

Towards reconstructing DNA-based offending trajectories within and across the borders

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Seminar 3: Comparing the use of DNA in criminal investigations & DVI across European borders

ESRC Research 'Seminar series on genetics, technology, security and justice. Crossing, contesting and comparing boundaries'

Objectives of this talk

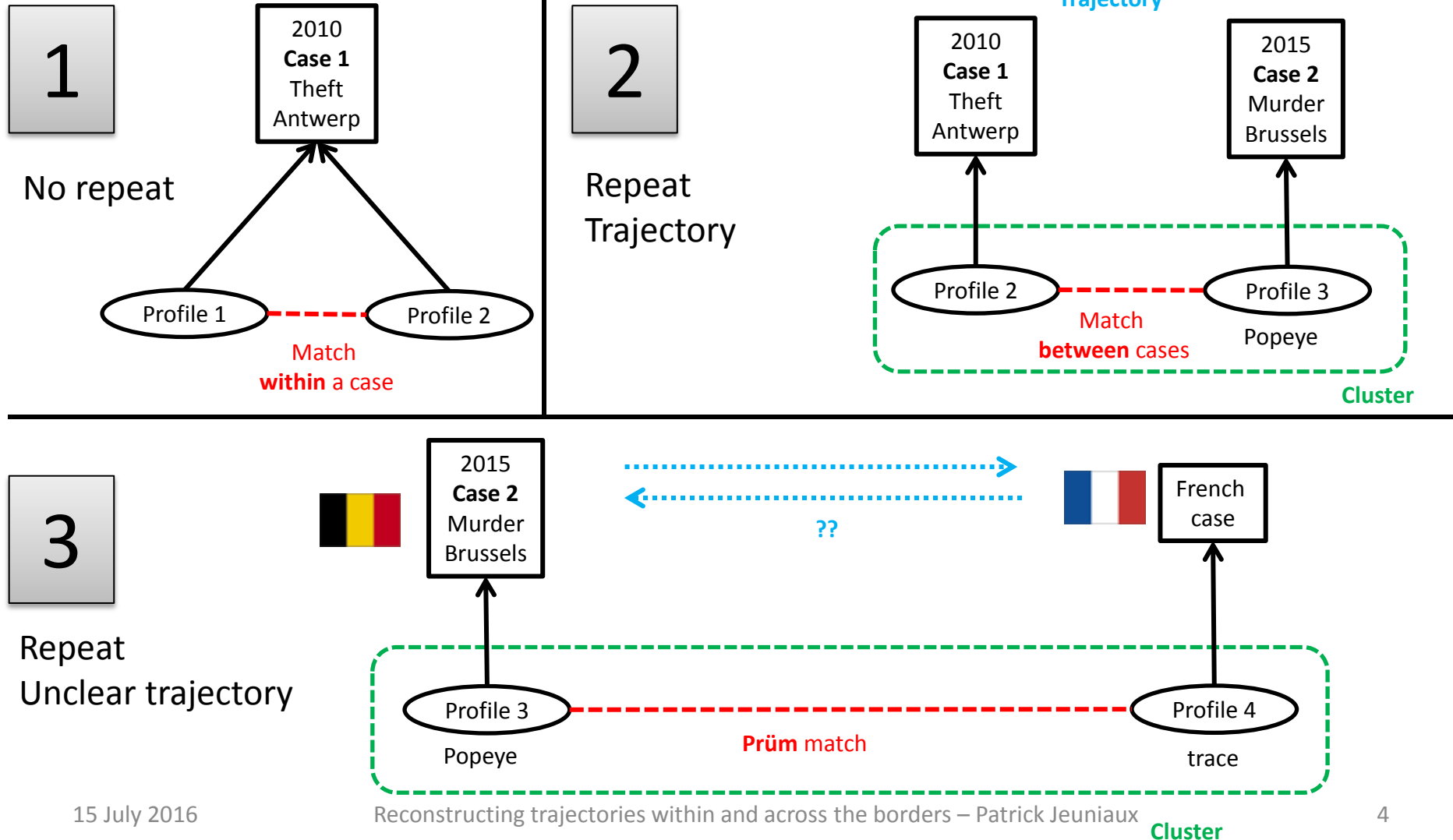
- 1) Illustrate the **potential** (and limits) of studying offending **trajectories** with **DNA** database data.
- 2) Examine **differences** between **national** and **international** offending trajectories

Quick context

- Institute (NICC): (1) forensic science, (2) criminology
- Belgian DNA database:
 - Law 1 (1999), application (2002)
 - Law 2 (2011), application (2014)
- CODIS + administrative database
- Prüm Scheme
 - Decentralized exchange of data
 - (No storage in a central database)
 - Step 1 (DNA data, automatic, highly uniform)
 - Step 2 (case data, manual, dep. on national legislations)
- Prüm in Belgium: NL, FR, DE, LU

Fundamental concepts:

repeat offenders, clusters, trajectories



Introducing offending trajectories

- **What:** Person vs crime. Longitudinal study
- **Why:** Fundamental knowledge of criminology (1986), strategy, operations.
- **Questions:** Onset, end, duration, structure.
- **Sources:** Official data, surveys, operational data.
- **Problems:** Reconstruction (dark number & bias).
- **Results:** short duration, precocity, persistence, seriousness.

