DE JURE (Data and Evidence for Justice Reform)

Innovations in Data with Justice and Security Implications: South Asia Region

Daniel L. Chen, Manuel Maqueda, and Sandeep Bhupatiraju

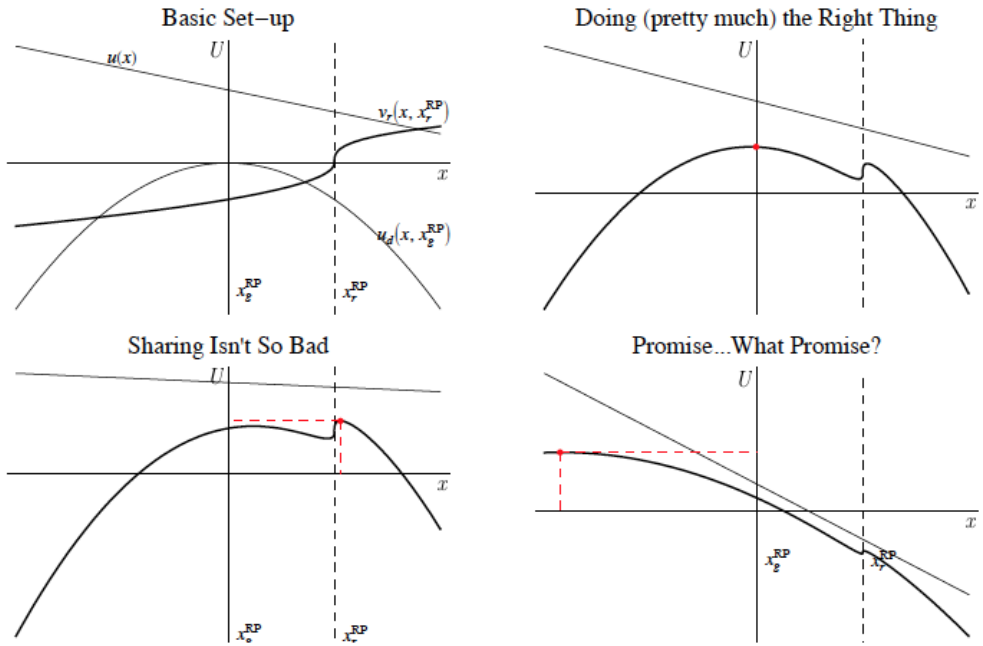
Judicial Analytics and Law *J of Artificial Intelligence & Law*, Chen 2018

Justice: **equal treatment before the law** $(y = f(X) + \varepsilon, actions \rightarrow X)$
equality based on recognition of difference
$(y \perp W, var(\varepsilon) \perp W, actions \nrightarrow W)$

control principle and **merit** principle: individuals responsible only for events that are under their control
W: race, gender, masculinity, name, football, weather, judge's lunchtime, preceding case, ...

Machine Learning and Rule of Law *Computational Analysis of Law*, Chen 2018

- Behavioral anomalies offer intuitive understanding of feature relevance
- "settings where people are closer to *indifference* among options are more likely to lead to detectable effects [of behavioral biases] outside of it." (Simonsohn, JPSP 2011)



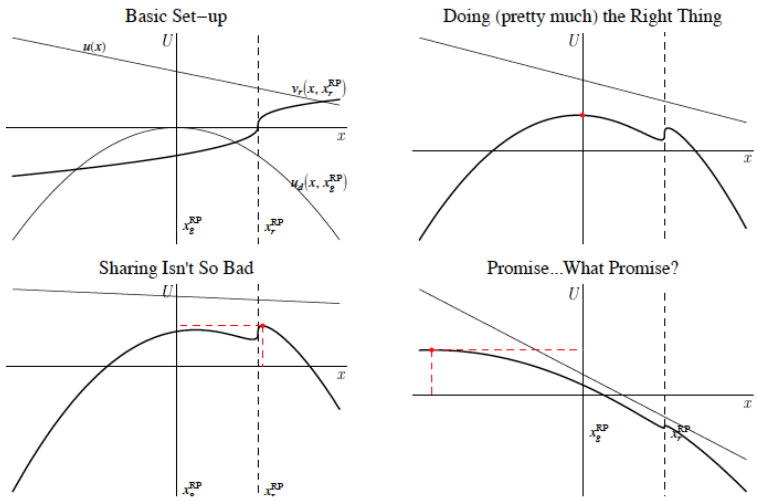
A model of recognition-respect and

revealed preference indifference

Research in Experimental Economics, Chen 2017

Social Contract

- state expects citizens, generally, to obey the law
  - rules that limit individuals to take actions that might otherwise be justified.
  - so state owes a way to address a wrong through the formal legal system.
- implies a right to recourse, a recognition of wrongs (Goldberg and Zipursky, HUP 2020)
- **access** to justice, **efficiency** of justice, knowledge/precedent/**equity**



A lack of recognition

revealed preference indifference

fragility, conflict, and violence

"Ferguson and the Violence of Indifference" (*Critical Education*, Cuenca 2017)

The New York Times

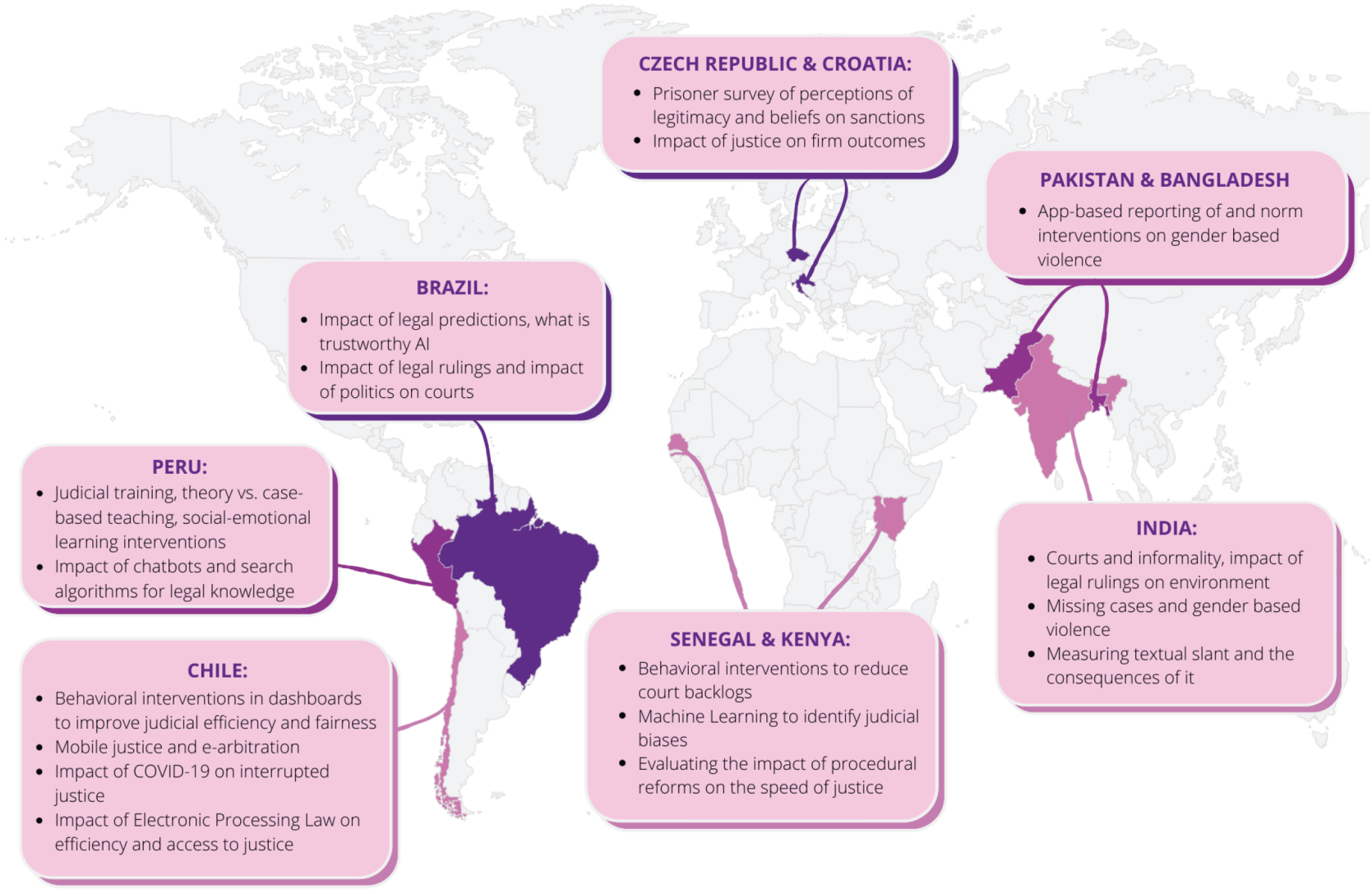
Before an Arrest, Officers Tossed a (Virtual) Coin

July 14, 2018

Justice and security

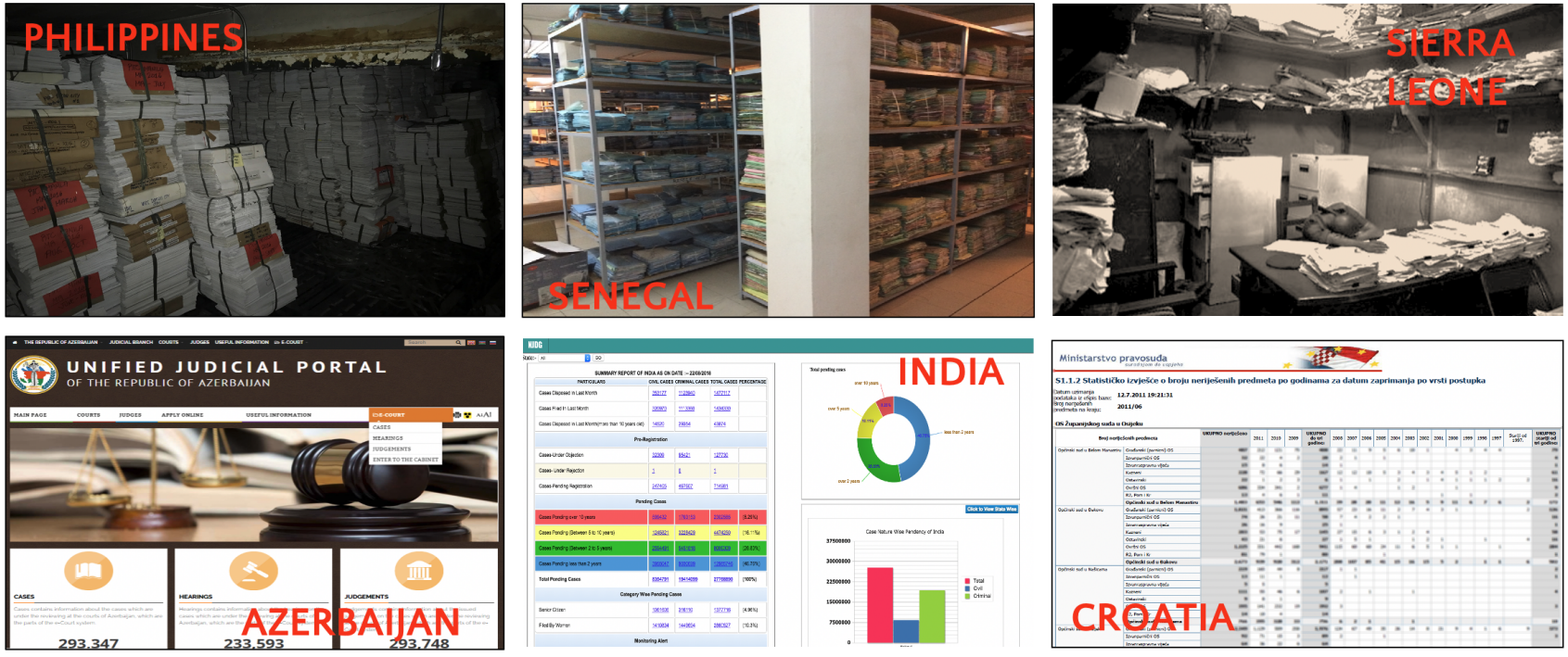
Economic development & legal institutions are associated

Country Specific Examples of Our Work



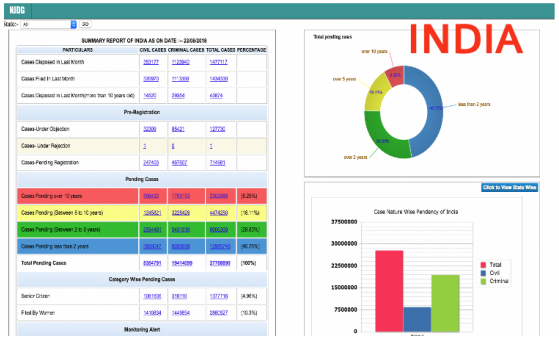
We run law and development RCTs through relationships with government partners who link legal cases to downstream effects for individuals and firms.

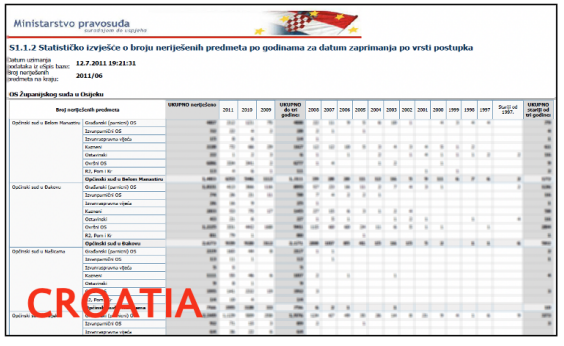
Data Ecosystems



- Recent innovations have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - ML applications to produce interpretable data from unstructured text
  - Predictive models of decision-making to better understand biases and address them with digital interfaces

(1) Data Ecosystems





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  - Increasingly digitized **large-scale datasets**
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  - Predictive models of decision-making to better **understand biases** and address them with digital interfaces

(2) Recognition-Dignity

- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
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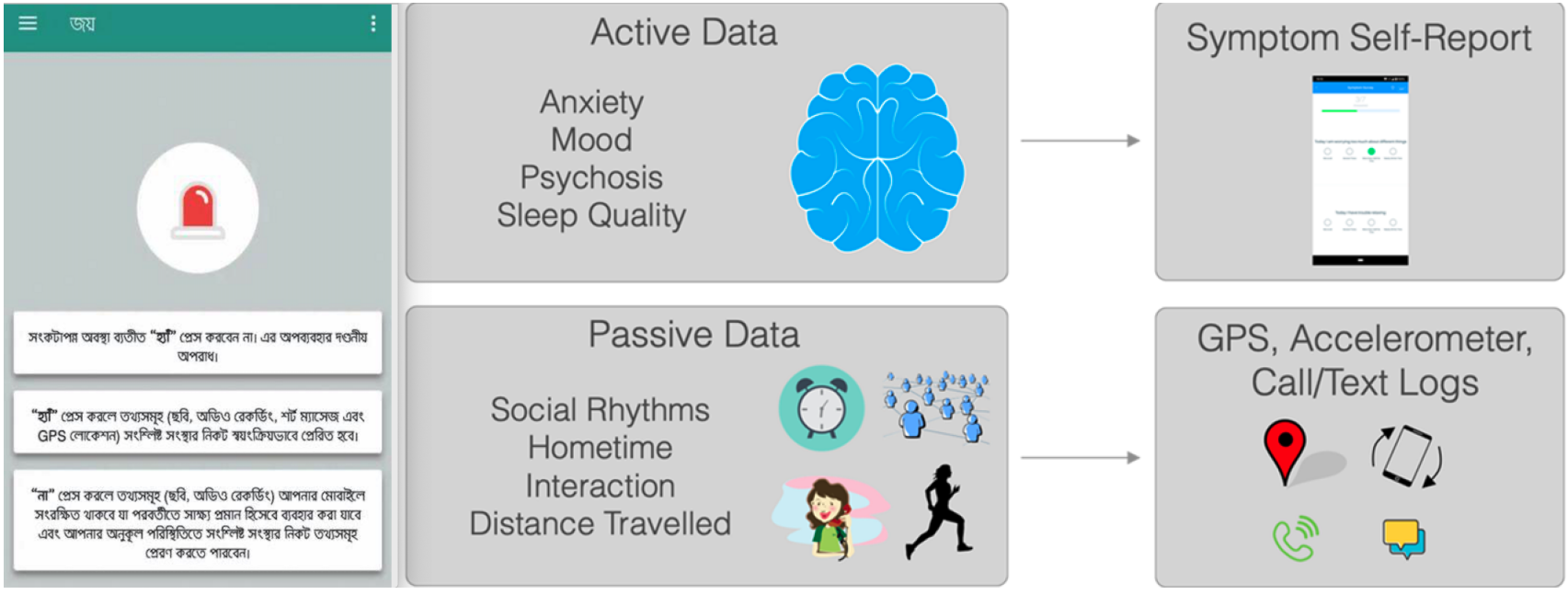
  - Predictive models of decision-making to better **understand biases** and **address them with digital interfaces**

