Guns and Kidneys
How Transplant Tourism Finances Global Conflict

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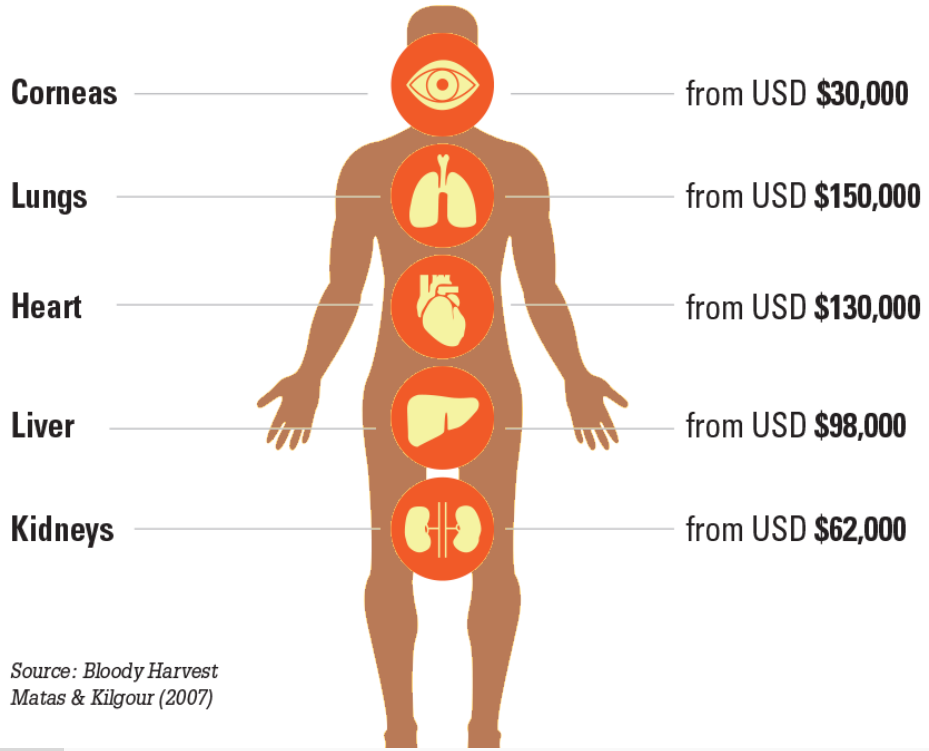


Introduction

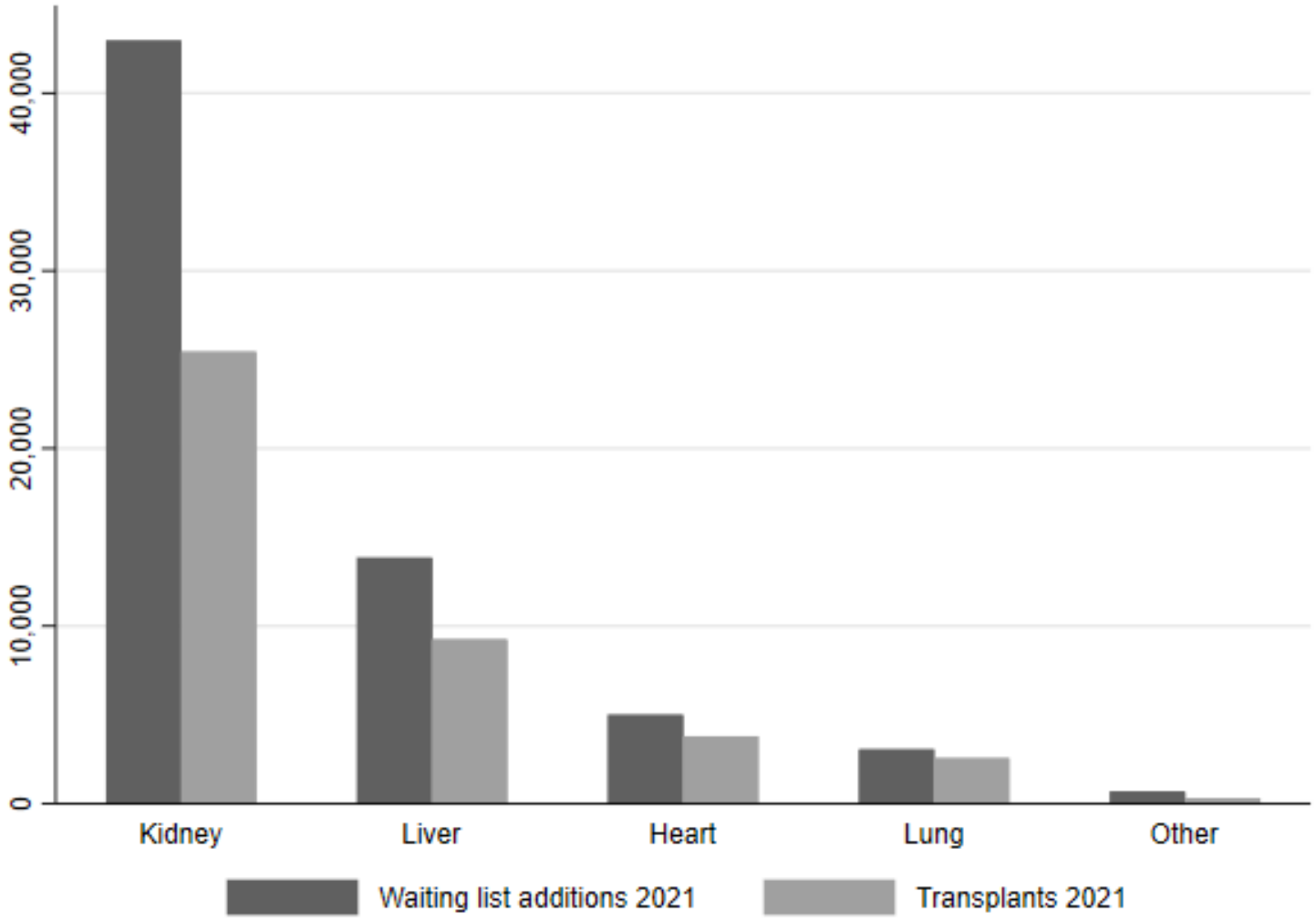
- Non-state armed groups finance their activity via
  - Robbery/theft/smuggling/fraud/kidnapping Makarenko (2004)
  - Donations Limodio (2022)
  - Control of oil and gas resources FATF (2014)
  - Mining activities Berman et al. (2017)
  - and organ trade