Using forensic DNA databases

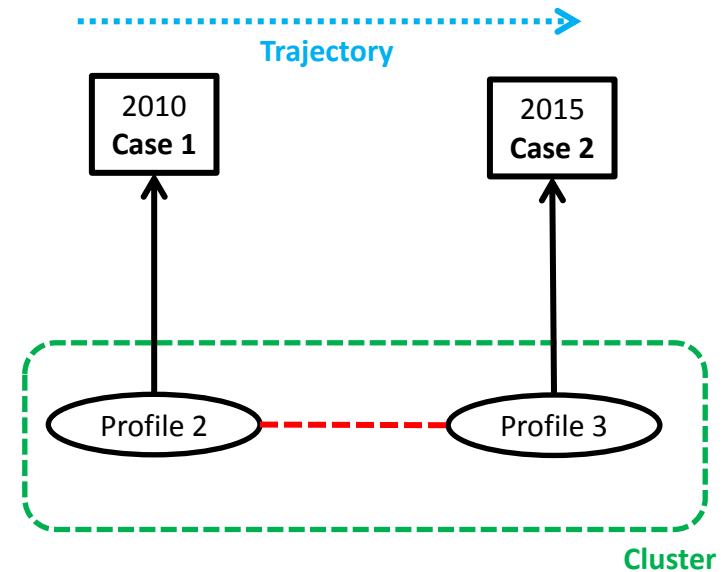
Pros	Cons
Comparing known and unknown offenders (Lammers et al.)	DNA bias
Reliability of DNA	Poverty of meta data: location, timing, nature of crime
Study of transnational offending (Prüm)	

Objectives of this talk (**reminder**)

- 1) Illustrate the **potential** (and limits) of studying offending **trajectories** with **DNA** database data.
- 2) Examine **differences** between **national** and **international** offending trajectories

The data

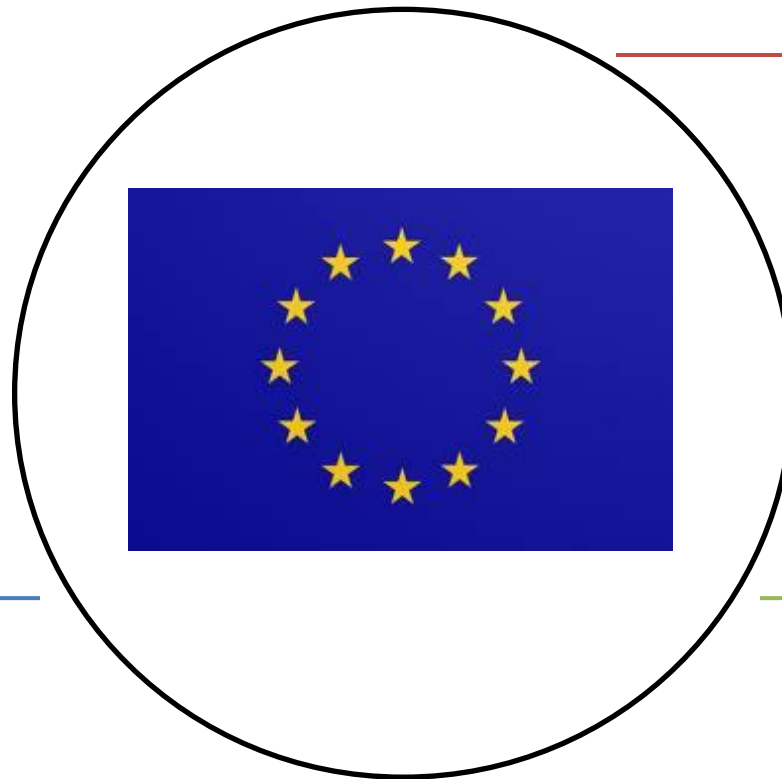
- Source: Belgian admin. data, 10 May 2016
- Entities: case, profile, person (**cluster**)
- Number of clusters: 7535
- Some info on Prüm :
 - (next slide)



Matches with Prüm

N = 7535 (100%)

Does not match
with Prüm :
5090 (68%)