(3) Gender-Based Violence (& sexual harassment)



- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
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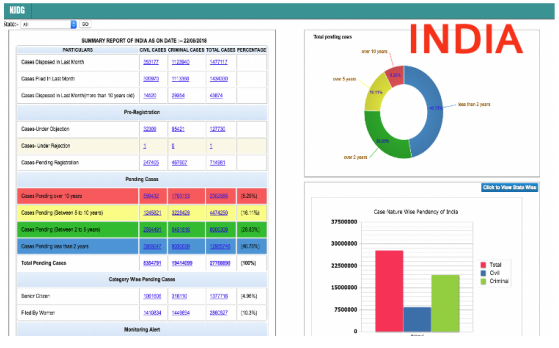
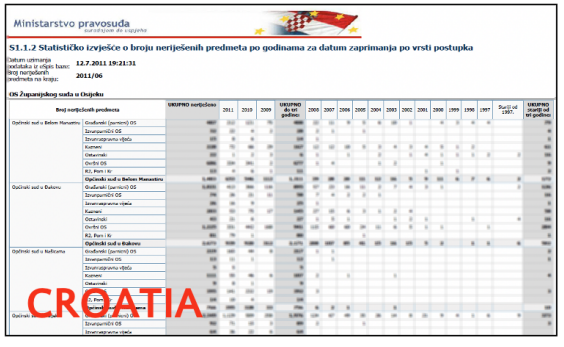
(4) Forward Look & Lessons





- Recent innovations have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - ML applications to produce interpretable data from unstructured text
  - **Predictive models of decision-making** to better understand biases and address them with digital interfaces

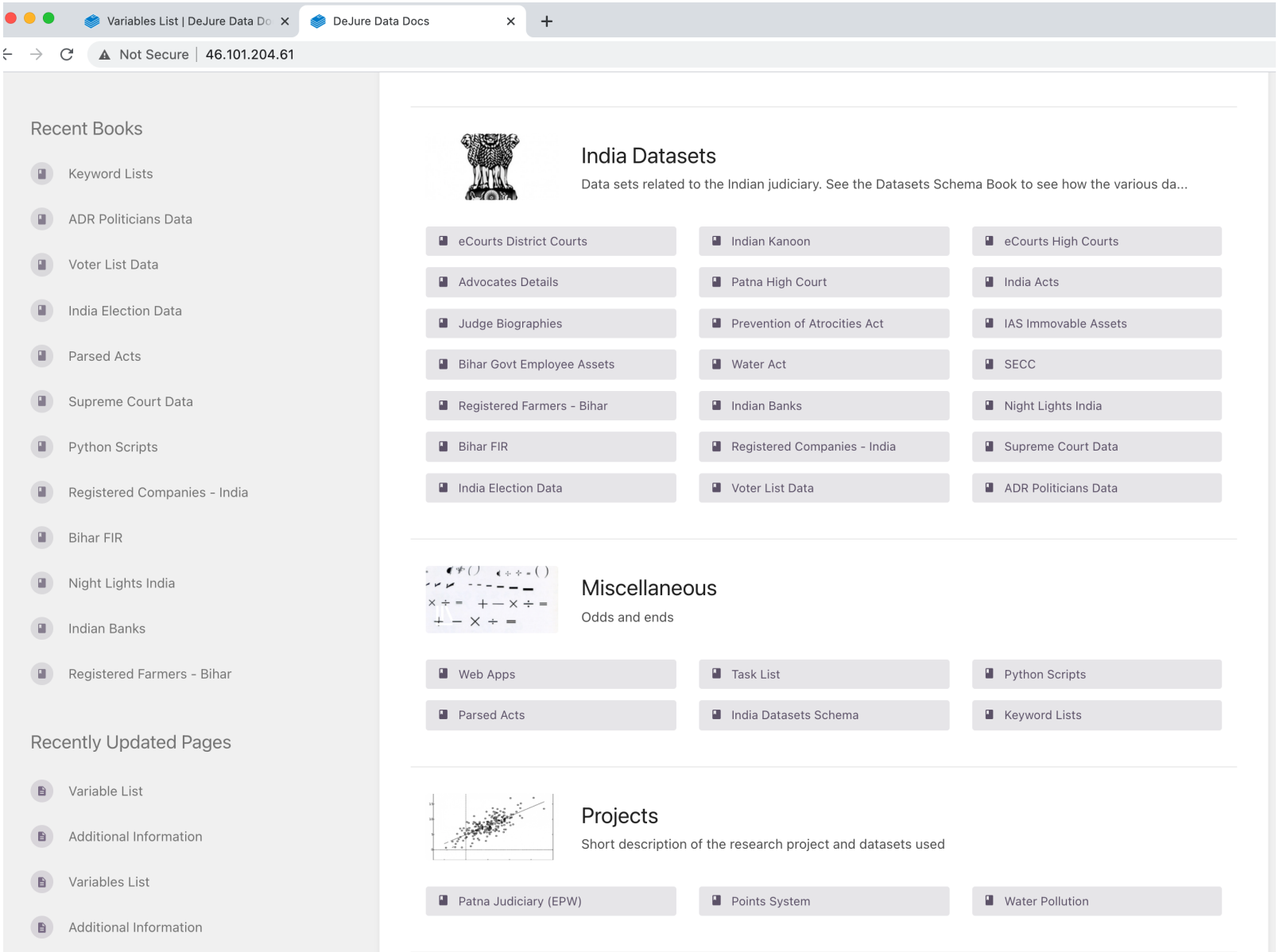
LET ME BEGIN WITH INDIA

India E-courts

	prev. scrape	current scrape	Δ
districts	608	633	+ 04%
courts	6292	7154	+ 14%
# of cases 2015-2018 all states	40.95M	48.9M	+ 19%

year	prev. scrape	new scrape	merged
2000	0.46M	0.53M	calculating
2001	0.71M	0.77M	calculating
2002	0.79M	0.92M	calculating
2003	0.97M	1.12M	calculating
2004	1.15M	1.31M	calculating
2005	1.49M	1.59M	calculating
2006	1.73M	1.92M	calculating
2007	1.86M	2.1M	calculating
2008	2.23M	2.49M	calculating
2009	2.69M	2.89M	calculating
2010	3.31M	3.47M	calculating
2011	2.22M	4.05M	calculating
2012	3.66M	4.92M	calculating
2013	7.26M	7.32M	calculating
2014	10.37M	10.21M	calculating
2015	8.29M	9.13M	10.74M
2016	10.88M	9.4M	12.03M
2017	10.8M	9.82M	12.83M
2018	10.98M	9.37M	13.3M
2019	0M	8.59M	8.59M

Data Wiki



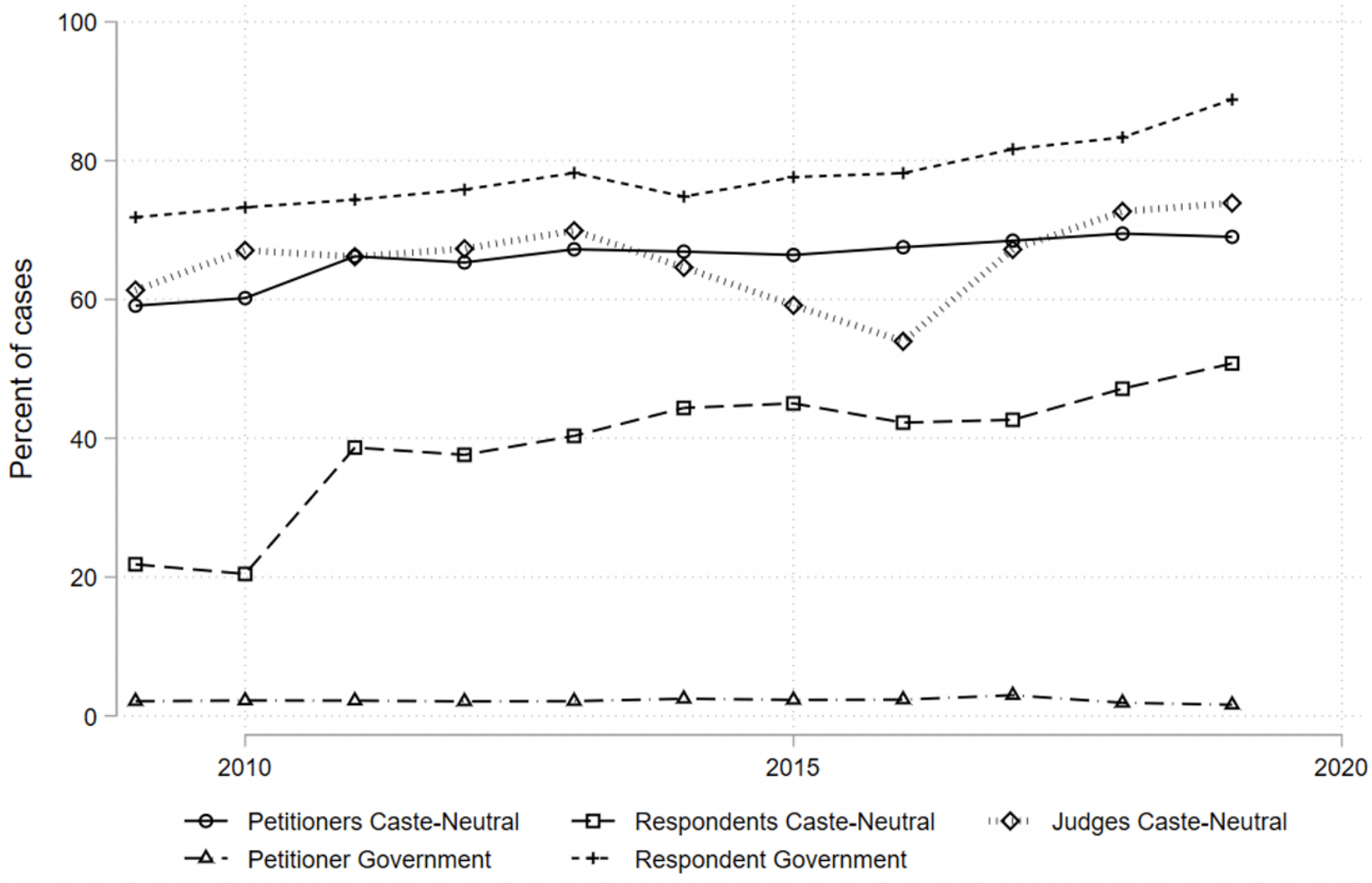
Database of Central Acts, Database of Banks, Database of Assets, ...

India

- Impacts **of** law
  - linkages to litigant (firm or individual)
  - economic data, pollution, land disputes
- Impacts **on** law
  - elections, inconsistencies, networks, movements
  - (politics, psychology, economics, social)
- **Improving** rule of law
  - court reforms, decision-support, transparency
- https://explore-ecourts.herokuapp.com/

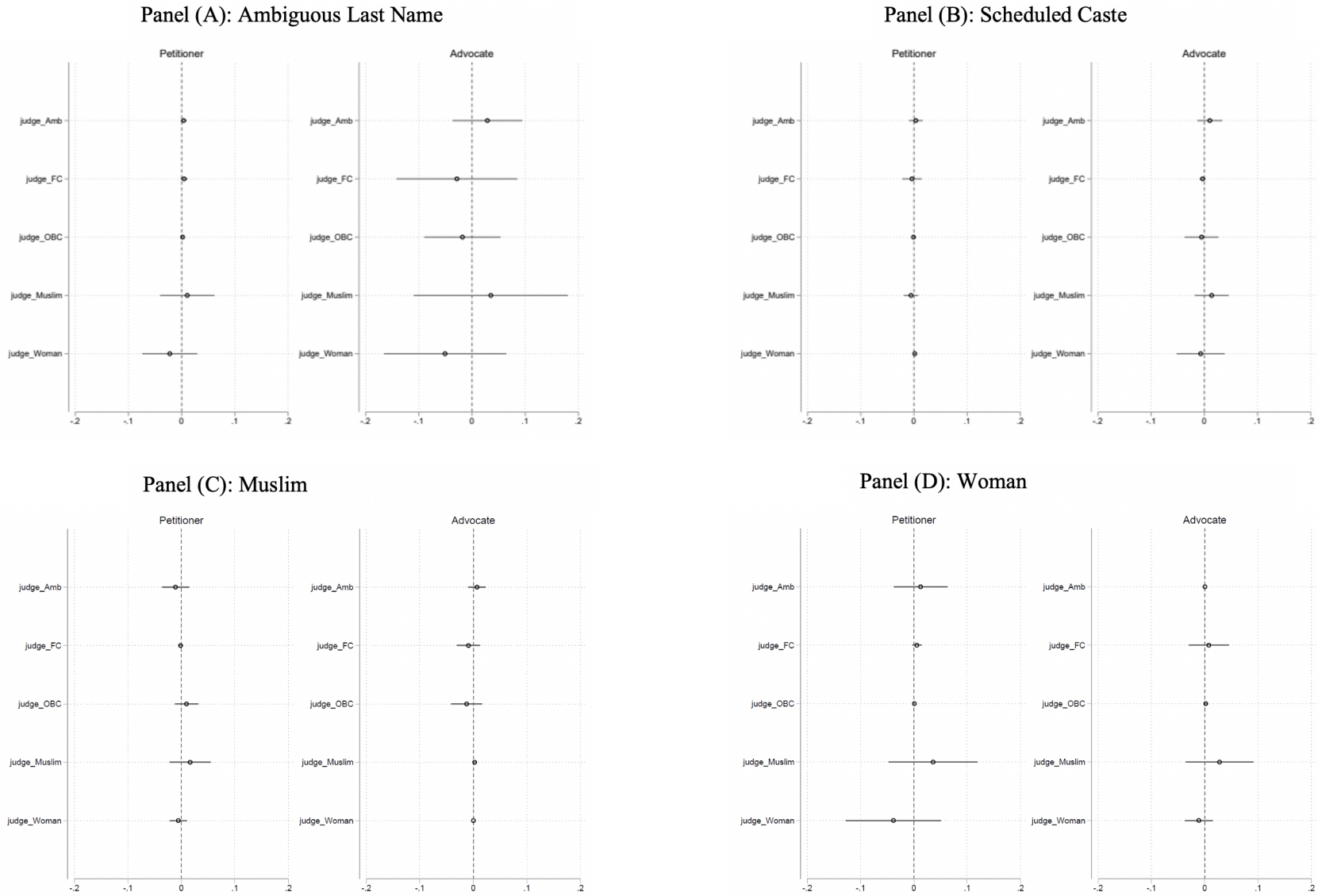
Highlight four studies (then turn to pakistan)

(1) A window into social processes (Bhupatiraju, Chen, Joshi, Neis 2020)



High Courts of Bihar

(1) A window into social processes



No strong evidence of non-random assignment between petitioners (advocates) and judges

(1) A window into social processes

Strong evidence of assortative matching between caste-neutral petitioners and advocates

	(1) Petitioner's Advocate is caste neutral	(2) Petitioner's Advocate is SC	(3) Petitioner's Advocate is a woman	(4) Petitioner's Advocate is Muslim
Petitioner Caste-Neutral	0.058***			
	(0.014)			
Petitioner SC		-0.001		
		(0.001)		
Petitioner Woman			0.006	
			(0.005)	
Petitioner Muslim				0.085***
				(0.020)
Constant	0.569***	0.111***	0.134***	0.095***
	(0.005)	(0.000)	(0.001)	(0.001)
R-Squared	0.132	0.113	0.108	0.121
N	327,156	271,676	327,156	327,156