Do armed groups finance attacks by illegal organ trade?

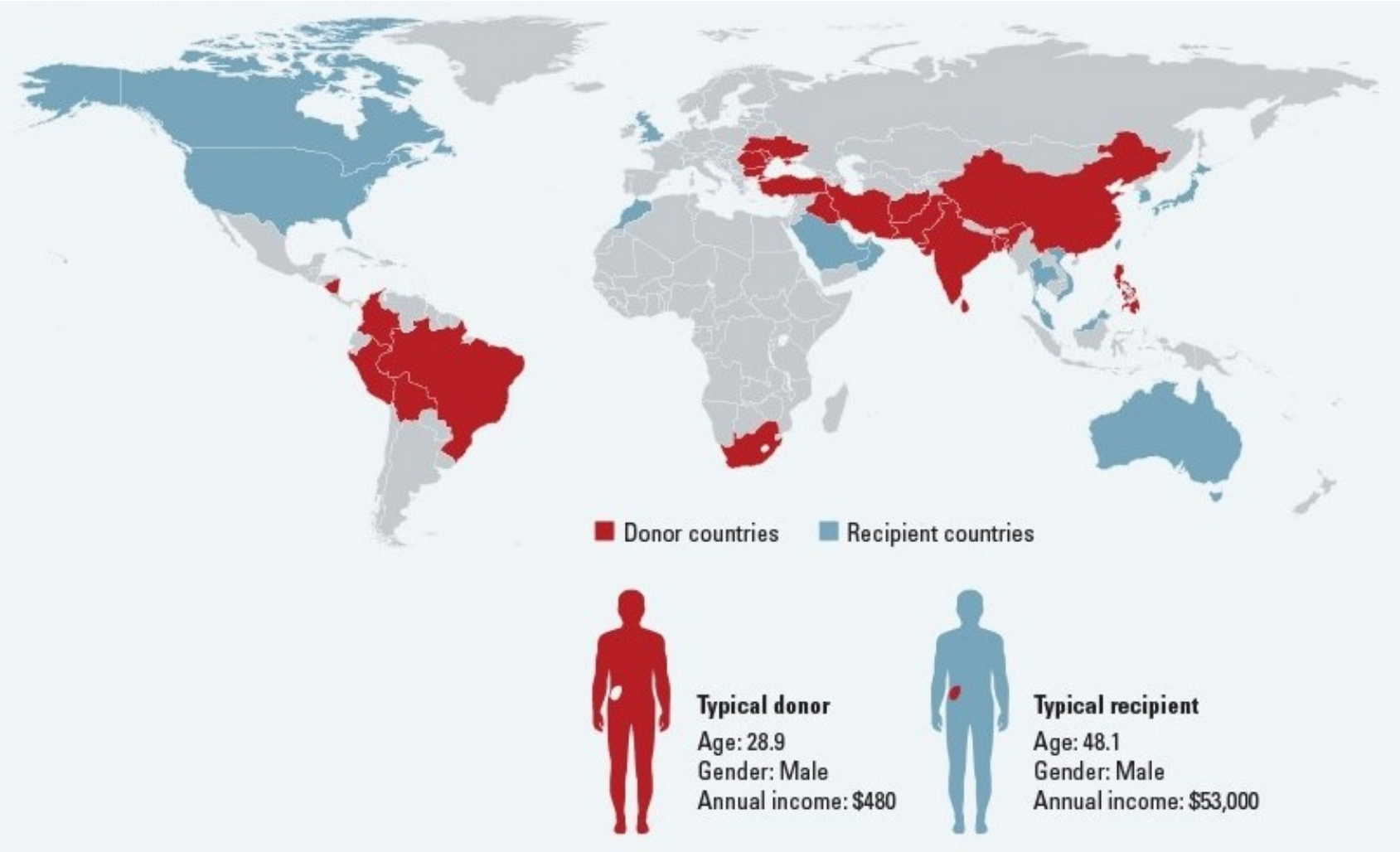
This project

- I investigate the **impact of organ trafficking on local conflict** using georeferenced data on conflict events and hand-collected data on local transplant infrastructure.
- I exploit **exogenous variation in kidney demand** using the number of U.S. waiting list patients, their payment capacity and their physical condition.
- I find that **higher kidney demand increases conflict in localities with a transplant infrastructure**.
  - A one-standard deviation increase in the U.S. waiting list for kidneys leads to an increase in the probability of conflict by 17% *(compared to localities without transplant infrastructure)*
- I show that **armed groups with a transplant infrastructure at home increase their probability of performing an attack** with an increase in kidney demand.
- Higher kidney demand is associated with an **increase in suspicious payments** from and to countries with a transplant infrastructure.

The organ market: (U.S.) Waiting lists



The global market for kidneys: Transplant tourism



Source: Der Spiegel

How to disappear from waiting list?

Conceptional framework: Conflicts and organs

Suggested mechanism

- Armed groups are financially constrained. Berman et al. (2017)
- They use organ trafficking to finance attacks.
- The more organs they can sell and the higher the price of these organs, the higher the probability that they perform an attack.

Problem

- War zones are a major target for organ recruitment and create organ demand.
- The more conflicts happen, the more organs can be acquired and the more organs are needed.

Solution

- Use exogenous organ demand from the U.S. waiting list for kidney transplants.
- Compare impact on conflict **outside the U.S.** when armed groups can involve in organ trafficking with when they cannot.

Specification

$$Conflict_{it} = \beta\, Transplant\ infrastructure_i \times Kidney\ demand_t + FE_i + FE_t + \epsilon_{it}$$

- *at location i: 0.5°latitude × 0.5°longitude cell (55km × 55km)*
- *at time t: month*

c.f. Berman et al. (2017)

Data

Dependent variable: Probability of Conflict

- Source: The Armed Conflict Location & Event Data Project (ACLED)

Independent variable: U.S. waiting list patients for kidneys

- Source: United Network of Organ Sharing Standard Transplant Analysis and Research File (National UNOS STAR file)

Treatment condition: Cells with a transplant center

- Source: Hand-collection of authorized transplant centers, according to official government lists and Google maps coordinates