The Netherlands

France



Germany

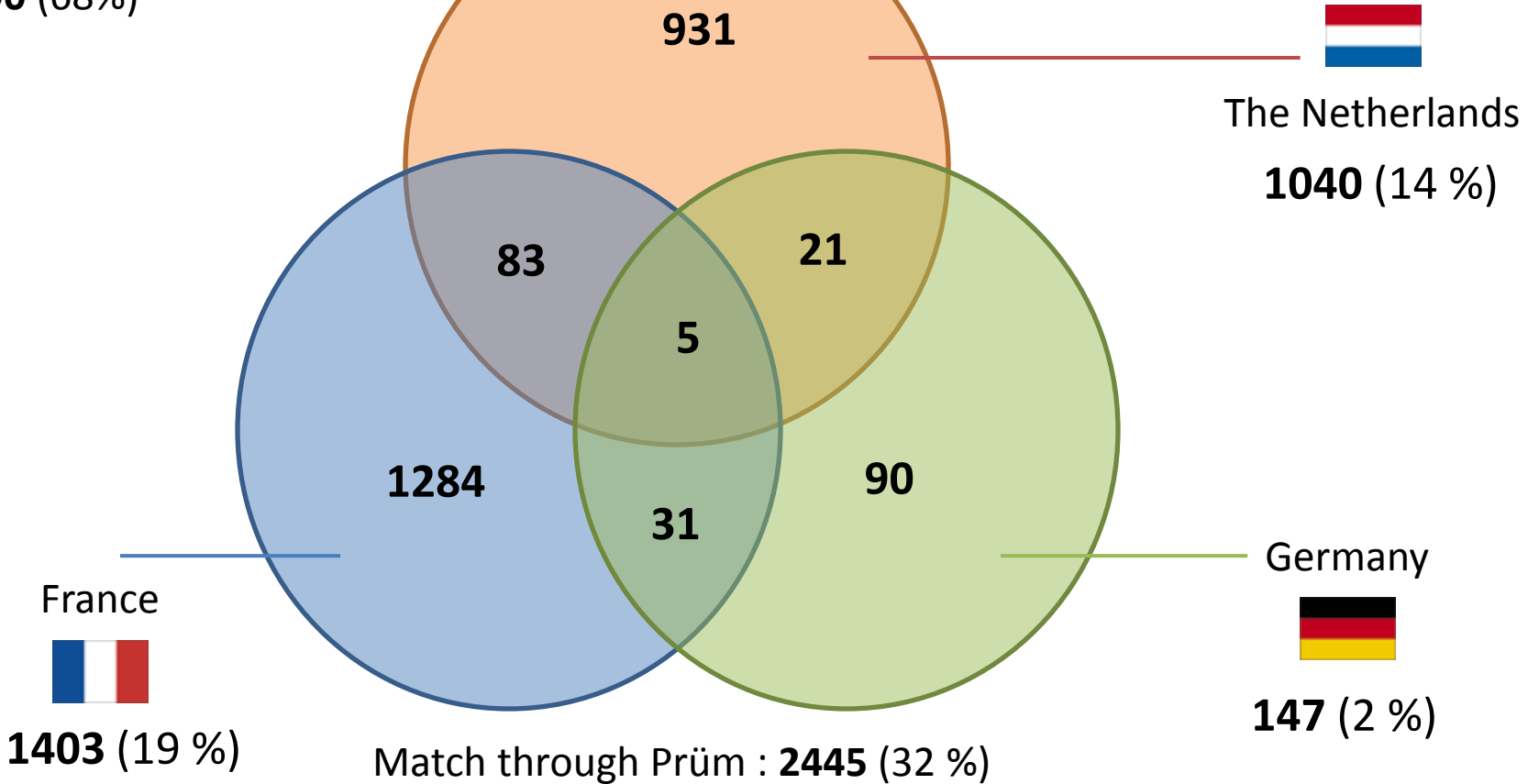


Match through Prüm : **2445** (32 %)

Per country

N = 7535 (100%)

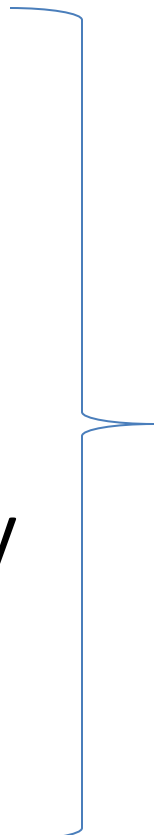
Does not match
with Prüm :
5090 (68%)



Methodological Difficulties

- 1) How do we take into account the **selection bias**?
 - (we don't)
- 2) How do we **count** the units?
 - (the cases, not the profiles)
- 3) How do we **describe** the units?
 - (rough category of offences and district instead of crime locations)
- 4) How do we **order** the units?
 - (year of the case instead of date)

Example of **coarse** crime description

- Voyeurism
 - Gross indecency
 - Sexual harassment
 - Prostitution
 - Promotion of pornography
 - Human trafficking
 - Rape
- 
- = sex crime

A few results


- Yes, we can !
 - We have implemented a procedure to reconstruct trajectories from administrative data.
 - Examples on the next slide.
- Next: Let's see the type of 'criminological information' it can bring us.