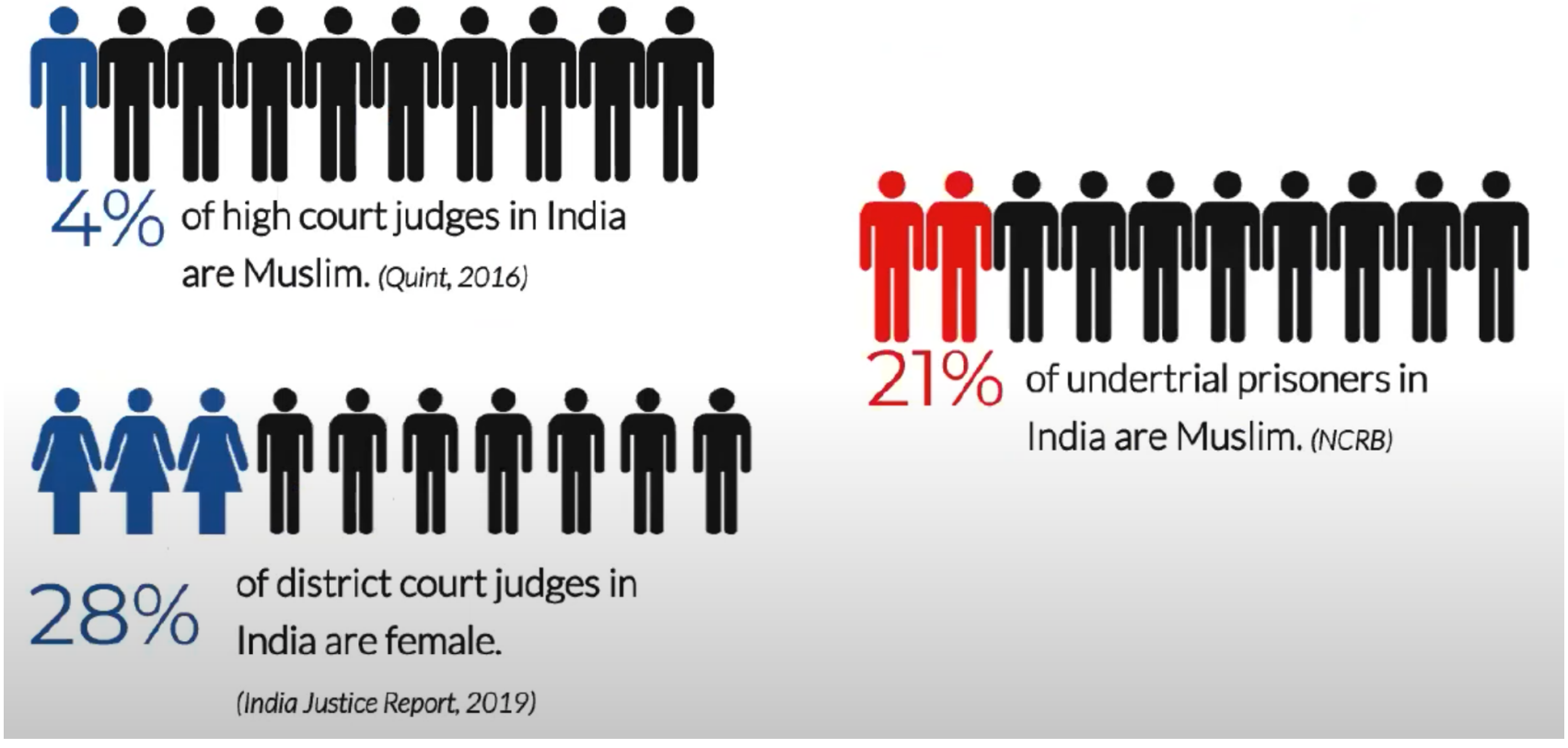
Caste-neutral names salient as is religion

IS THERE BIAS (AND IF SO WHERE) IN THE JUSTICE SYSTEM?

(2) Judicial bias by gender and religion (Ash, Asher, Bhowmick, Bhupatiraju, Chen, Devi, Goessman, Novosad, Siddiqi 2020)

* This paper focuses on **bias in the criminal justice system in India**.
* The research body on bias and criminal justice in the US is rich (Dobbie et al. 2018, Abrams et al. 2012, Alesina et al. 2014, etc.).
* There has been very limited empirical research on justice systems in developing countries, including India.
* In this paper, we specifically focus on **in-group bias by religion and gender in the Indian judiciary.**

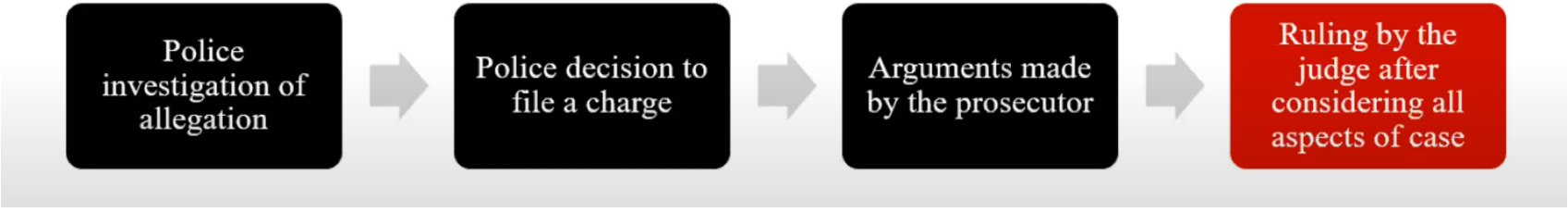
Muslims and women are underrepresented in the Indian judiciary



Muslims represent 14% and women 48% of the population

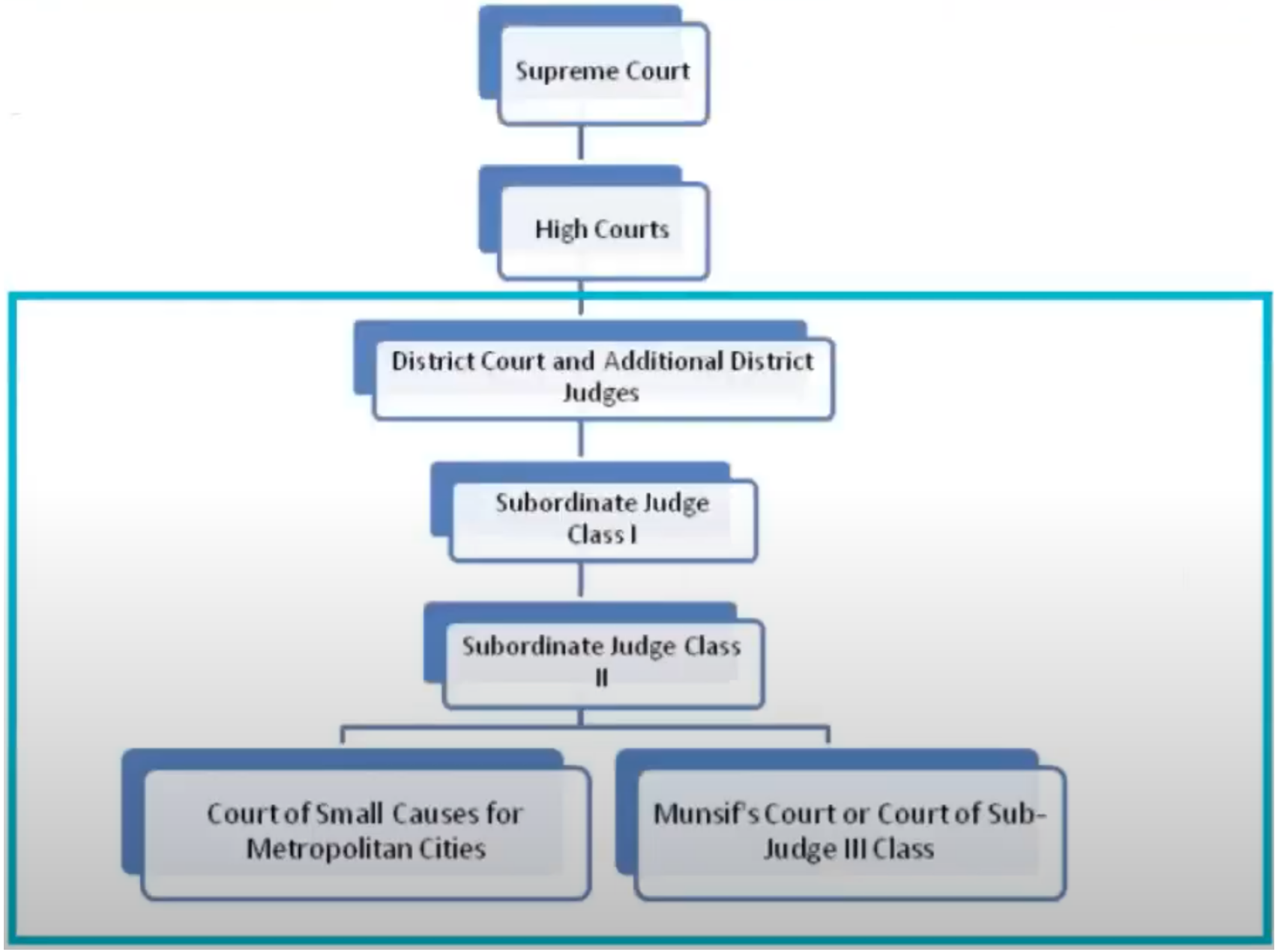
Stages of the criminal justice process

* There could be identity-motivated bias at each stage of the criminal justice process.



This study focuses on bias at the final stage of the process, i.e. **judge decision-making**

Scope of this paper: India's lower judiciary



Assignment of cases to judges in the lower judiciary

1. The judiciary condemns the practice of **judge shopping** or **forum shopping** *(M/s Chetak Construction Ltd. v. Om Prakash & Ors., 1998(4) SCC 577)*
2. The online case management system is designed to then assign unique IDs to the cases for random allocation.
3. This allocation does account for jurisdiction of a Police Station, pendency status of Courts, and other predetermined factors.
4. The lawyers/litigants are then informed about the allocation of the cases filed by them.
5. The District Judge has the right to override this allocation in exceptional circumstances.

This paper

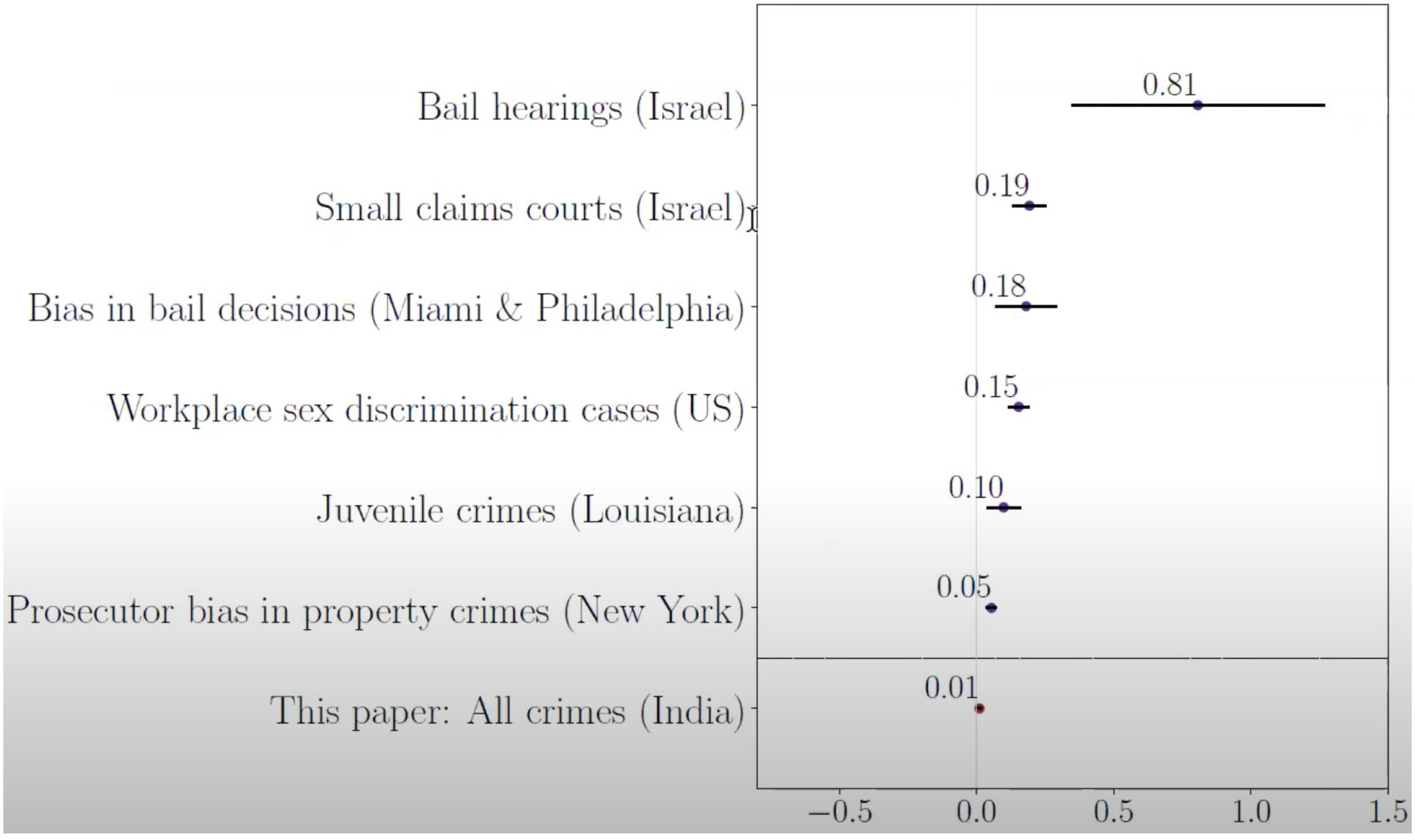
What we do:

- Collect records from 80M cases.
- Classify judge and defendant names by regligion/gender.

What we find:

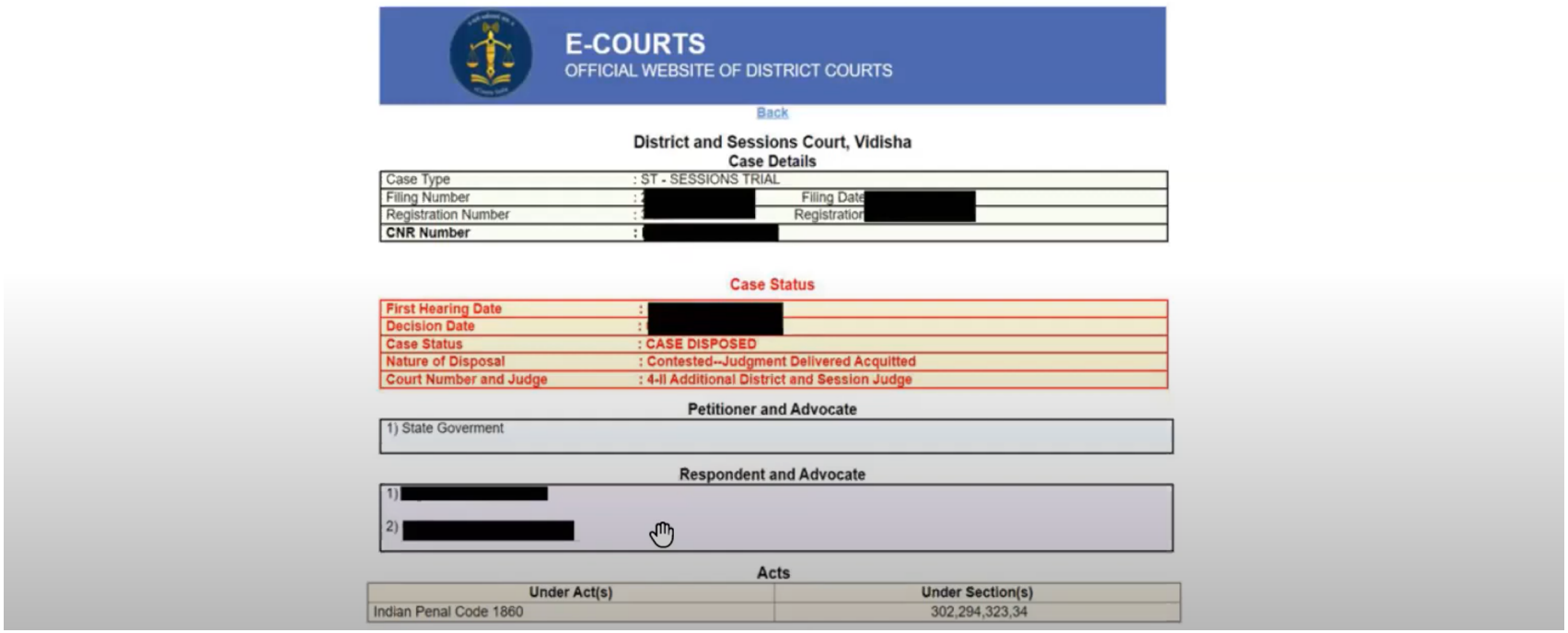
- Judge gender bias effects are tiny compared with magnitude of bias recorded in other studies in different contexts.
- Female judges are consistently less lenient toward all defendants compared to male judges.
- No evidence of in-group bias by religion — we are able to rule out effect sizes of one-fifth the sizes reported by other well-known studies.