▸▸ Data properties

Sample

15,876 cells in **eight countries** which have

- Transplant tourism activity, according to newspaper articles
- An official government list with transplant centers/hospitals
  - India
  - Pakistan
  - South Africa
  - Argentina
  - Russia
  - Hungary
  - Bulgaria
  - Armenia

135 months from January 2010 to March 2021

Probability of conflict (Standardized coefficients)

	Dependent variable: Probability of conflict (in basis points)					
Transplant center						
× waiting list (WL) patients	90.8***	73.6***				
	(16.3)	(15.8)				
× WL patients with income			244.1***	189.8***		
			(37.3)	(35.3)		
× WL patients on dialysis					0.9	5.5
					(14.0)	(13.7)
Observations	2,143K	2,142K	2,143K	2,142K	2,143K	2,142K
Cell fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Base prob. transplant cells	538.4	538.4	538.4	538.4	538.4	538.4

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In a cell with a transplant center, conflict probability increases

- from 5.4% to 6.3% with a 1 SD increase in WL patients.
- from 5.4% to 7.8% with a 1 SD increase in WL patients with income.
- not significantly with a 1 SD increase in WL patients on dialysis.

▸▸ Similar results for number of attacks

Does transplant tourism increase the fighting capabilities of armed groups?

- Assumption: Armed groups mainly benefit from transplant tourism in their home region.

$$Conflict_{jt} = \beta_0 + \beta_1 \, Transplant\ center\ at\ home_j \times Kidney\ demand_t + FE_j + FE_t + \epsilon_{jt}$$

- *of armed group j: 723 non-state armed groups*
  - ***Transplant center at home**: Transplant center in cell where group is based (hand-collected headquarter cell, founding cell or cell of ethnic origin)*
- *at time t: month*

Group's probability of conflict (Standardized coefficients)

	Dependent variable: Group's probability of conflict (in basis points)					
Transplant center at home region						
× waiting list (WL) patients	28.4**	27.4**				
	(13.8)	(13.4)				
× WL patients with income			59.3**	64.2**		
			(29.6)	(29.9)		
× WL patients on dialysis					6.9	3.6
					(13.6)	(12.7)
Observations	95,715	95,580	95,715	95,580	95,715	95,580
Group fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Base prob. transplant groups	217.0	217.9	217.0	217.9	217.0	217.94

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The probability of conflict of a group with a transplant center at its home region increases

- from 2.2% to 2.5% with a 1 SD increase in WL patients.
- from 2.2% to 2.8% with a 1 SD increase in WL patients with income.