Example: 12 trajectories

	Status	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Suspect	Bur. BG				Bur. LI						Bur. AN
2	Convicted		4 Bur. 3 HA, TG	7 Bur., Eva. 4 HA, 2 LI, DE, TU	Bur., OC HA, LE	VT, Bur. LE, LI	2 Bur. 2 HU	2 Bur. 2 LI	Bur. LI			Thr. LI
3	Trace					VT LE		OC LI				
4	Trace					Bur. TG	2 Bur. 2 HU	OC, Bur. LI, HA	2 Bur. HA, TG			
5	Trace					Bur. LE		Bur. LI				
6	Trace							OC LI				
7	Convicted				VT LI			OC LI		Bur. LI		
8	Trace								Bur. LI			
9	Trace								Bur. LI	Bur. LI		
10	Suspect											3 Bur. 2 AN, TG
11	Convicted									Bur. LI		Bur. AN
12	Convicted					Misc. BR						Bur. AN

Size of clusters/trajectories

Max = 62 cases**

Number of Belgian cases	1	2	3	4	5	6	7	> 7	TOTAL
Match with Prüm 	1829	361	113	54	29	21	6	32	2445
NO match with Prüm	21*	3207	1016	425	190	89	47	95	5090
TOTAL	1850	3568	1129	479	219	110	53	127	7535

n = **5395** (72 %)

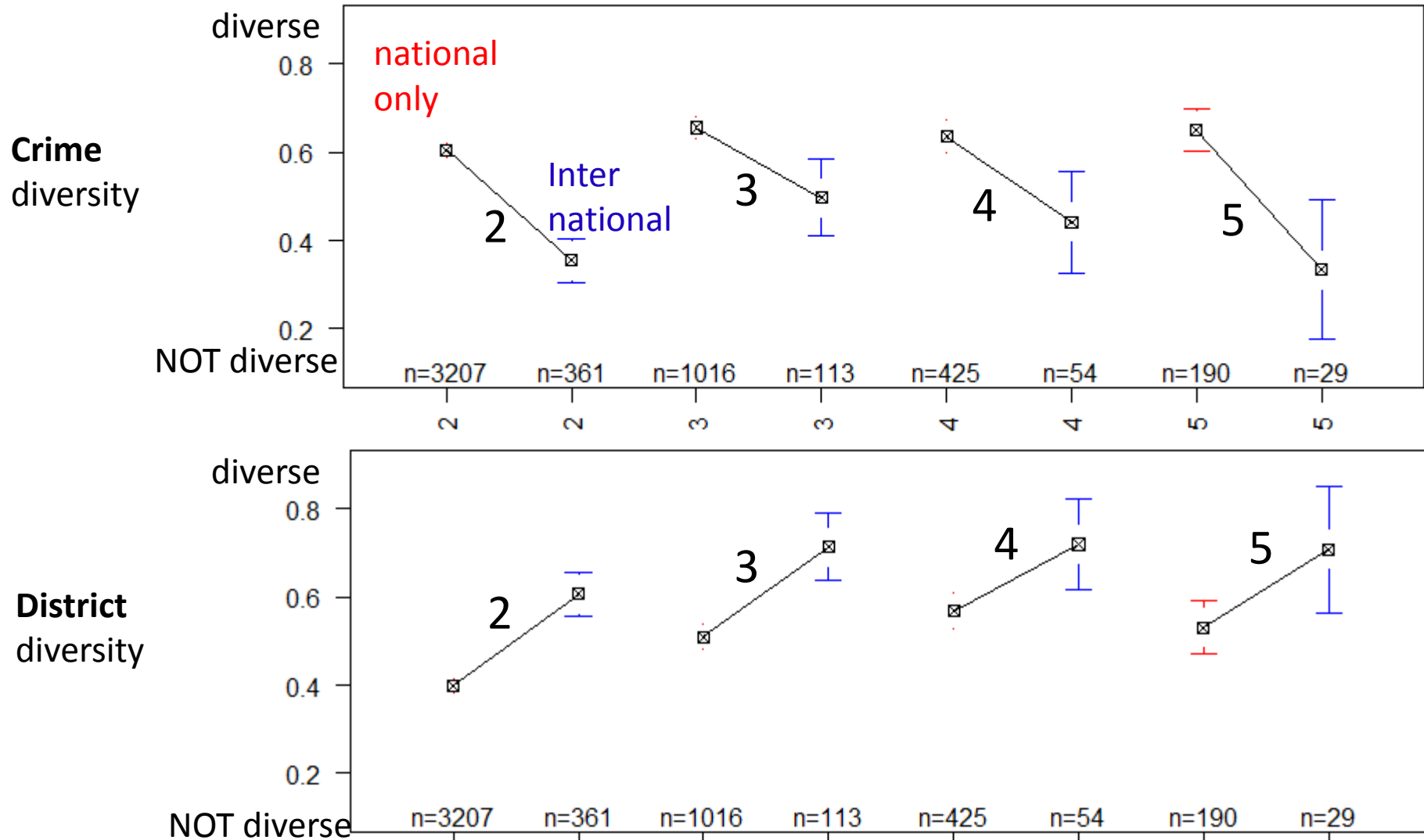
* = *administrative error*

** max 169
in criminal justice file.
We miss something.

Crime and district diversity

not diverse (0) – diverse (1)

n = 5395 (72 %)