Comparison with judicial in-group bias in other studies



India E-Courts Case Records

"National data warehouse for case data including the orders/judgments for courts across the country."



E-COURTS
OFFICIAL WEBSITE OF DISTRICT COURTS

Back

District and Sessions Court, Vidisha
Case Details

Case Type	: ST - SESSIONS TRIAL		
Filing Number	: [redacted]	Filing Date	[redacted]
Registration Number	: [redacted]	Registration	[redacted]
CNR Number	: [redacted]		

Case Status

First Hearing Date	: [redacted]
Decision Date	: [redacted]
Case Status	: CASE DISPOSED
Nature of Disposal	: Contested--Judgment Delivered Acquitted
Court Number and Judge	: 4-II Additional District and Session Judge

Petitioner and Advocate

1) State Goverment

Respondent and Advocate

1) [redacted]
2) [redacted]

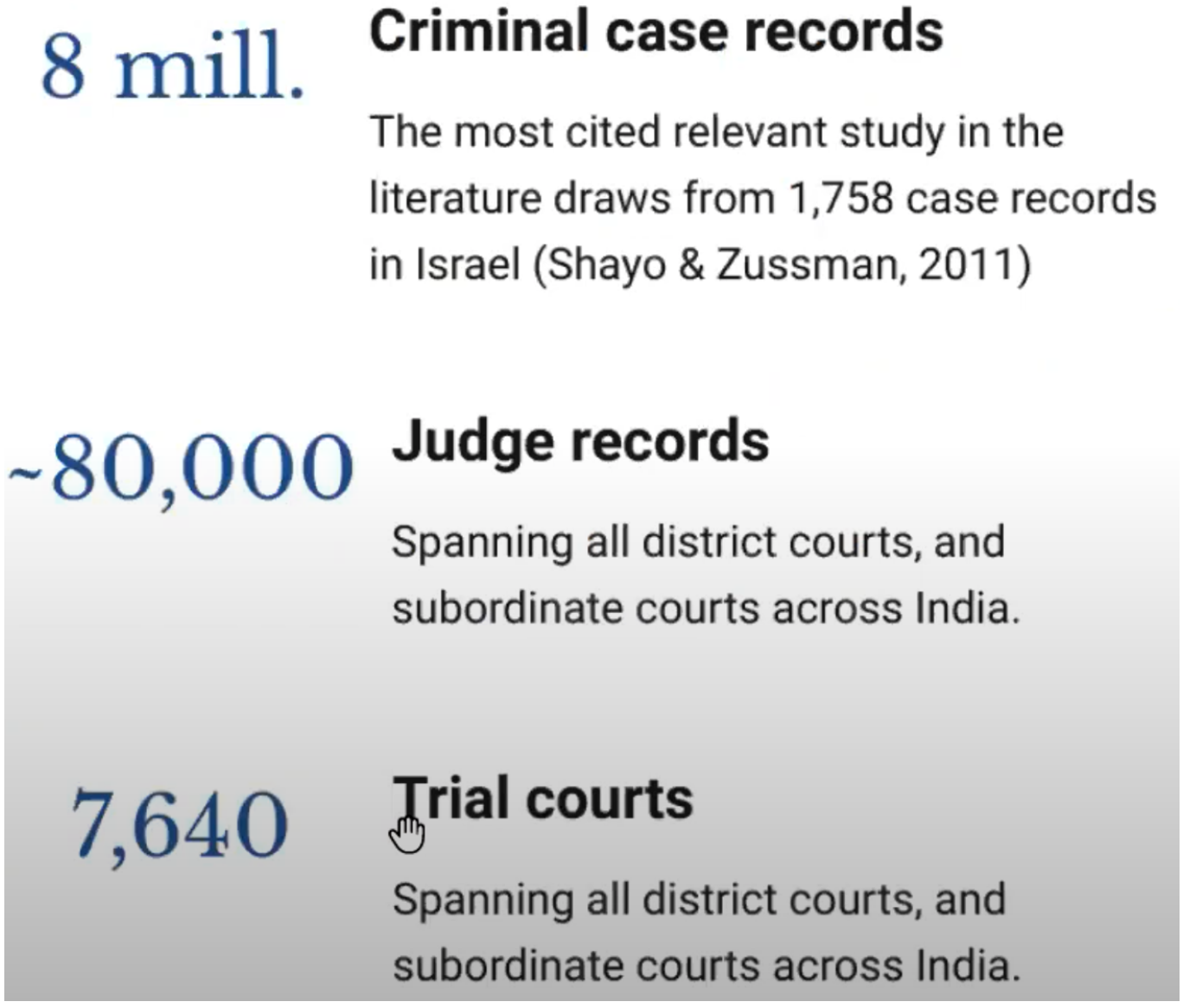
Acts

Under Act(s)	Under Section(s)
Indian Penal Code 1860	302,294,323,34

India E-Courts Case Records

* **Source:** Indian eCourts platform (ecourts.gov.in):
  "National data warehouse for case data including the orders/judgments for courts across the country."
* **Scope:**
  * All courts that constitute the Indian **lower judiciary**: *District and session courts, and subordinate courts across all districts in India.*
  * All cases filed between **2010-2018**.
  * $>$ **80 million case records across** $>$ **7000 courts.**
* **Judges Platform**: acquired $>$ **100k judge records.**

Sample: cases filed under Indian Penal Code of Criminal procedure



Religion and Gender Identity

* **Problem:** Records do not contain demographic data (gender/religion)
  * **Solution:** Apply a machine classifier to name string

Character-level Bidirectional Long Short-Term Memory (LSTM) network

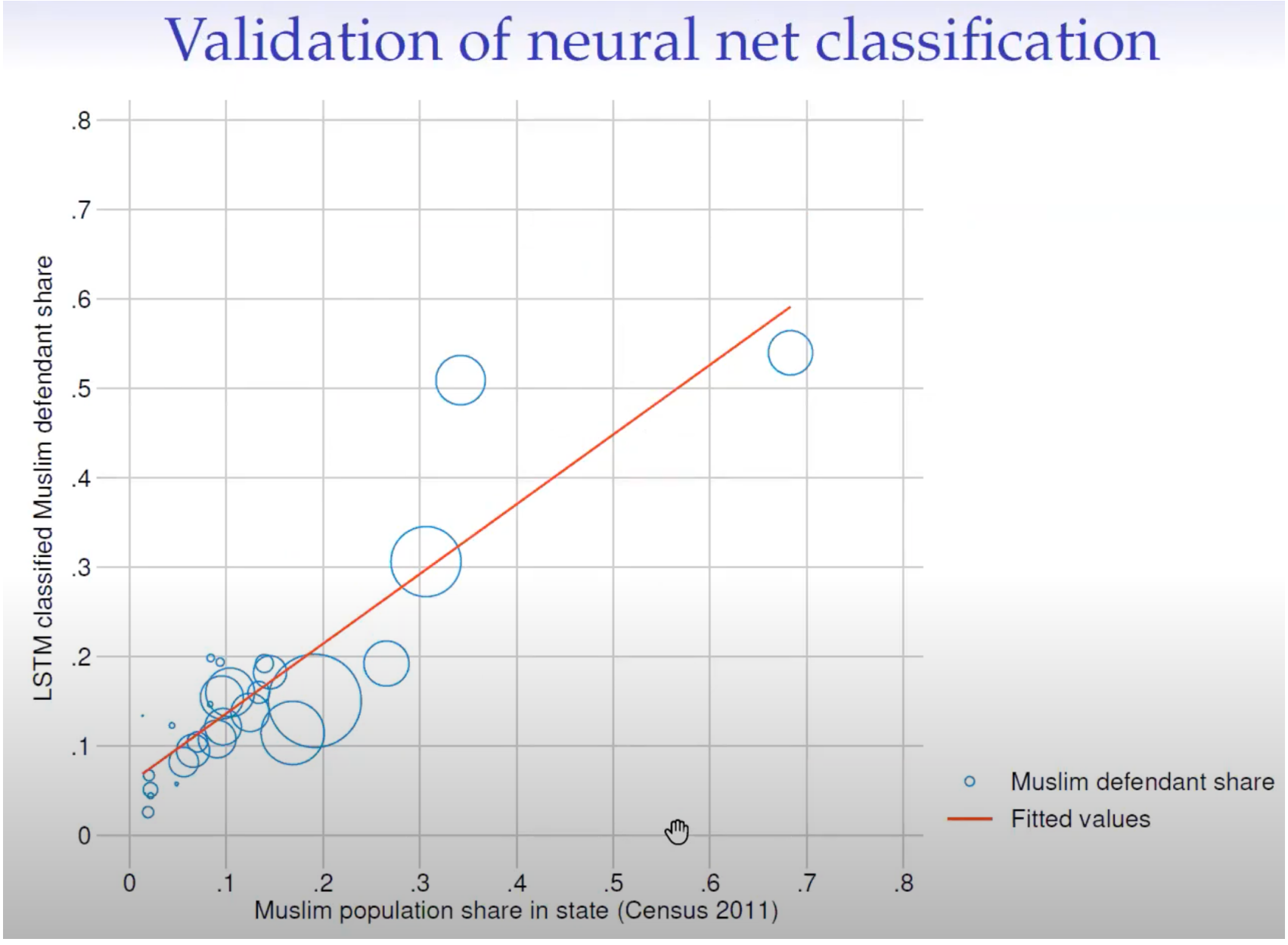
  * Specific type of Recurrent Neural Network – reads over name characters and interprets them based on a "memory" of the history of characters.

Religion and Gender Identity

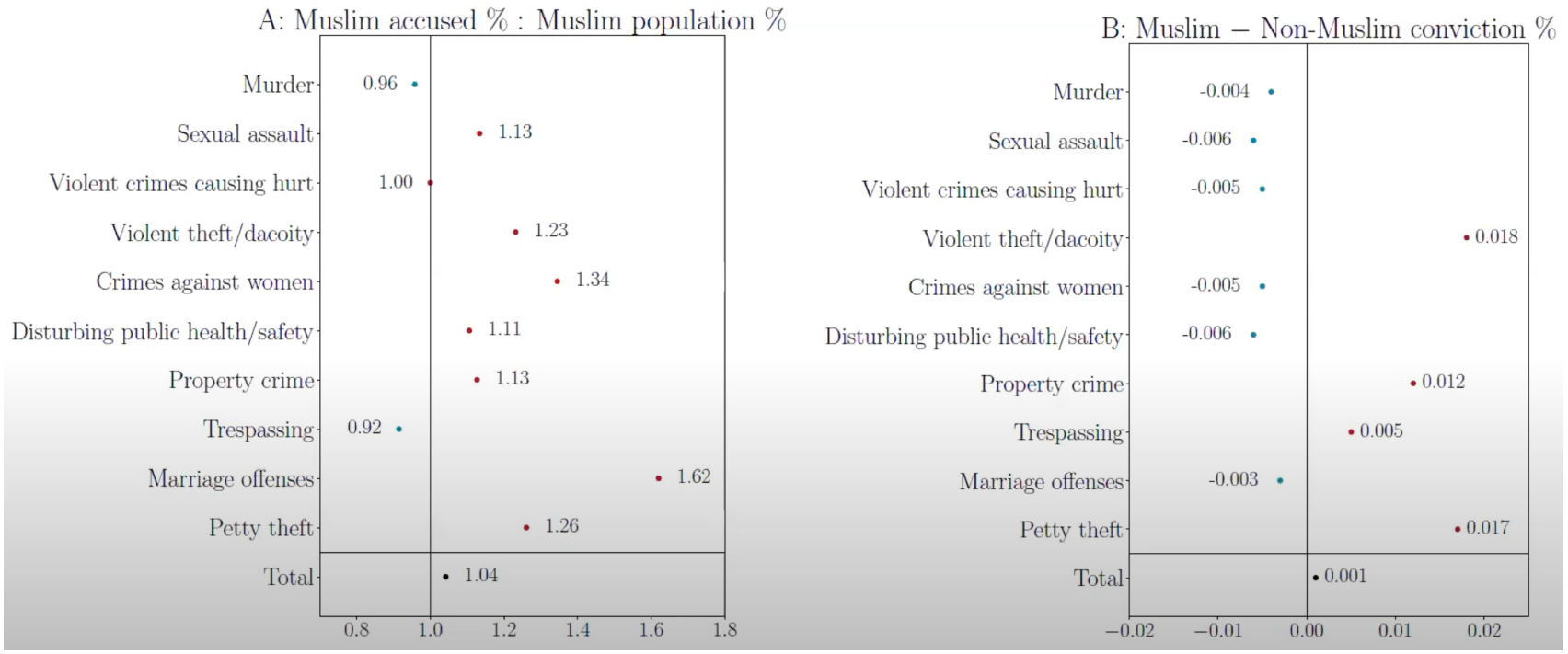
Training dataset for Neural Network

Panel A: Delhi voter rolls names		
Female	6,138,337	44.8
Male	7,556,138	55.2
Total	13,694,475	100.0
Panel B: National Railway exam names		
Buddhist.	1,910.	0.1
Christian	11,194	0.8
Hindu.	1,174,076	84.8
Muslim.	163,861	11.8
NA	33,882	2.4
Total	1,384,923	100.0

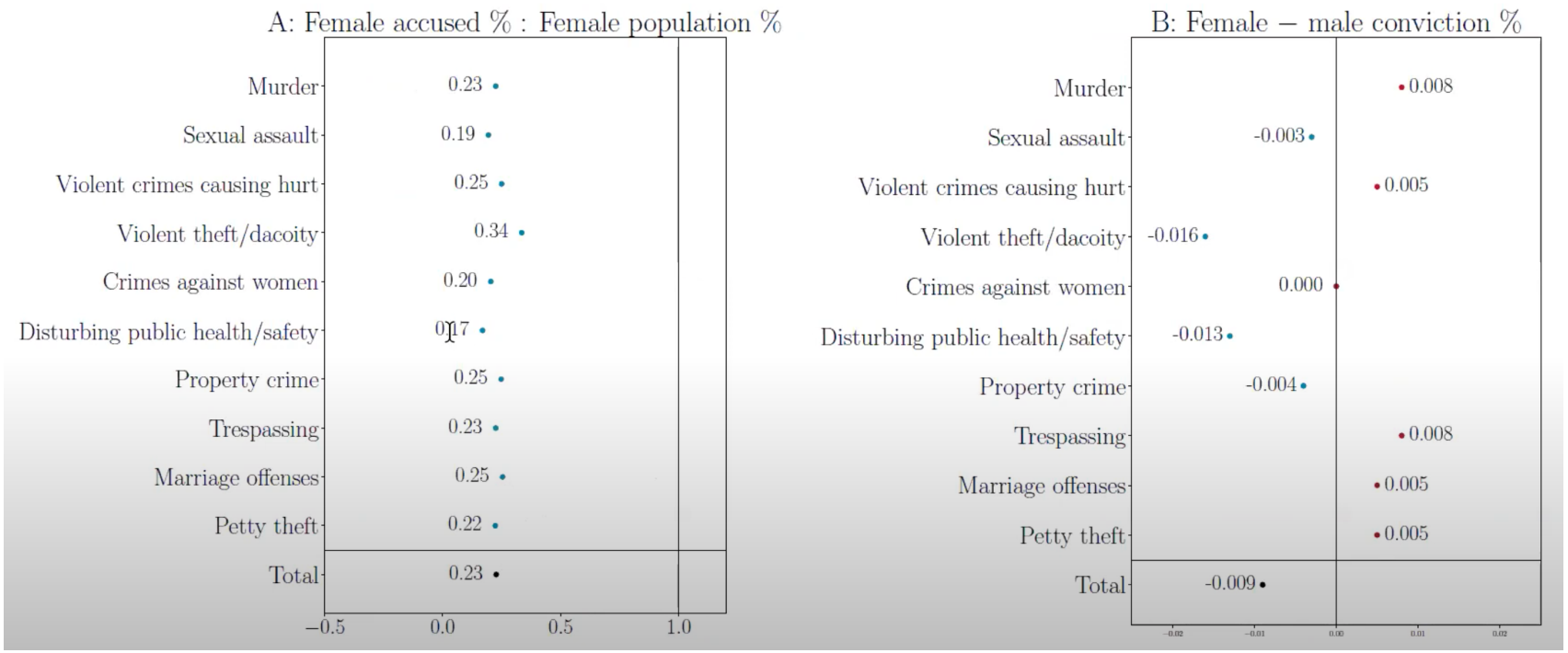
Religion and Gender Identity



Muslim defendants disproportionately charged for crimes



No evidence of anti-female discrimination in charge rates



Case outcome specification

* $\sim 60\%$ of case outcomes can be assigned without a problem, e.g:
  * $Y = 1$ when acquitted (good outcome for defendant)
  * $Y = 0$ when convicted (bad outcome for defendant)
* $\sim 40\%$ of the cases have ambiguous outcomes in the metadata, such as: "decided", "judgement", "partly decreed", etc.
* So, we define our outcome in *three different ways*.