Group's probability of conflict outside home region

	Dependent var.: Group's probability of conflict outside home region					
Transplant center at home region						
× waiting list (WL) patients	25.6**	24.7**				
	(12.7)	(12.3)				
× WL patients with income			51.6*	55.9*		
			(29.0)	(29.3)		
× WL patients on dialysis					6.5	3.5
					(12.3)	(11.4)
Observations	95,715	95,580	95,715	95,580	95,715	95,580
Group fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Base prob. transplant groups	160.6	161.3	160.6	161.3	160.6	161.32

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The probability of conflict outside the home region of a group with a transplant center at its home region increases

- from 1.6% to 1.9% with a 1 SD increase in WL patients.
- from 1.6% to 2.1% with a 1 SD increase in WL patients with income.

⏩ Similar results for number of attacks

Is transplant tourism associated with suspicious payments?

$$\textit{Suspicious payments}_{ct} = \beta_0 + \beta_1 \textit{Trafficking country}_c \times \textit{Kidney demand}_t + FE_c + FE_t + \epsilon_{ct}$$

- *for country c:*
  - ***Trafficking country**: Country that is involved in organ trafficking, according to the WHO*
  - ***Suspicious payments**: from and to country c, according to FinCEN files*
- *at time t: month*

⏩ Payment data properties

Suspicious payments (Standardized coefficients)

	Dependent variable: Log suspicious payments		
Trafficking country			
× waiting list (WL) patients	0.249**		
	(0.12)		
× WL patients with income		0.165**	
		(0.08)	
× WL patients on dialysis			0.187**
			(0.09)
Observations	17,850	16,275	17,325
Country fixed effects	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes
Mean log payments transplant countries	0.49	0.54	0.51

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In a country notorious for organ trafficking, the number of suspicious payments from and to the country increases

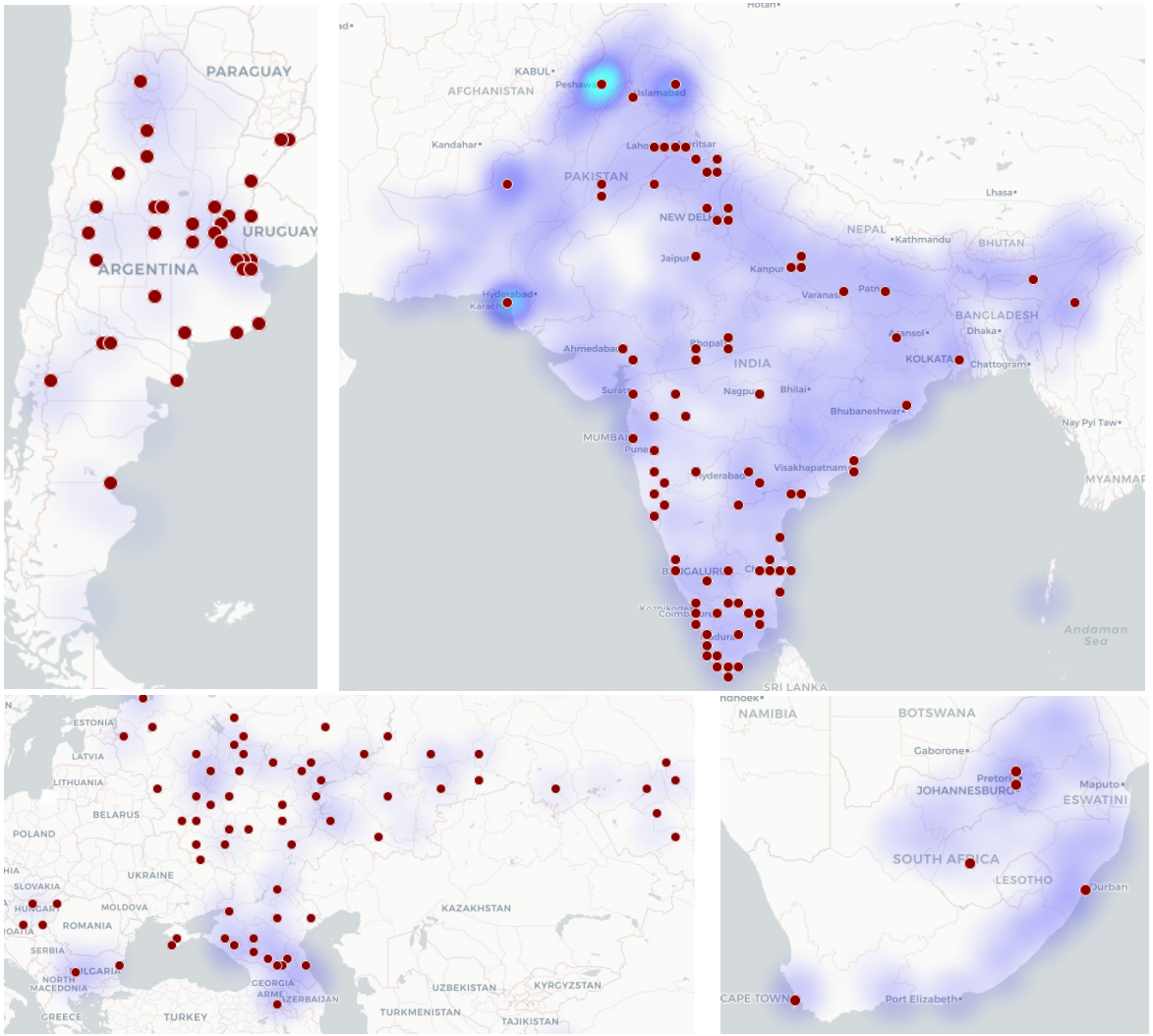
- by 25% with a 1 SD increase in WL patients.
- by 17% with a 1 SD increase in WL patients with income.
- by 19% with a 1 SD increase in WL patients on dialysis.