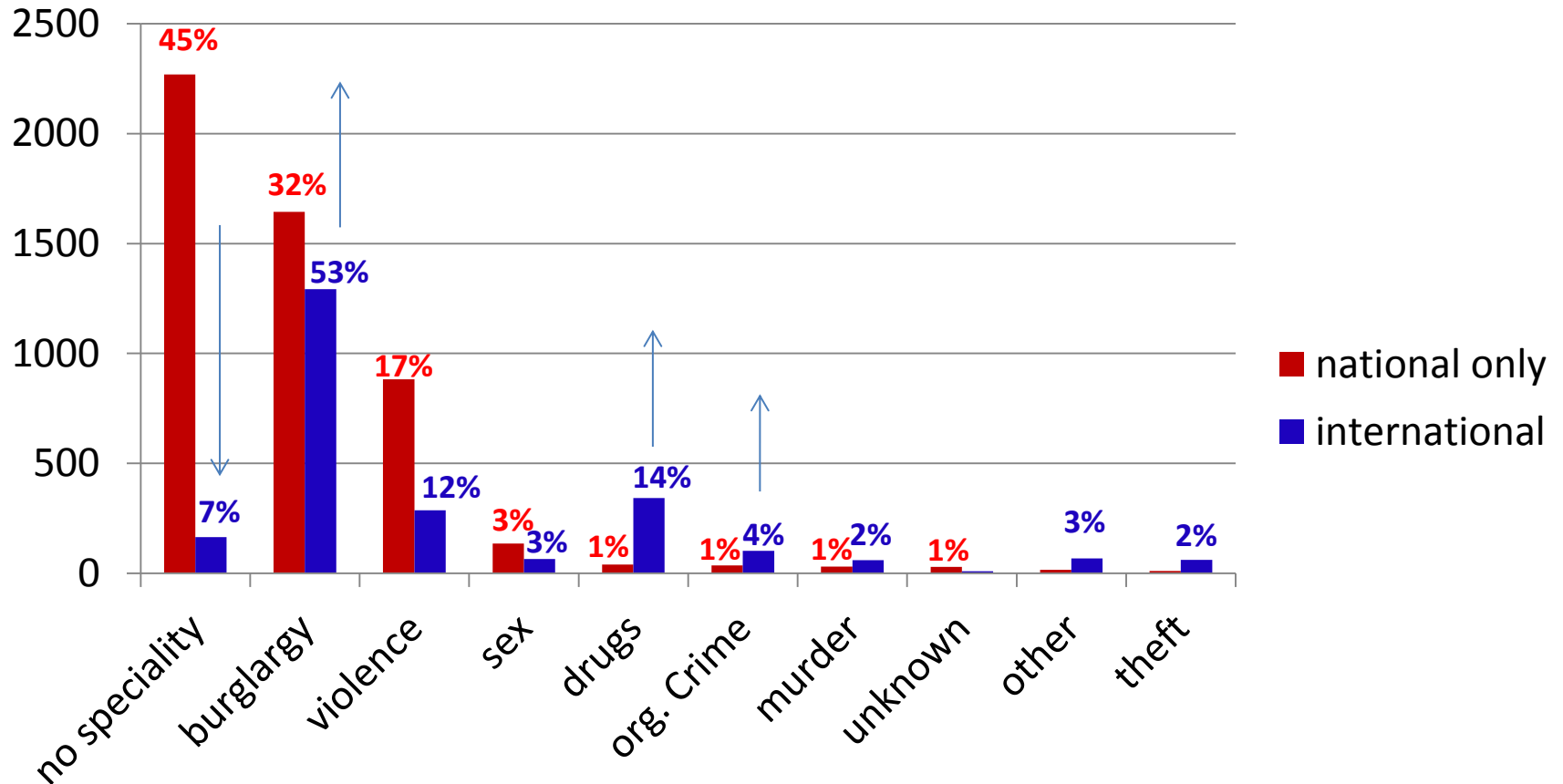


Crime speciality