Case outcome specification

Outcome	Definition
* Any decision	= 1 if case has a disposition at all, 0 if no decision
* Acquitted	= 1 if disposition is clearly acquitted, 0 if disposition is something else
* Not convicted	= 1 if the case has a disposition, 0 if the case has a disposition that is clearly convicted

Empirical Strategy

We exploit **random assignment of judges to cases**. We model outcome Y_{ict} for case i in court c at time t as

$$Y_{i,c,t} = \alpha + \beta_1 \text{judge\_female}_{i,c,t} + \beta_2 \text{def\_female}_{i,c,t} + \beta_3 \text{judge\_female}_{i,c,t} * \text{def\_female}_{i,c,t} + \phi_{c,t} + \delta \chi_{i,c,t} + \epsilon \quad (1)$$

* α = average outcome for baseline category, male judges and male defendants.
  everything analogous for Muslim/non-Muslim
* β_1 = effect of female judge on male defendant
* $\beta_1 + \beta_3$ = effect of female judge on female defendant
* β_3 = gender in-group bias

Assessing randomization

	Female judge	Female judge	Muslim judge	Muslim judge
Panel A: Sample with clear acquitted/convicted outcomes				
Female defendant	-0.00210	-0.000112	0.00436	-0.00278
	(0.00254)	(0.00159)	(0.00403)	(0.00231)
Muslim defendant	0.00593*	0.00472**	0.00103	-0.000126
	(0.00341)	(0.00209)	(0.00506)	(0.00279)
Observations	355848	877290	145864	373478
Fixed Effect	Court-month	Court-year	Court-month	Court-year
Panel B: Sample including observations with no decision				
Female defendant	-0.00153	-0.0000955	0.00163	-0.000319
	(0.00223)	(0.00132)	(0.00331)	(0.00190)
Muslim defendant	0.00594**	0.00436***	0.00601	0.00244
	(0.00298)	(0.00168)	(0.00412)	(0.00222)
Observations	624863	1548299	244724	641333
Fixed Effect	Court-month	Court-year	Court-month	Court-year

Standard errors in parentheses

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

Female judges are less lenient, but do not rule differently on male and female defendants

	(1) Acquitted	(2) Acquitted	(3) Any decision	(4) Any decision
Female judge on Male defendant (β_1)	-0.015**	-0.007**	0.000	-0.006
	(0.006)	(0.003)	(0.008)	(0.004)
Female judge on Female defendant ($\beta_1 + \beta_3$)	-0.004	-0.001	-0.002	-0.005
	(0.008)	(0.005)	(0.009)	(0.005)
Own gender bias (β_3)	0.010*	0.006	-0.002	0.001
	(0.006)	(0.004)	(0.006)	(0.004)
Reference group mean	0.181	0.181	0.569	0.569
Observations	355848	877290	624863	1548299
Fixed effect	Court-month	Court-year	Court-month	Court-year

Standard errors in parentheses

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

Reference group: Male judges, Male defendants

Specification: $Y_{i,c,t}=\alpha+\beta_1 judge\_Female_{i,c,t}+\beta_2 def\_Female_{i,c,t}+\beta_3 judge\_Female^{*}_{i,c,t} def\_Female_{i,c,t}+\phi_{c,t}+\delta\chi_{i,c,t}+\epsilon$

Magnitude of in-group bias by religion is a precisely estimated zero

	(1) Acquitted	(2) Acquitted	(3) Any decision	(4) Any decision
Muslim judge on non-Muslim defendant (β_1)	0.002	-0.002	0.022*	0.012*
	(0.01)	(0.005)	(0.012)	(0.006)
Muslim judge on Muslim defendant ($\beta_1 + \beta_3$)	-0.001	0.001	0.024*	0.013*
	(0.014)	(0.007)	(0.013)	(0.007)
Own religion bias (β_3)	-0.002	0.002	0.002	0.002
	(0.009)	(0.005)	(0.008)	(0.005)
Reference group mean	0.141	0.142	0.594	0.594
Observations	145864	373478	244724	641333
Fixed effect	Court-month	Court-year	Court-month	Court-year

Standard errors in parentheses

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

Reference group: non-Muslim judges, non-Muslim defendants

Specification: $Y_{i,c,t}=\alpha+\beta_1 judge\_Muslim_{i,c,t}+\beta_2 def\_Muslim_{i,c,t}+\beta_3 judge\_Muslim^*_{i,c,t} def\_Muslim_{i,c,t}+\phi_{c,t}+\delta\chi_{i,c,t}+\epsilon$

No robust evidence of in-group bias by gender when the judge is female (in gender-related crimes)

Panel A: Court-month fixed effect		
	(1)	(2)
	Any decision at all	Acquitted
Female judge on Male defendant (β_1)	-0.031*	-.034
	(.017)	(.028)
Observations	27217	11756
Panel B: Court-year fixed effect		
	(1)	(2)
	Any decision at all	Acquitted
Female judge on Male defendant (β_1)	-.007	-.009
	(.007)	(.01)
Observations	74866	36685

Standard errors in parentheses

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

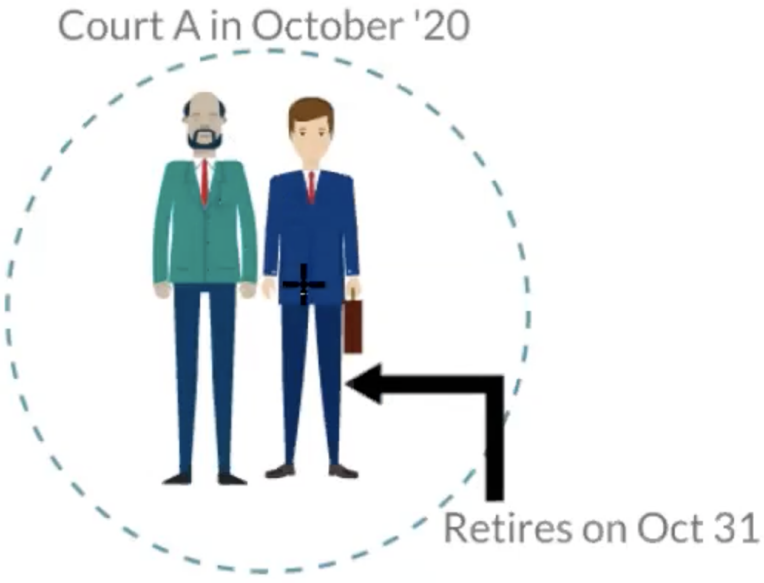
- Crime on women analysis focuses on male defendants since the number of female defendants is negligible

Empirical strategy II: Event study

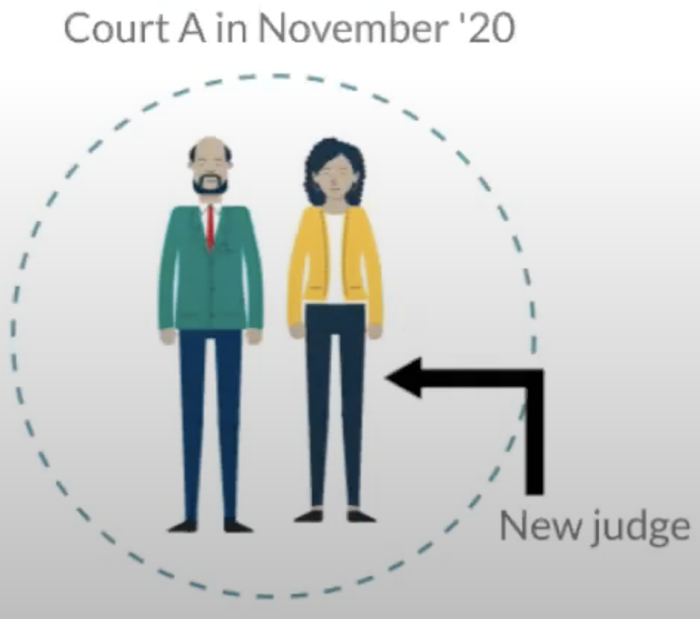
We exploit judge replacements in courts to study the following court composition changes using a regression discontinuity specification:

Event	Description
Pro-defendant transition	Share of judges belonging to defendant's identity increases by $\geq 50\%$ in the court
Against defendant transition	Share of judges belonging to defendant's identity decreases by $\geq 50\%$ in the court
Composition neutral transition	Share of judges belonging to defendant's identity remains unchanged by a transition

Event study illustration



Accused name	Case decision date
Rahul (M)	Oct 1, 2020
Pooja (F)	Oct 5, 2020
Ram (M)	Nov 5, 2020
Anjali (F)	Nov 5, 2020



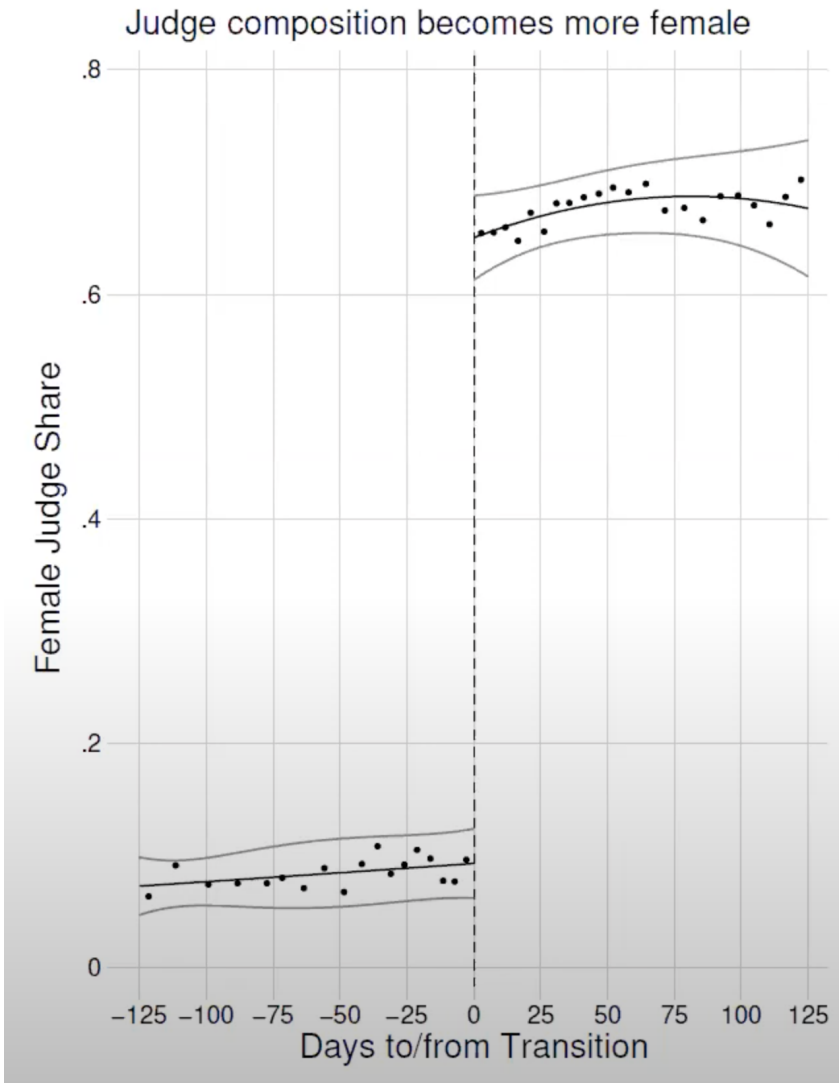
Event: Female judge share in court A increased by 50% after Oct 31

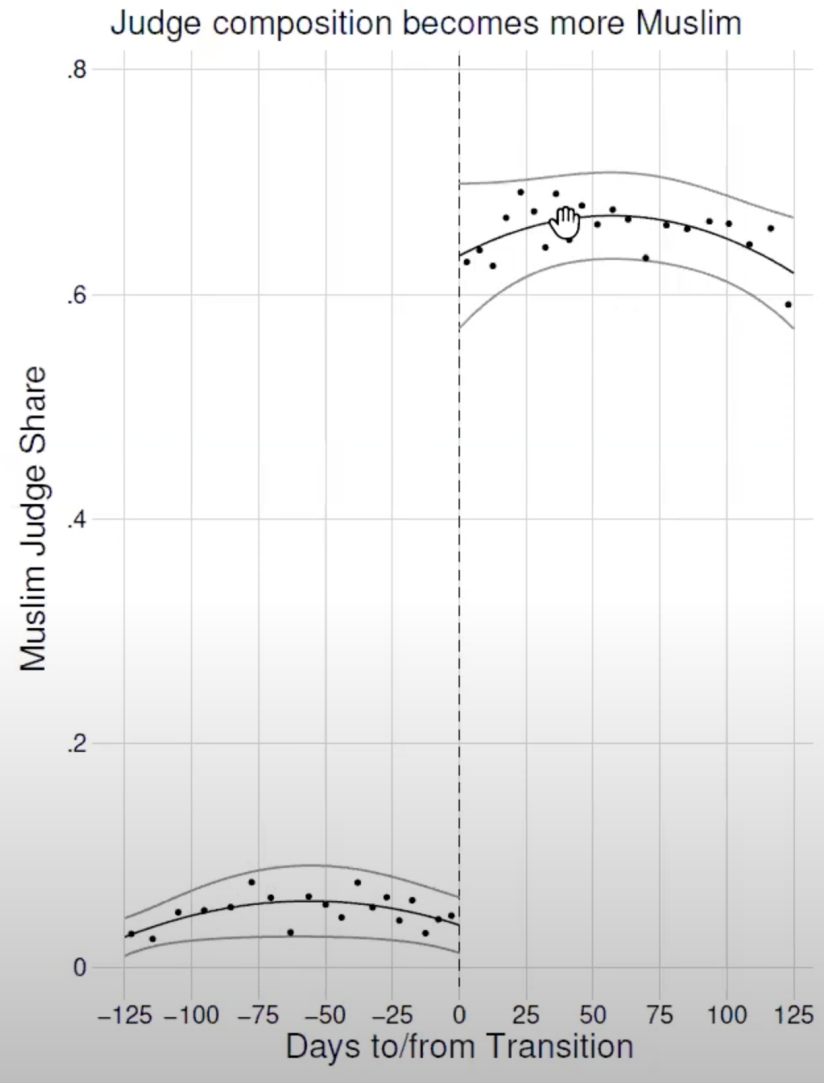
1. Is Anjali more likely to get acquitted than Pooja?