Conclusion

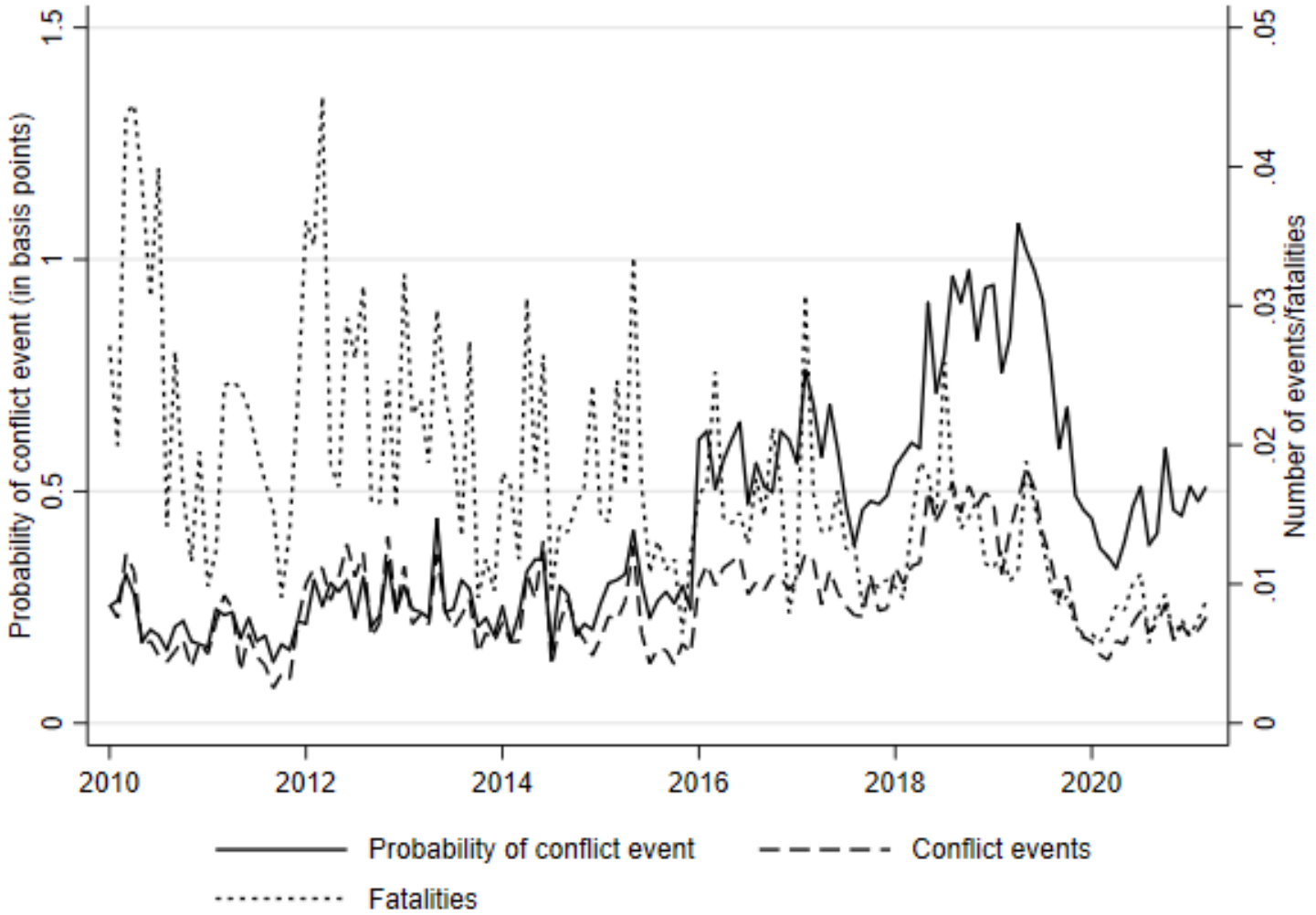
- An increase in the number of U.S. waiting list kidney patients is associated with
  - An **increase in the probability of a conflict** in 0.5°latitude × 0.5°longitude cells with a transplant center.
  - An **increase in the probability that groups with a transplant center in their home region perform an attack**, both in total and outside their home region.
  - **More suspicious payments** to and from countries notorious for organ trafficking.
- Effects are stronger for waiting list patients with a labor income and nonexistent for patients who are on dialysis.
- **This evidence is consistent with the hypothesis that armed groups finance attacks with transplant tourism.**

Thanks for your attention.