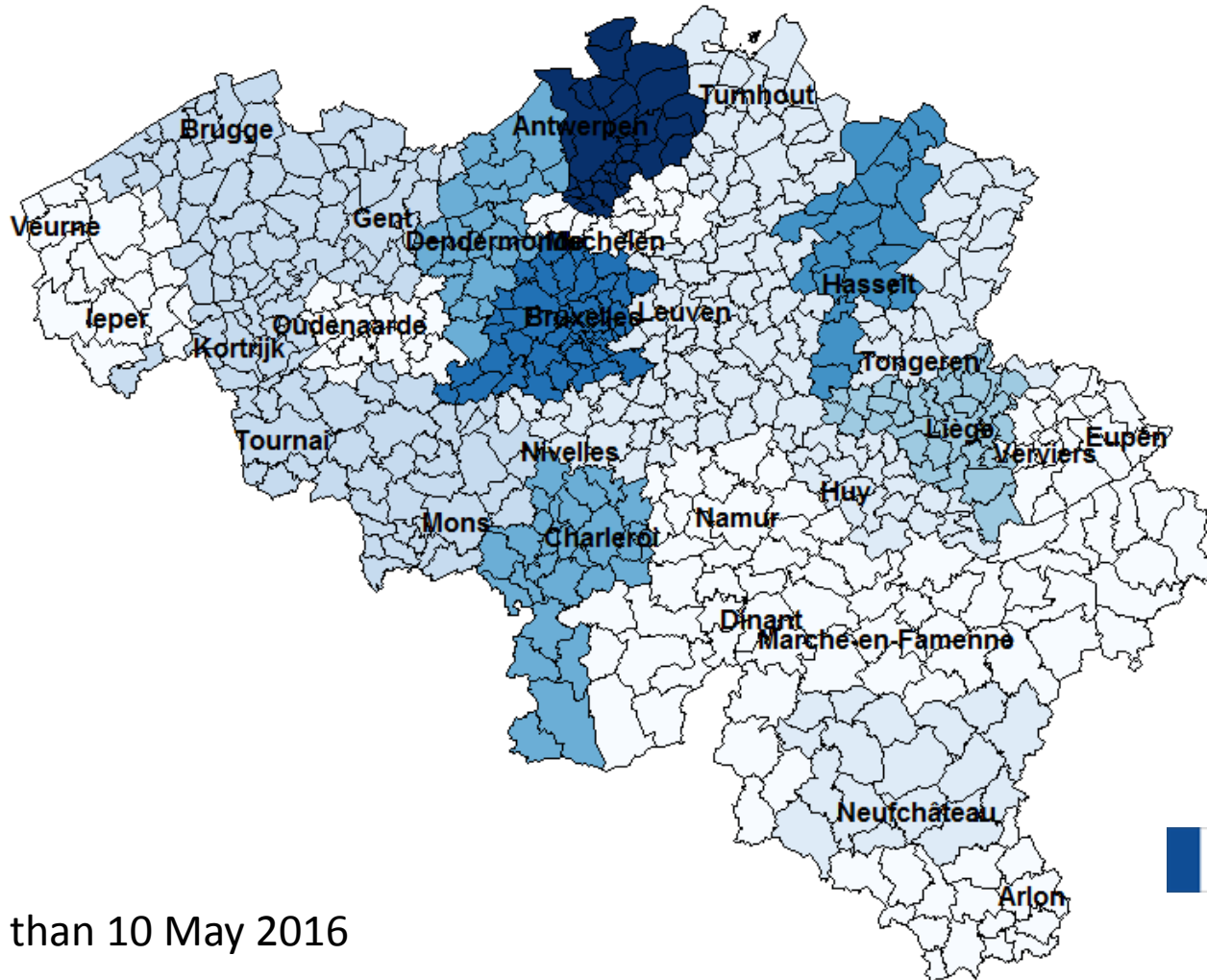
Speciality : > 50%

n = 5395 (72 %)