2. Is Ram less likely to get acquitted than Rahul?

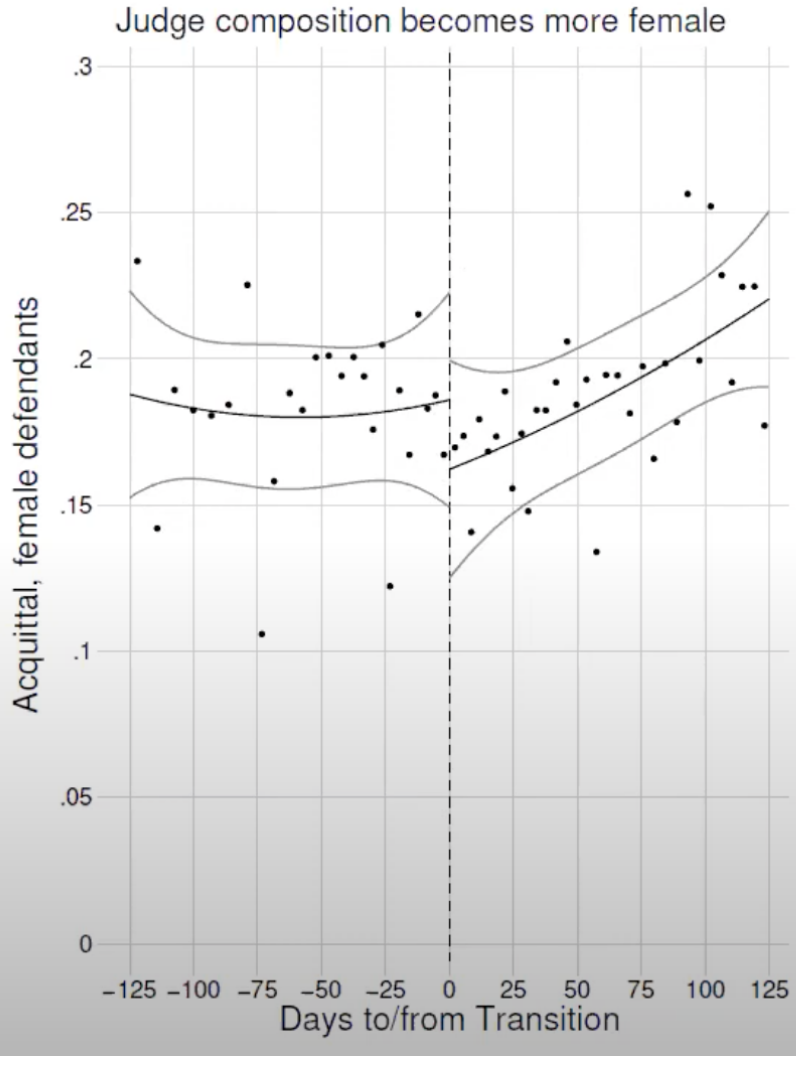
Measuring Transitions

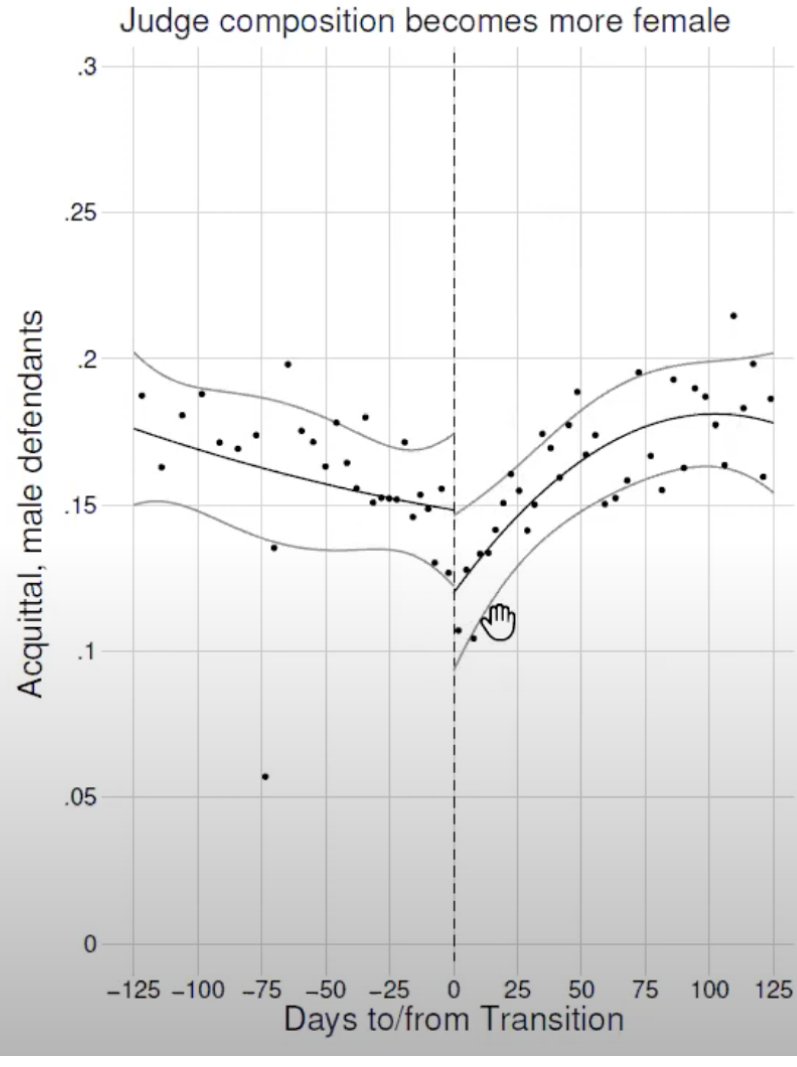
Event study approach: First stage



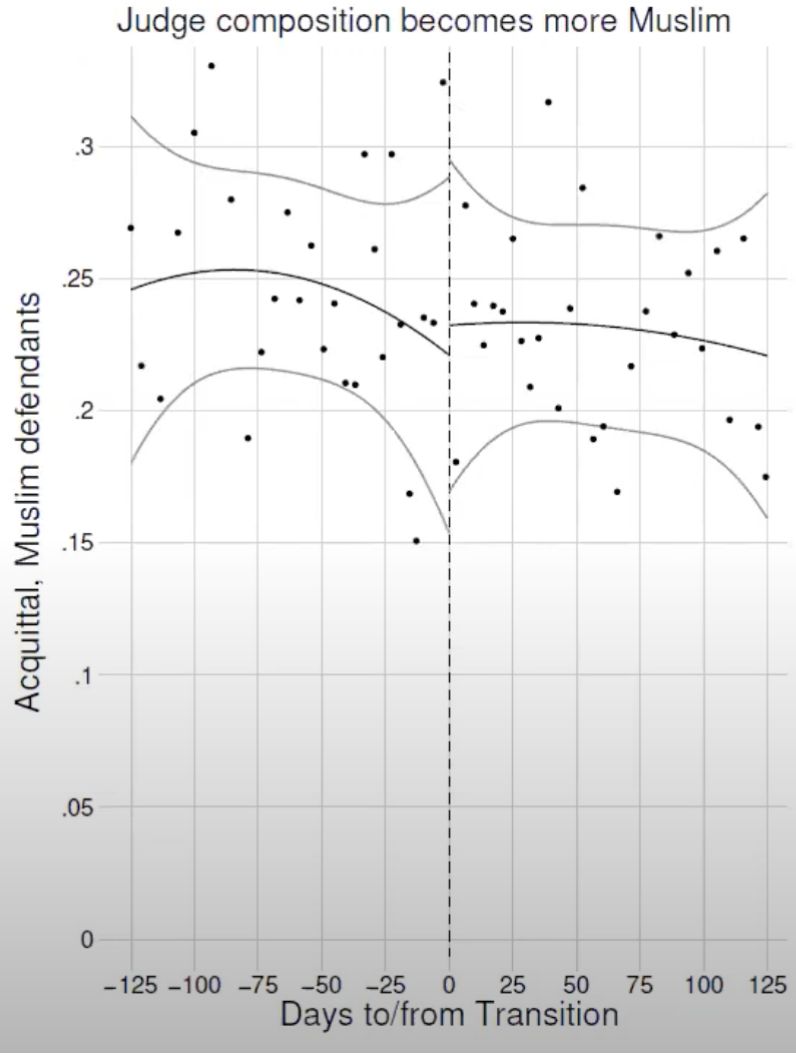


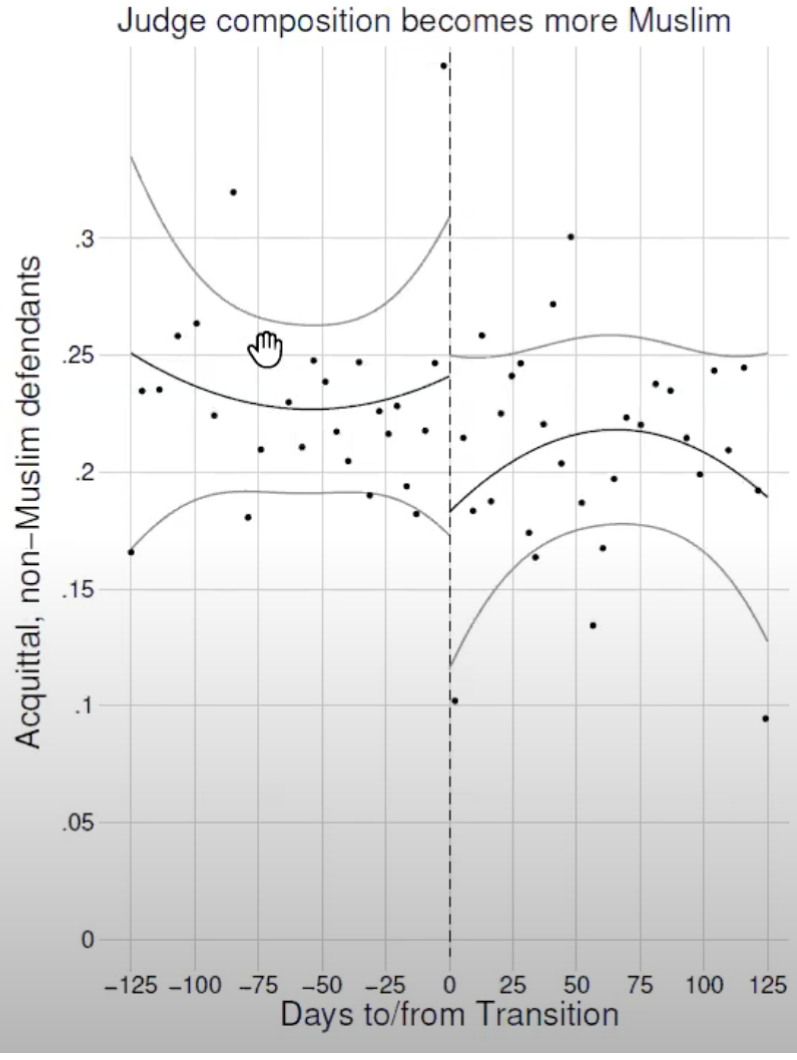
Impact of transitions that increase female judge share, for female and male defendants



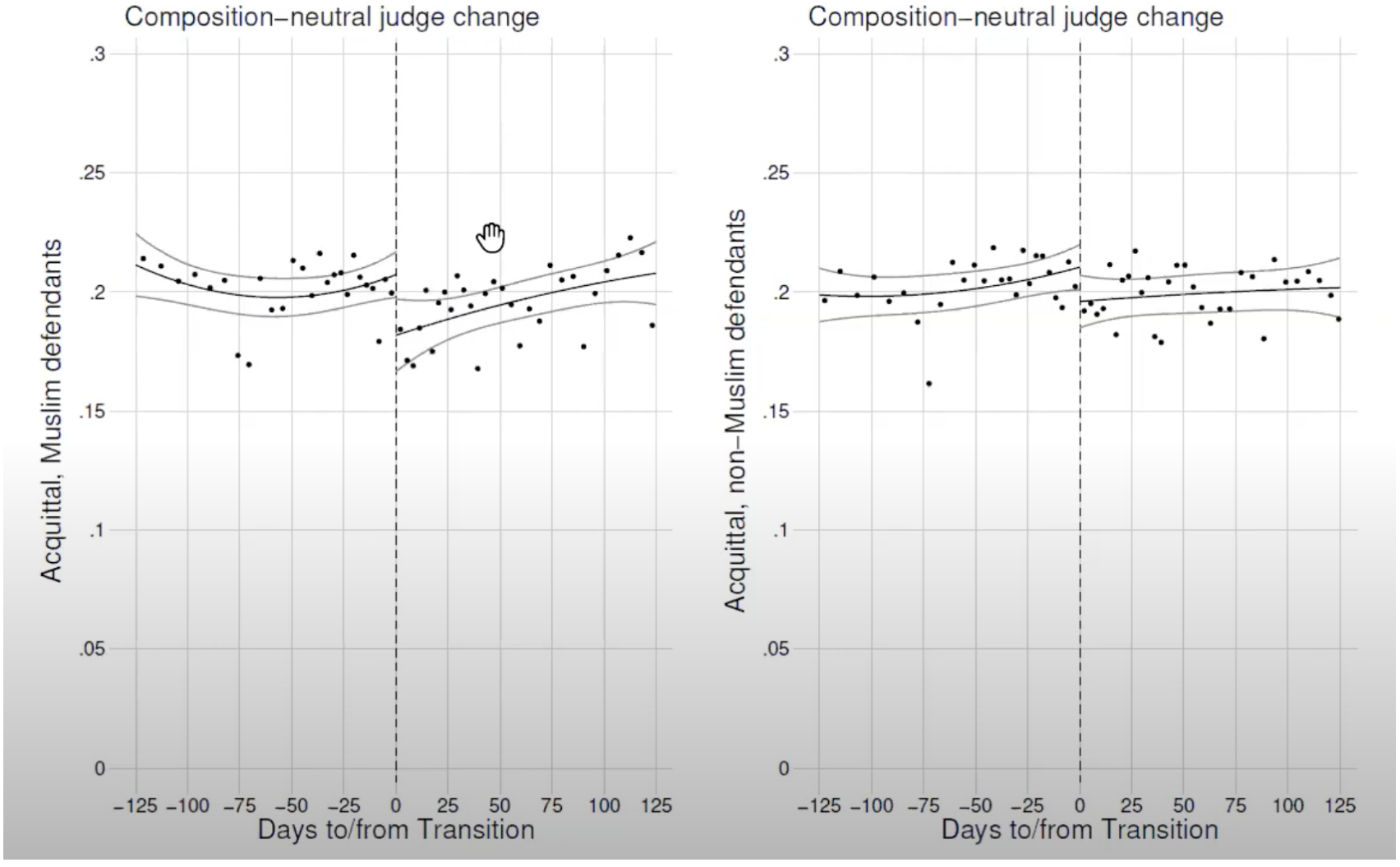


Impact of transitions that increase Muslim judge share, for Muslim and non-Muslim defendants





Impact of composition-neutral judge transitions, for Muslim and non-Muslim defendants



(2) Judicial bias by gender and religion

* Large-scale analysis of bias in judicial decision-making in a developing country.
* Precise and robust null estimate of in-group bias along gender and religion dimensions at the judicial outcome stage of criminal process
    * Some evidence that female judges are harsher on male defendants, but the magnitude is extremely small.
      Effect size: 0.7-1.5 pp, p: 0.10
* We rule out effect sizes one-fifth of those found in other literature (< 1 *pp* vs. 17 *pp* in Shayo and Zussman (2011), 15 *pp* in Knepper (2018), 5 *pp* Carly Will Sloan (2020))

(2) Judicial bias by gender and religion

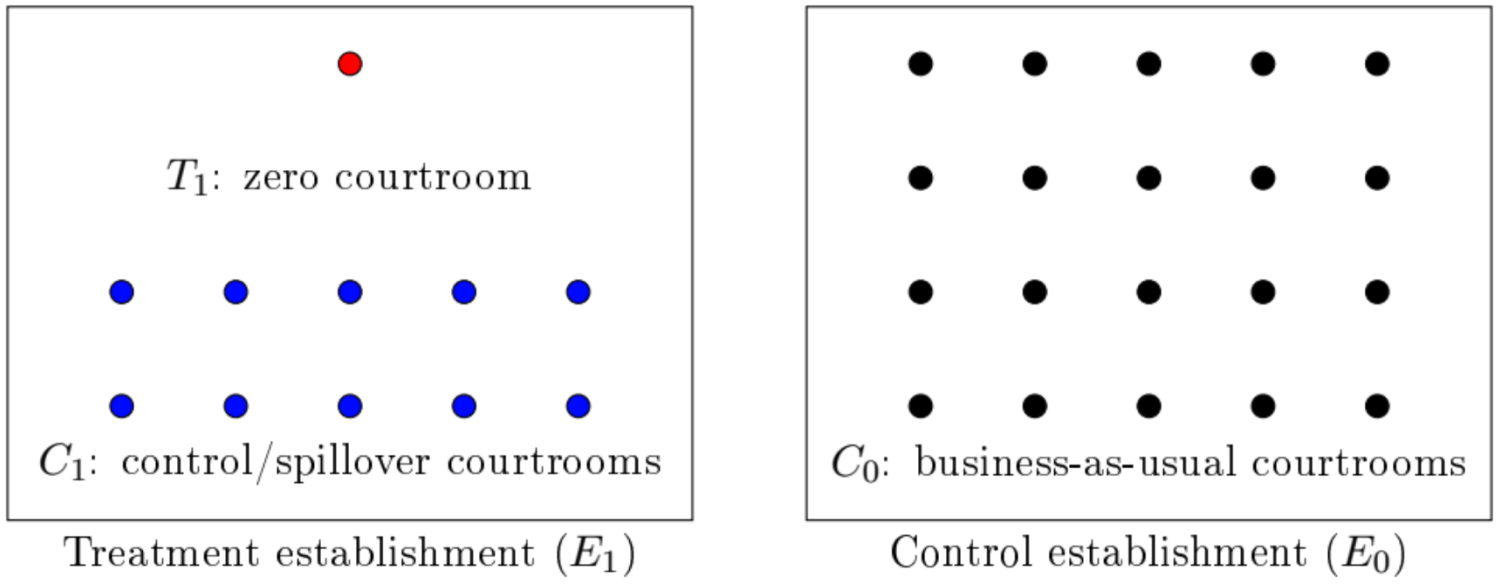
* We **do not rule out** that the criminal justice system is biased.
* We do reject existence of meaningful in-group bias at the judicial outcome stage.
* **Future research can address:**
  1. Whether bias exists at the earlier stages of criminal process?
  2. Whether bias exists in higher courts where judges' discretion may be greater?
  3. Whether the identity of the victim matters?