Spatial distribution of conflict events and transplant centers

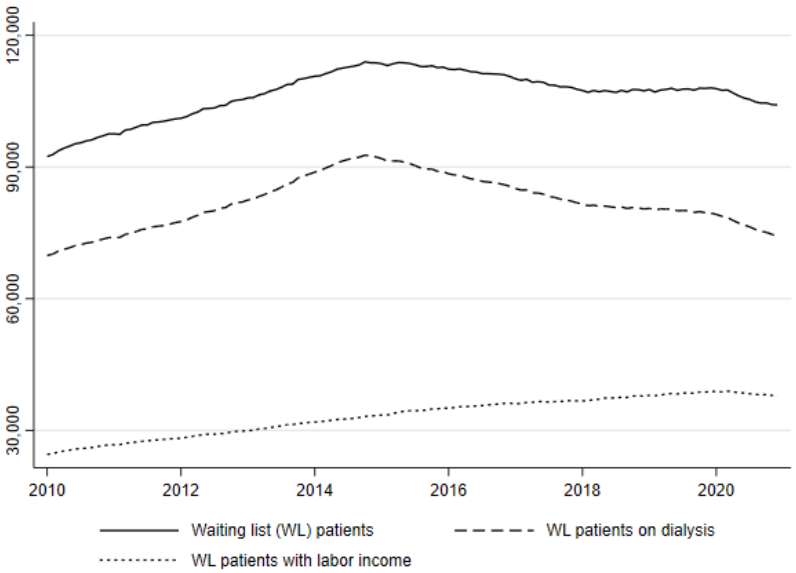


Probability of conflict, conflict events and fatalities

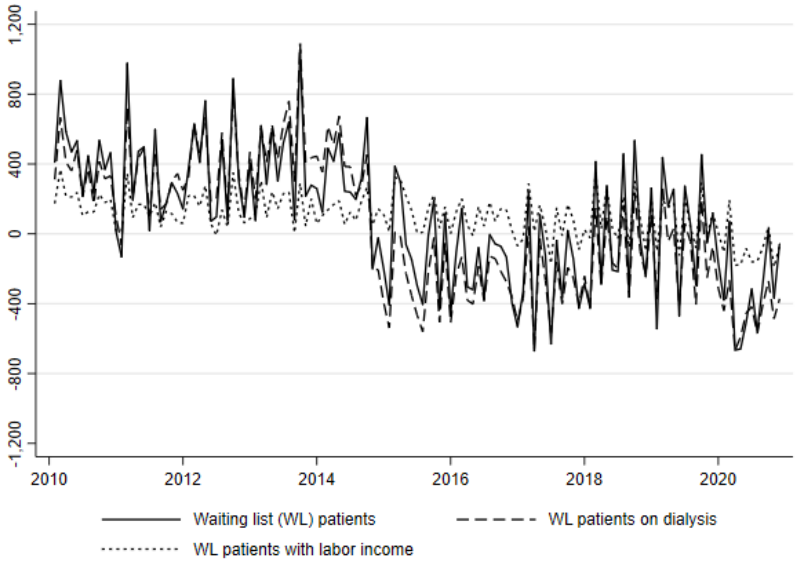


Demand for kidneys on the U.S. waiting list

Number of patients



Monthly changes



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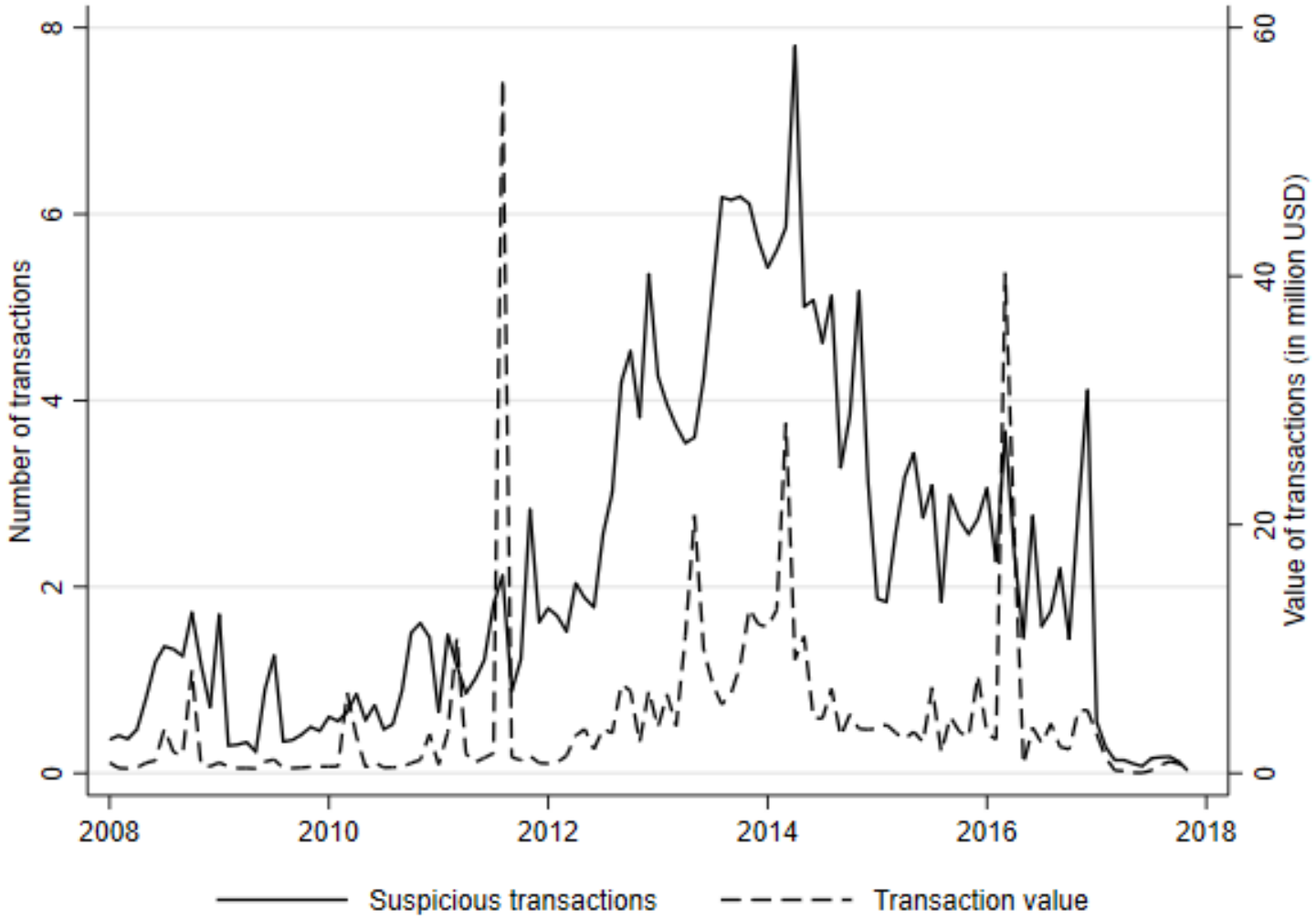
	N	Mean	SD	Median	Min	Max
Panel A: Cell-month level						
Conflict in 15,876 cells over 135 months						
Probability of conflict in %	2,143,260	.448	6.67	0	0	100
Number of events	2,143,260	.0096	.272	0	0	62
| Events $>$ 0	9,592	2.17	3.45	1	1	62
Panel B: Month level						
Kidney demand over 135 months						
Waiting list patients	2,143,260	106,554	5,347	107,526	92,409	113,951
with labor income	2,143,260	33,409	4,290	34,506	24,538	38,952
on dialysis	2,143,260	81,857	6,025	81,015	69,849	92,709
Panel C: Cell level						
Transplant infrastructure in 15,876 cells						
N transplant centers	2,143,260	.03937	.632	0	0	31
At least one center in %	2,143,260	1.37	12	0	0	100
Panel D: Group-month level						
Conflict of 723 groups over 135 months						
Probability of conflict in %	97,605	1.67	13	0	0	100
Number of events	97,605	.0315	.35	0	0	20
| Events $>$ 0	1,633	1.88	1.95	1	1	20
Prob. of conflict outside home region in %	97,605	1.25	11	0	0	100
Number of events outside home region	97,605	.0251	.3227	0	0	20
| Events outside home region $>$ 0	1,219	2.017	2.09	1	1	20
Panel E: Group level						
Transplant infrastructure at home region of 723 groups						
N transplant centers	97,605	2.88	6.63	0	0	31
At least one center in %	97,605	31	46	0	0	100
Panel F: Country-month level						
Financial transactions from and to 105 countries over 291 months						
Suspicious payments	17,850	1.46	7.15	0	0	162

