Code: matchit(known.rendition detention.site + staging.post + rendition.aircraft + washington.dulles, method = "exact", discard = "hull.both", data = matching)

Descirption: Exact matching is used to preprocess the public flight data and identify likely rendition flights. Flights are matched on exactly the same values of the covariates outlined in the rendition flight specificiation model (see Cordell (2017) Table 2).

Results: 345 flights identified by the analysis as likely rendition flights (including 302 new flights beyond the known renditions).

Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file). The subgroups are presented in order of importance to the theoretical argument.

Figure 1: Distribution of flights during each stage of matching (Cordell (2017), p. 185).

Method: Descriptive statistics visualised by a stacked histogram.

Description: The distribution of flights during each stage of matching are visualised over time according to their value on each of the covariates included in the matching algorithm.
Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file).

Figure 2: Distribution of identified rendition flights (Cordell (2017), p. 186).
Method: Descriptive Statistics visualised by a histogram.
Description: The distribution of flights identified by the model as a likely rendition flight visualised over time. Each year is labeled by a historical event during the War on Terror that took place during that time.
Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file).

Figure 3: Frequency of rendition circuits (Cordell (2017), p. 186).
Method: Descriptive Statistics visualised using the rworldmap package.
Description: The distribution of flights per country identified by the model as a likely rendition circuit, with darker shades indicating higher values, and white for countries not identified by the analysis.
Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file). 12 flights in the data have an unassigned ICAO code for either the departure or arrival airport and consequently have not been attributed to any country.

Figure 4: Example of new rendition circuits (Cordell (2017), p. 187).
Method: Descriptive Statistics visualised using the cshapes package.
Description: The flight path of two rendition flight circuits identified by the matching model which pass through Norway (red circuit) and Kazakhstan (blue circuit).
Note: The latitude and longitude coordinate data used for this figure are from the OpenFlights

(2012) Airports Database.

Table 4. Estimating model accuracy with 10 x repeated k-fold cross-validation using Naïve Bayes (Cordell (2017) p. 188).

Method: 10 x repeated k-fold cross-validation using Naïve Bayes.

Variables: Rendition flight = flight identified by Cordell (2017) as a rendition flight (dummy variable), Known rendition = flight identified by Blakeley and Raphael (2013) as a rendition flight (dummy variable), Non rendition = Flight identified by Blakeley and Raphael (2013) as a nonrendition flight (dummy variable).

Code:

```
train.control <- trainControl(method="repeatedcv", number=10, repeats=10)
model1 <- train(known.rendition rendition.flight, data=flight.data, trControl=train.control, method="nb")
train.control <- trainControl(method="repeatedcv", number=10, repeats=10)
model2 <- train(non.rendition rendition.flight, data=flight.data, trControl=train.control, method="nb")
non.rendition<-flight.data[flight.data$non.rendition==1,]
```

Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file).

Appendix 3. Country list of rendition flights (Cordell (2017) p. 196).

Method: Descriptive Statistics.

Description: The distribution of flights per country identified by the model as a likely rendition rendition flight including the range of years.

Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file).

Appendix 4. Country list of rendition circuits (Cordell (2017) p. 196-197).

Method: Descriptive Statistics.

Description: The distribution of flights per country identified by the model as a likely rendition

circuit including the range of years.

Note: One classified rendition circuit (10 individual flights) that has not yet been made public has been removed from the data. This produces slightly different results to those presented in Cordell (2017) (see syntax file). 12 flights in the data have an unassigned ICAO code for either the departure or arrival airport and consequently have not been attributed to any country.

3 Log file

No further explanation required at this stage.

References

R. Blakeley and S. Raphael. Rendition project flight database. 2013. URL `https://www.therenditionproject.org.uk/flights/flight-database.html`.

R. Cordell. Measuring extraordinary rendition and international cooperation. *International Area Studies Review*, 20(2):179–197, 2017.

OpenFlights. Openflights airport database. 2012. URL `https://openflights.org/data.html`.