TURNING FROM BIAS TO EFFICIENCY

(3) Impact of "Zero" Courts (Bhupatiraju, Chen, Neis 2020)

Delhi High Court - 11 subordinate courts with no backlog were chosen as 'pilot courts'

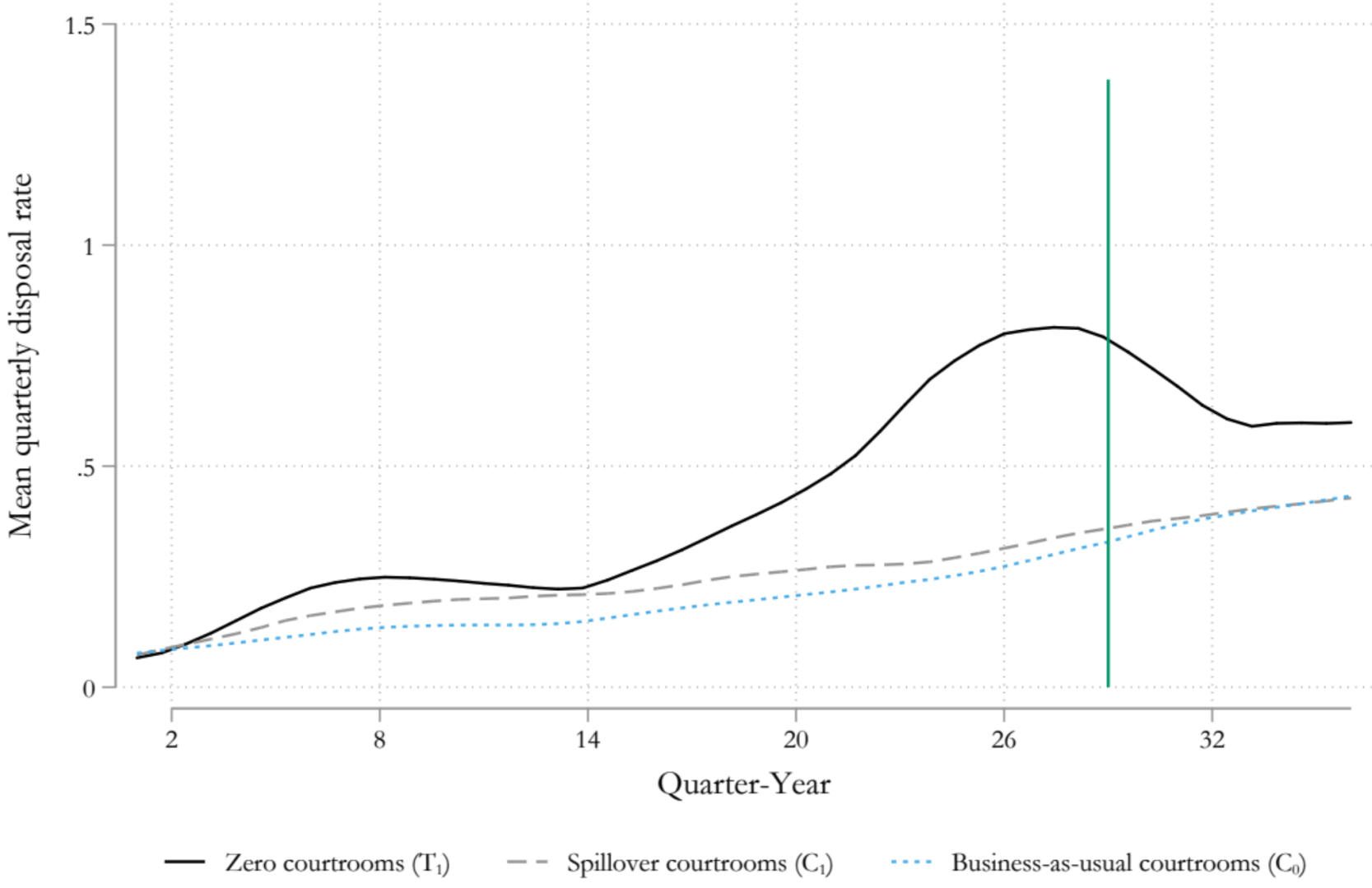
An illustration of two model court establishments:



and their functioning was compared with 11 courts with regular workload

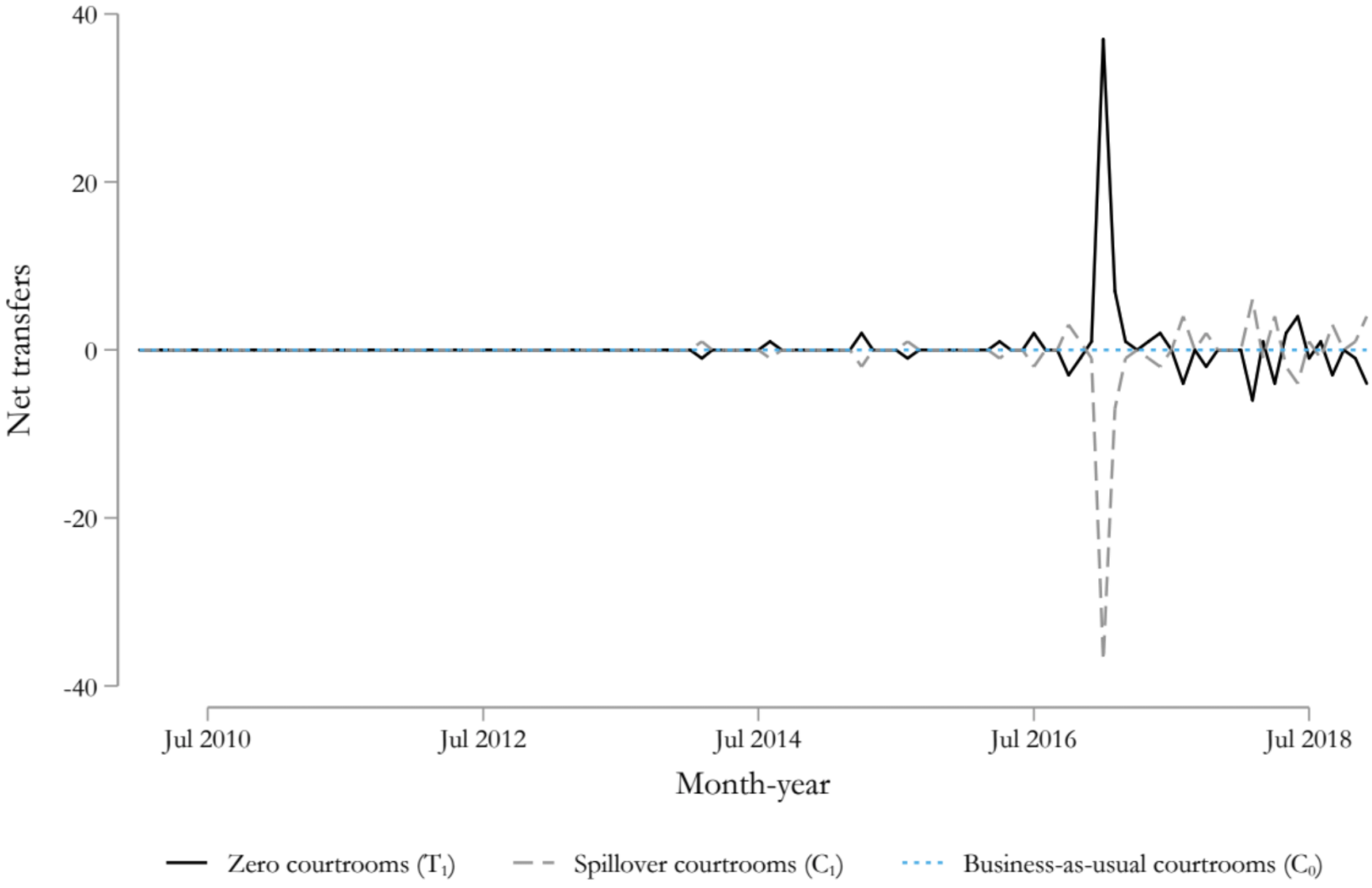
(3) Selection of "Zero" Courts

Figure 10: Mean quarterly disposal rate



(3) Impact of "Zero" Courts

Figure 12: Density of transfers by month



(3) Impact of Transfers

	Days in court	Disposed within 1 year	Number of Hearings	Duration of Hearings
Judge changed	169*	-0.24**	3.1*	83***
	(93)	(.11)	(1.8)	(25)
Mean dep. var.	503	0.47	8.1	234
Observations	601540	601775	600268	397902
Month FE	Y	Y	Y	Y
F-test p-value	.12	.063	.085	.049

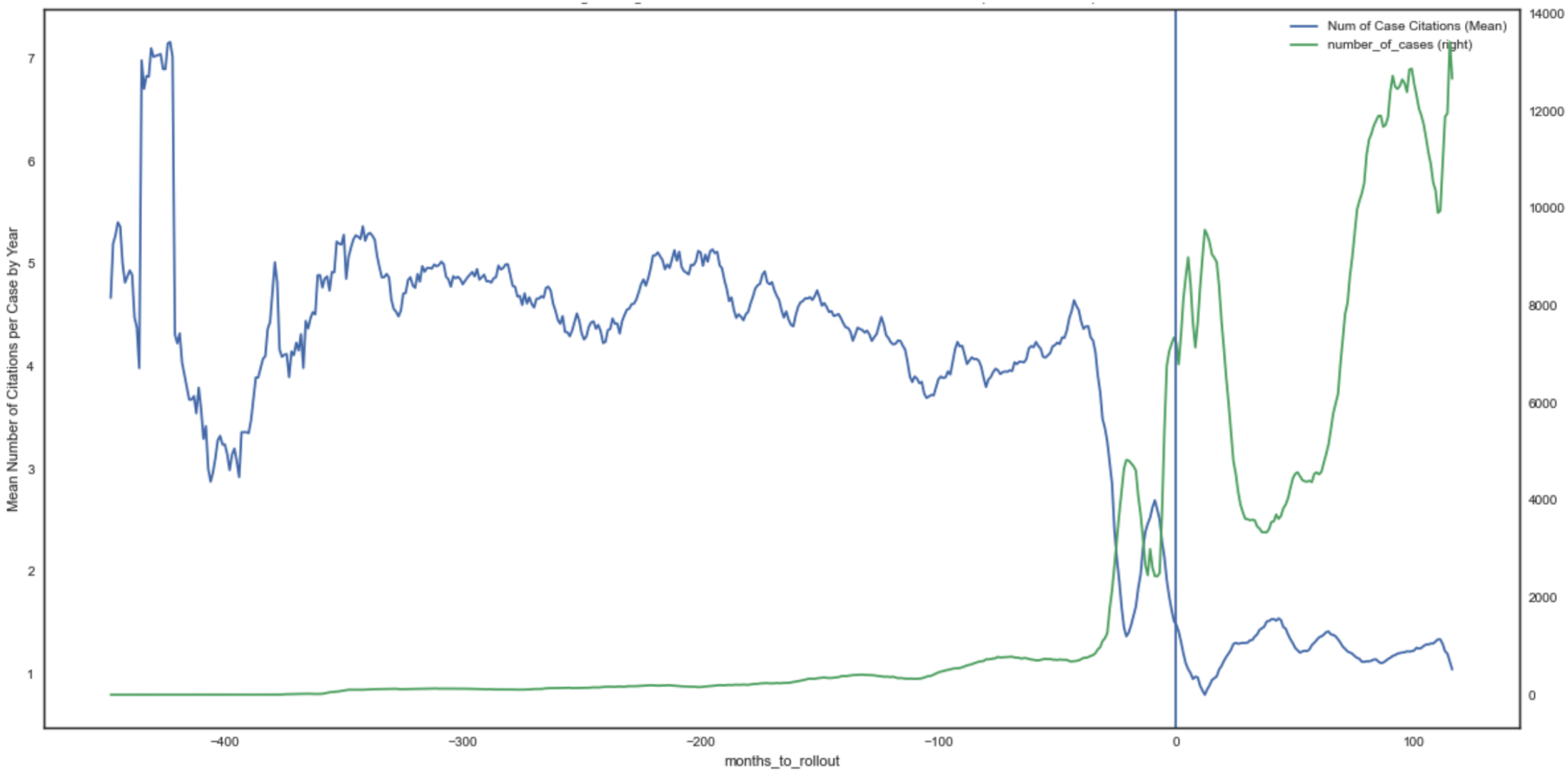
What is the impact of delay on litigants' outcomes?

one way to improve decision speed is access to precedent

(4) Impact of Legal Search Engines (Bhupatiraju, Chen, Joshi, Neis 2020)

- on how cases are decided?
- speed of resolution?
- diversity of citations?
- memes?

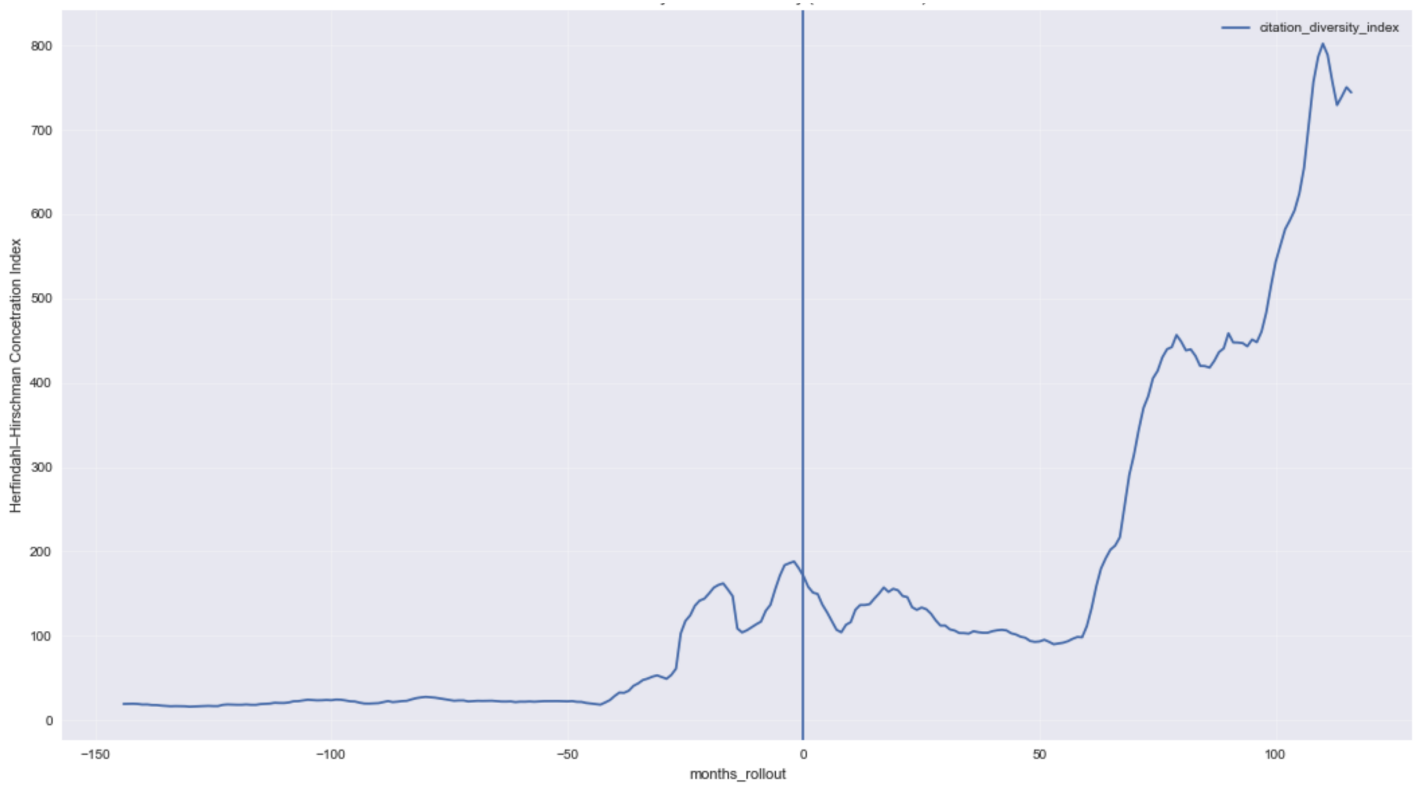
(4) Impact of Legal Search Engines



- Kanoon roll-out happened in stages
- Average citations per case falls

(4) Impact of Legal Search Engines

Preliminary evidence that legal search engine increased HHI concentration of citations



The impact of google on wikipedia is hard to know, since wikipedia didn't exist prior to google

here, we can study common law, to see the polarization or democratization of knowledge

What is the impact on decision speed and on decisions?