Suspicious payments



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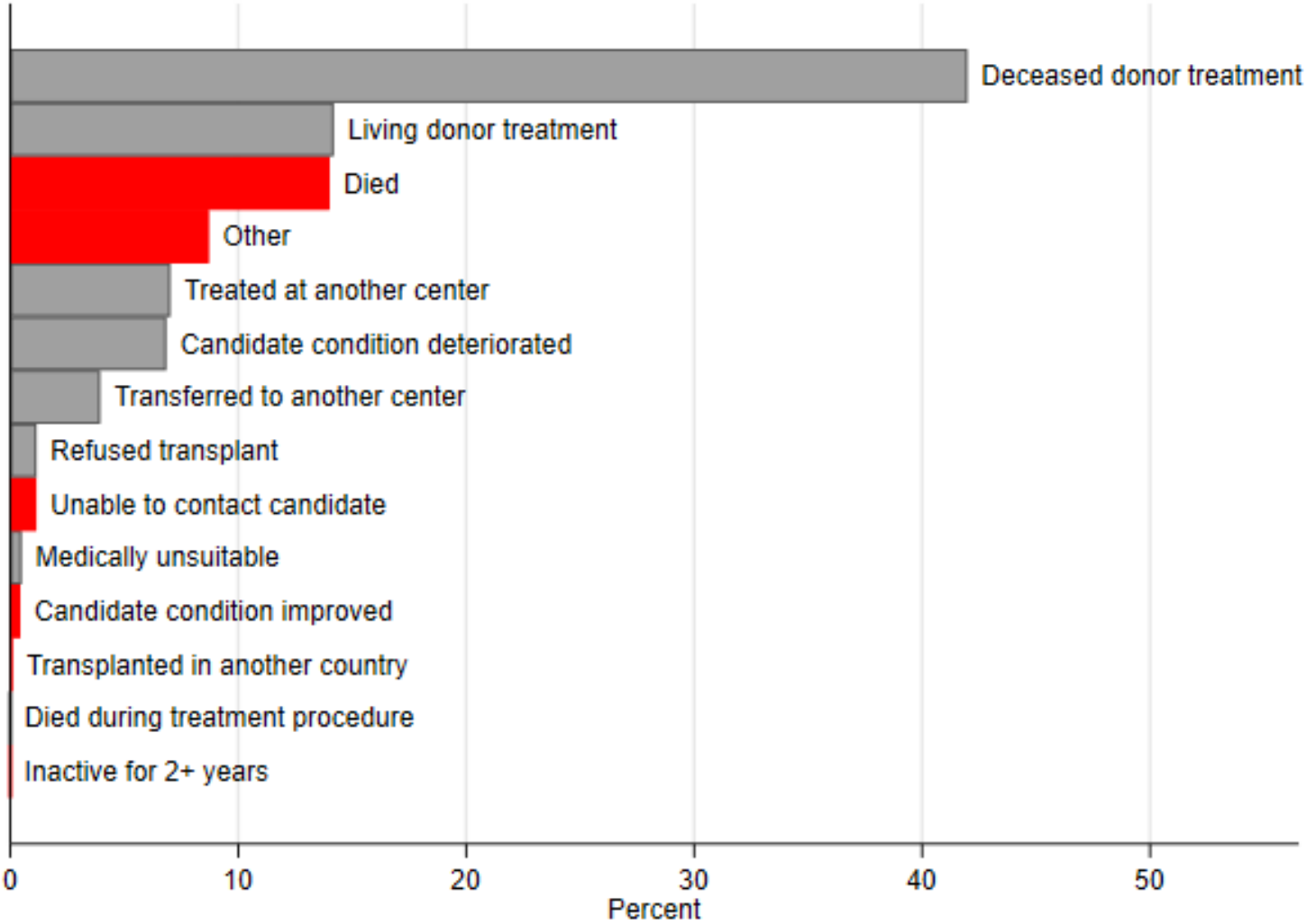
Reasons for removal from waiting list



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Number of Conflict Events (Standardized coefficients)

	Dependent variable: Log conflict events					
Transplant center						
× waiting list (WL) patients	0.009^{***}	0.007^{***}				
	(0.00)	(0.00)				
× WL patients with income			0.018^{**}	0.014^{*}		
			(0.01)	(0.01)		
× WL patients on dialysis					0.003	0.003
					(0.00)	(0.00)
Observations	2,143K	2,142K	2,143K	2,142K	2,143K	2,142K
Cell fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Mean log events transplant cells	0.07	0.07	0.07	0.07	0.07	0.07

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In a cell with a transplant center, the number of conflict events increases

- by 0.9% with a 1 SD increase in WL patients.
- by 1.8% with a 1 SD increase in WL patients with income.
- not significantly with an increase in WL patients on dialysis.

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Groups' number of conflict events (Standardized coefficients)

	Dependent variable: Group's log conflict events					
	(1)	(2)	(3)	(4)	(5)	(6)
Transplant center at home region						
× waiting list (WL) patients	0.002	0.002				
	(0.00)	(0.00)				
× WL patients with income			0.007*	0.007*		
			(0.00)	(0.00)		
× WL patients on dialysis					-0.000	-0.000
					(0.00)	(0.00)
Observations	95,715	95,580	95,715	95,580	95,715	95,580
Group fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Mean log events transplant groups	0.02	0.02	0.02	0.02	0.02	0.02
R-squared	0.18	0.18	0.18	0.18	0.18	0.18

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The number of coflict events a group with a transplant center at its home region increases

- by 0.2% with a 1 SD increase in WL patients with income.
- by 0.7% with a 1 SD increase in WL patients with income.
- not significantly with an increase in WL patients on dialysis.

Groups' number of conflict events outside home region

	Dependent variable: Log conflict events outside home region					
	(1)	(2)	(3)	(4)	(5)	(6)
Transplant center at home region						
× waiting list (WL) patients	0.002*	0.002*				
	(0.00)	(0.00)				
× WL patients with income			0.006	0.007*		
			(0.00)	(0.00)		
× WL patients on dialysis					0.000	-0.000
					(0.00)	(0.00)
Observations	95,715	95,580	95,715	95,580	95,715	95,580
Group fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	No	Yes	No	Yes	No
Country × month FEs	No	Yes	No	Yes	No	Yes
Mean log events transplant groups	0.02	0.02	0.02	0.02	0.02	0.02
R-squared	0.21	0.21	0.21	0.21	0.21	0.21

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The number of conflict evets outside the home region of a group with a transplant center at its home region increases

- by 0.2% with a 1 SD increase in WL patients.
- by 0.6% with a 1 SD increase in WL patients with income.
- not significantly with an increase in WL patients on dialysis.

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