Number of clusters

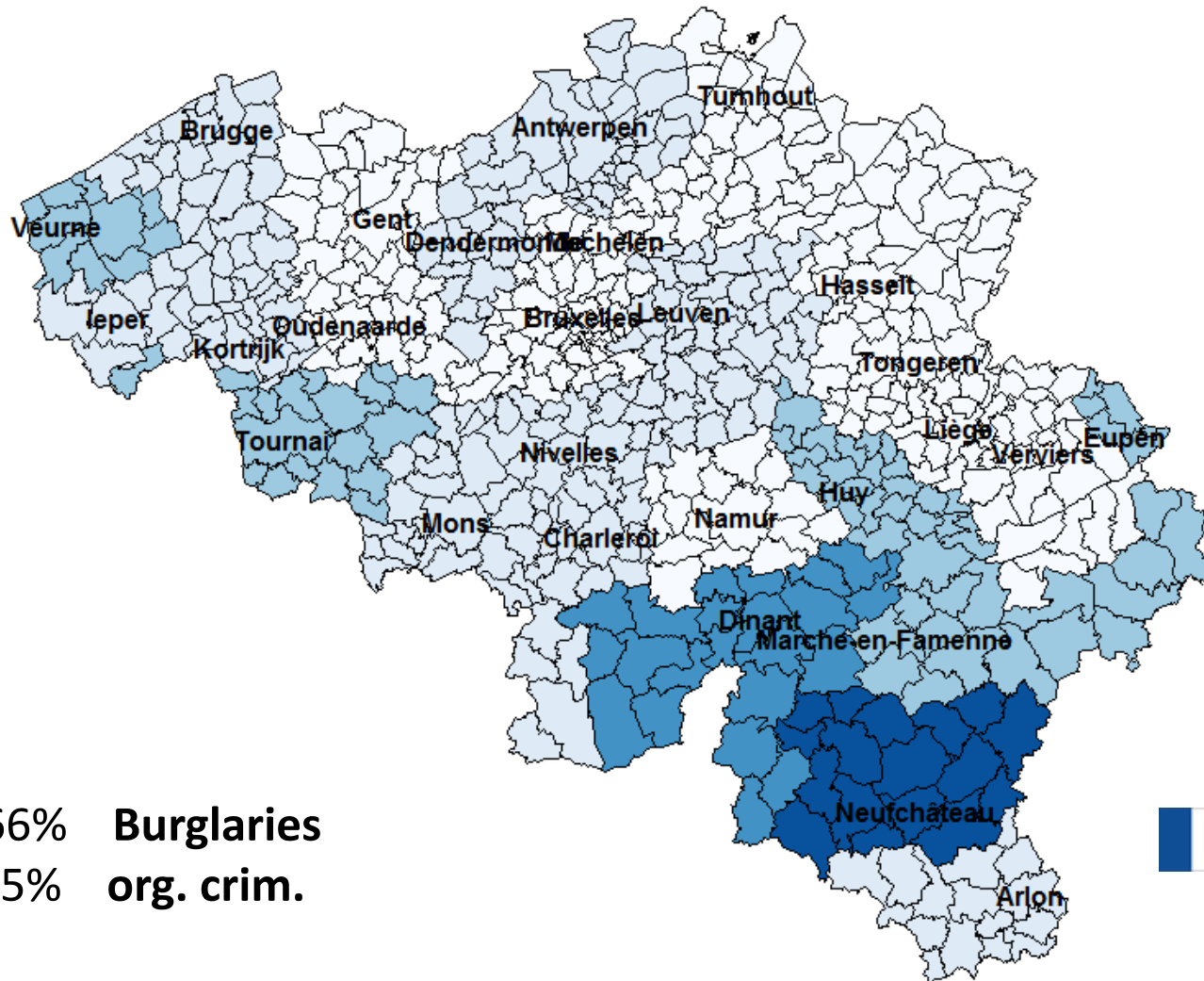


About 800 national cases* matching with FR



* data older than 10 May 2016

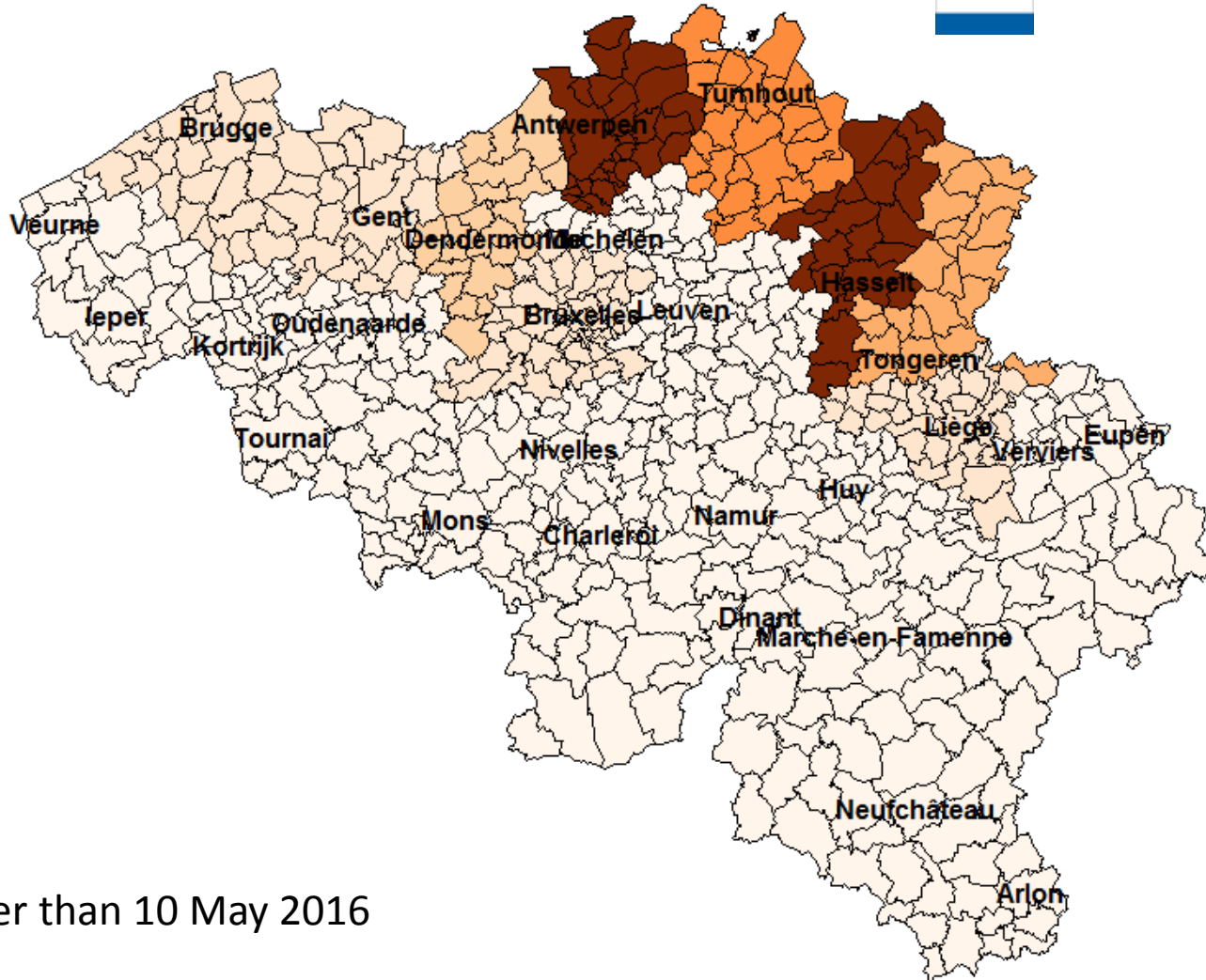
Proportion of cases that match with FR



39 % → 66% **Burglaries**
1% → 5% **org. crim.**

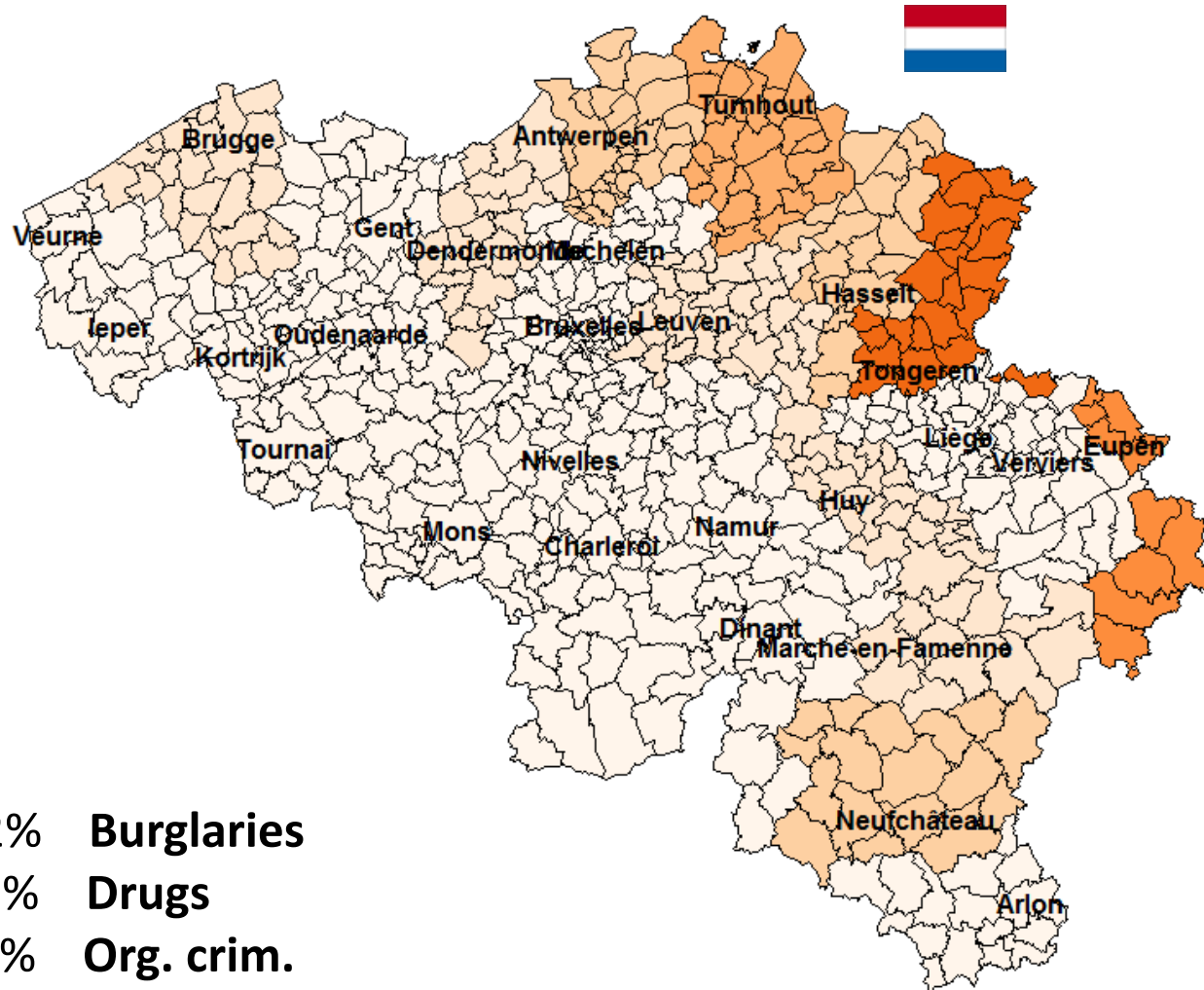


About 800 national cases* matching with NL



* data older than 10 May 2016

Proportion of cases that match with NL



39 % → 62% **Burglaries**

1% → 12% **Drugs**

1% → 4% **Org. crim.**

Conclusions

- **Why reconstructing trajectories:** criminology, strategy, operations.
- **Why forensic DNA data:** Ease to study transnational offending and unidentified offenders.
- **Data:** 7535 repeat offenders (clusters).
- **Difficulties:** poverty of information.
- **Results:** international clusters show *less* crime diversity (more burglaries, drugs, org. crime), but *more* district diversity (more crime but are close to borders).

What is missing?

- 1) deeper analysis: temporal analysis
- 2) how can it help operations (management) ?
- 3) discuss with stakeholders about strategy?
- 4) richer information on foreign side?
 - Prüm step 2. Legal issues?

Possible future project:

Examining *integrated* Prüm Step 2 data
from 4 countries



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Clusters classification