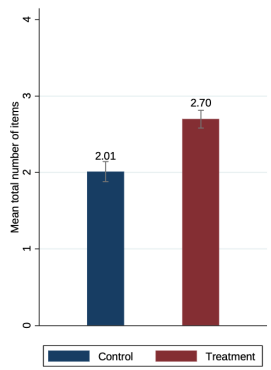
South Asia region

- India
- Pakistan
  - Civil services academy, empathy RCT (preliminary results)
    - ★ long-term engagement
  - 0.1% legal data sample (share 3 insights)
    - ★ data harmonization
  - Land revenue administration, ICT RCT (pilot grant)
    - ★ adaptive learning RCT opportunities shared with LAC
  - GBV RCTs (proposals)
    - ★ parallel RCT opportunities with Bangladesh (app launched in 2018)

EMPATHY IS PROPOSED ANTIDOTE TO IN-GROUP BIAS

Training Empathy (Chen, Mehmood, Rana 2020)

- The Pakistan civil service is interested in teaching empathy to elite civil servants (250 selected out of 15000 test-takers annually).
- Empathy vs. power lectures impacted survey responses (in a list experiment)



- February pilot in-person
- October by zoom
  - Empathy utilitarian vs. Empathy malleable vs. both vs. control

Impact on Social Emotional Learning

SOCIO-EMOTIONAL SKILLS

Why should we care?

- Socio-emotional skills are strong predictors of academic achievement and can become key success factors in the labor market and for numerous life outcomes.
- Yet, some SEL are still strongly predicted by social background / gender.
- This can change as socio-emotional skills are malleable.

How can education systems foster SEL?

Impact on Social Emotional Learning

Measuring Socio-Emotional Skills

We built a platform that contains incentivized games and survey questions to measure socio-emotional skills.

Incentivized games

Social preferences

Altruism
Trust
Cooperation
Moral
Redistribution
Honesty (Lie)

Other preferences

Impatience
Risk Aversion
Competitiveness
Perseverance
Beauty contest
Ambiguity aversion
Self-control

Survey-based measures

Self-confidence
Creativity
Empathy
Curiosity
Stereotypes (IAT)
Ethical decision (moral trolley)

Altruism

In this game, we allocate you 10 credits. Your task is to choose how many credits you want to keep for yourself and how many you want to give to another participant.

Please choose an option from the following distributions:

(Click on the axis below to position and move the cursor.)

You keep

4 credit (s)

You are giving

6 credit (s)

Charity

In this game, we offer you to make 5 choices. Only one of these choices will be used to determine the credits received if you are drawn.

For each of the choices, you must choose between receiving the credits or donating the credits to UNICEF. If you are drawn, we will transfer your donation to UNICEF and purchase measles vaccines.

Measles is an extremely infectious disease that spreads very quickly in densely populated spaces. In vulnerable children, the disease is often fatal (more than 100,000 deaths per year worldwide), and can cause long-term physical or mental damage. UNICEF conducts major immunization campaigns, especially after natural disasters and other emergencies, to prevent the spread of the disease.

For each row, please choose one of the two options:

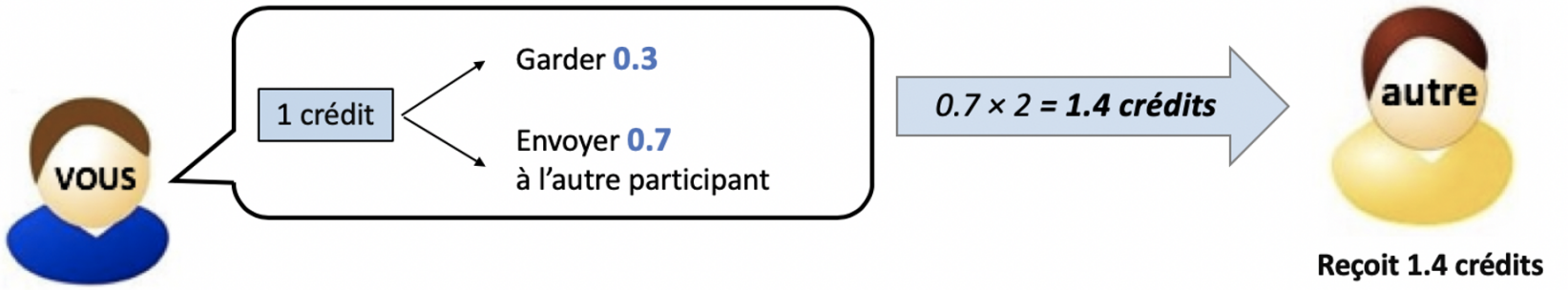
1)	○ I receive 2 credits; no donation to UNICEF	○ donation of 10 credits to UNICEF; no credits for me
2)	○ I receive 4 credits; no donation to UNICEF	○ donation of 10 credits to UNICEF; no credits for me
3)	○ I receive 6 credits; no donation to UNICEF	○ donation of 10 credits to UNICEF; no credits for me
4)	○ I receive 8 credits; no donation to UNICEF	○ donation of 10 credits to UNICEF; no credits for me
5)	○ I receive 10 credits; no donation to UNICEF	○ donation of 10 credits to UNICEF; no credits for me

Cooperation

Decision on your part

You must decide how much of this initial endowment you wish to transfer to the other participant (between 0 and 1 credit). The transferred quantity will be doubled and the other participant will receive this doubled quantity. What you choose not to transfer remains in your possession but will not however be doubled.

Exemple de votre décision



Decision (simultaneous) from your partner

The other participant simultaneously makes the same decision. He decides how much of his initial endowment he wishes to transfer to you (between 0 and 1 credit). You will receive double this transferred amount.

Coordination

Each round, each of you has the choice between two options: A and B.

Your winnings are shown in the table below
(your winnings are in blue, your partner's in black)

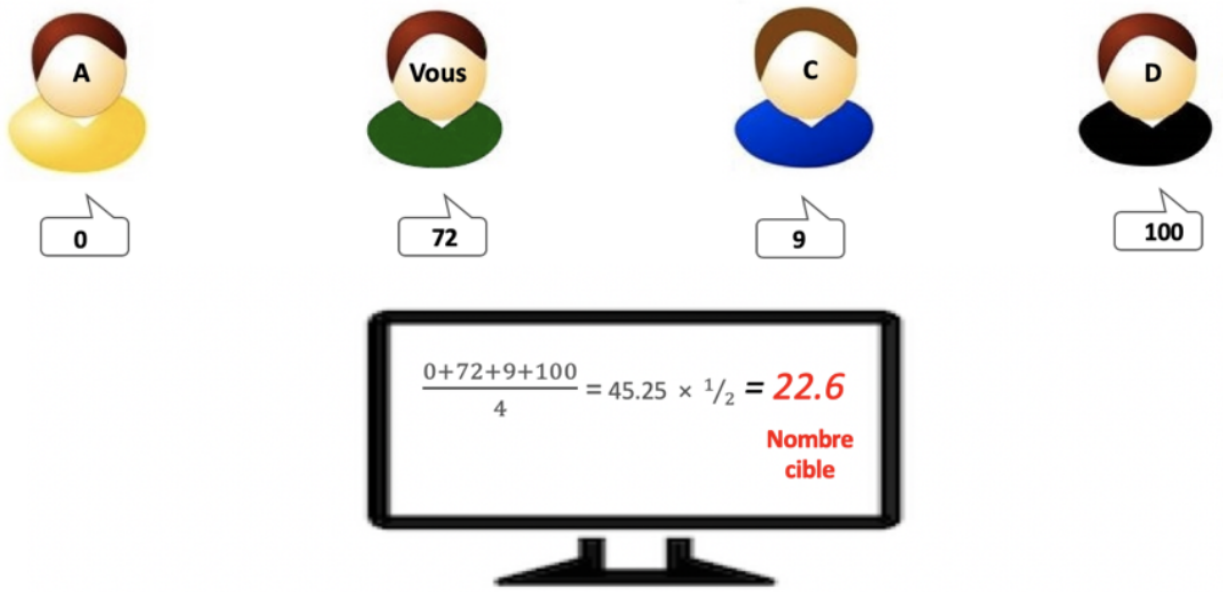
		L'autre participant	
		Action A	**Action B**
Vous	Action A	3 crédits, 3 crédits	3 crédits, 0 crédits
	Action B	0 crédits, 3 crédits	5 crédits, 5 crédits

Theory of Mind

Each round, each party member submits a number between 0 and 100. Single digit decimal numbers are allowed.

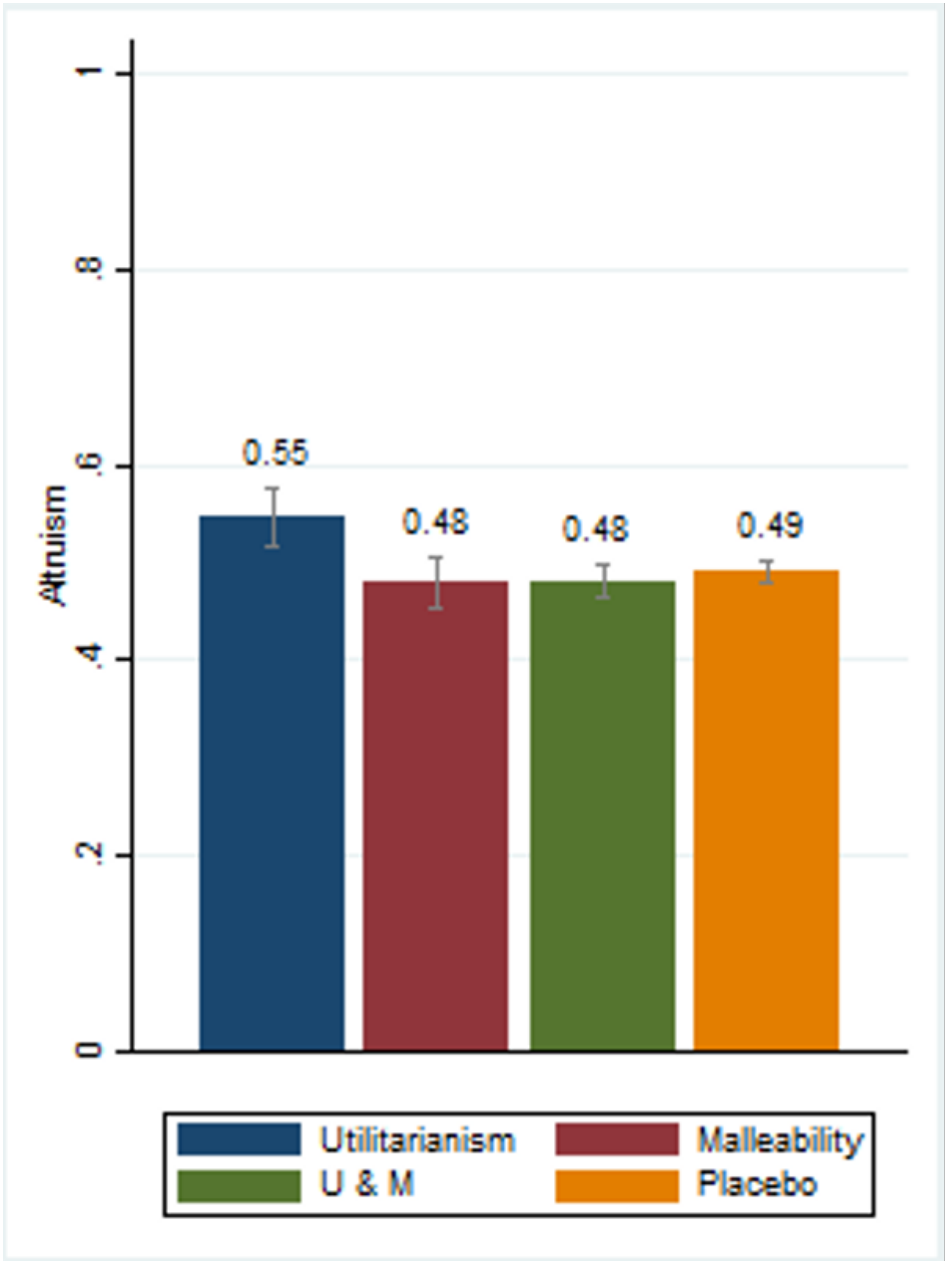
The computer then calculates the average of the 4 proposed numbers, then multiplies this average by a half.

This gives a " target number " as illustrated below.
The member of the group whose proposed number is closest to the target number earns 6 credits.

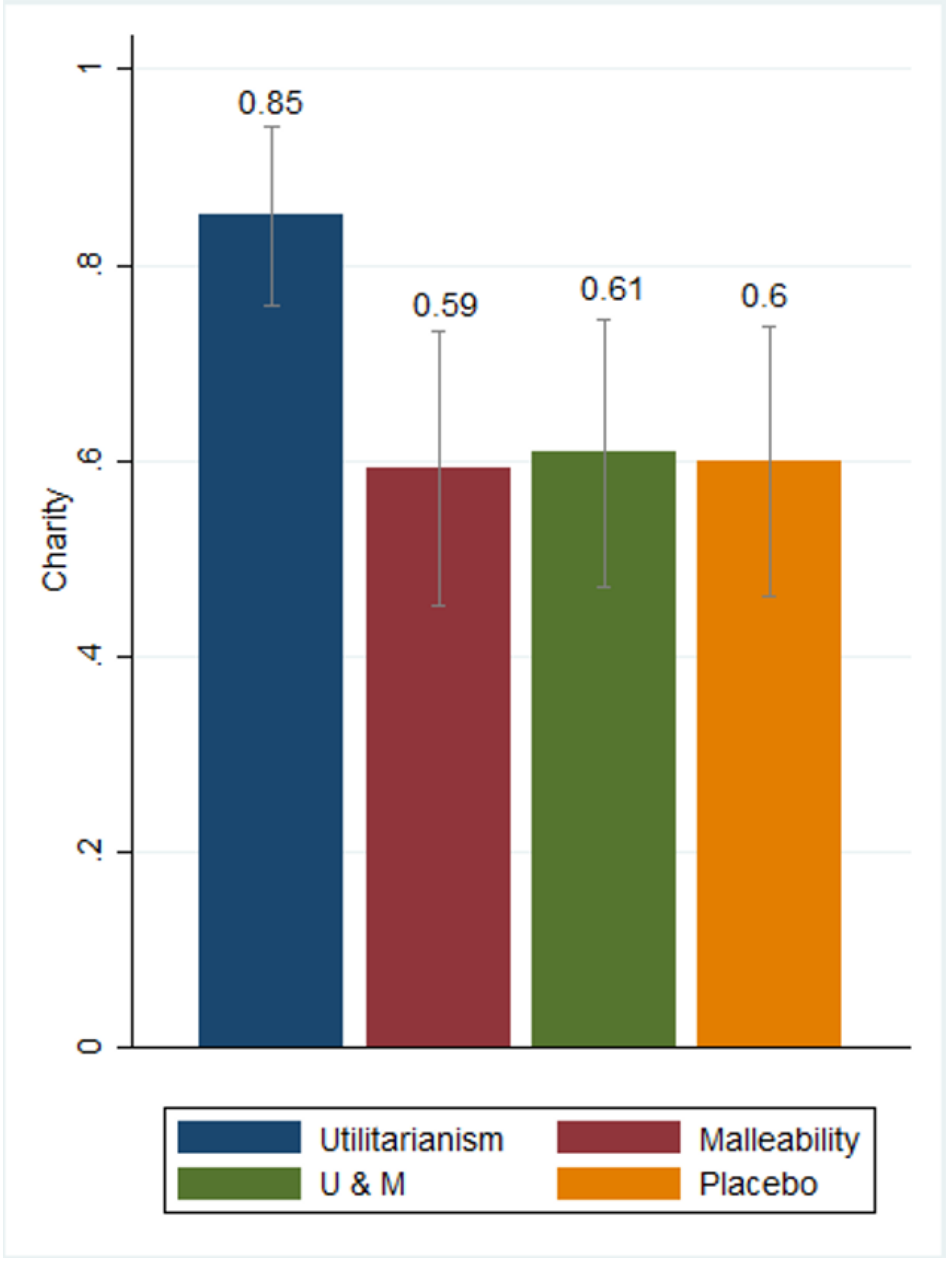


Le nombre soumis par le participant C (9) est le plus proche de 22.6.
Le participant C gagne donc 6 crédits.

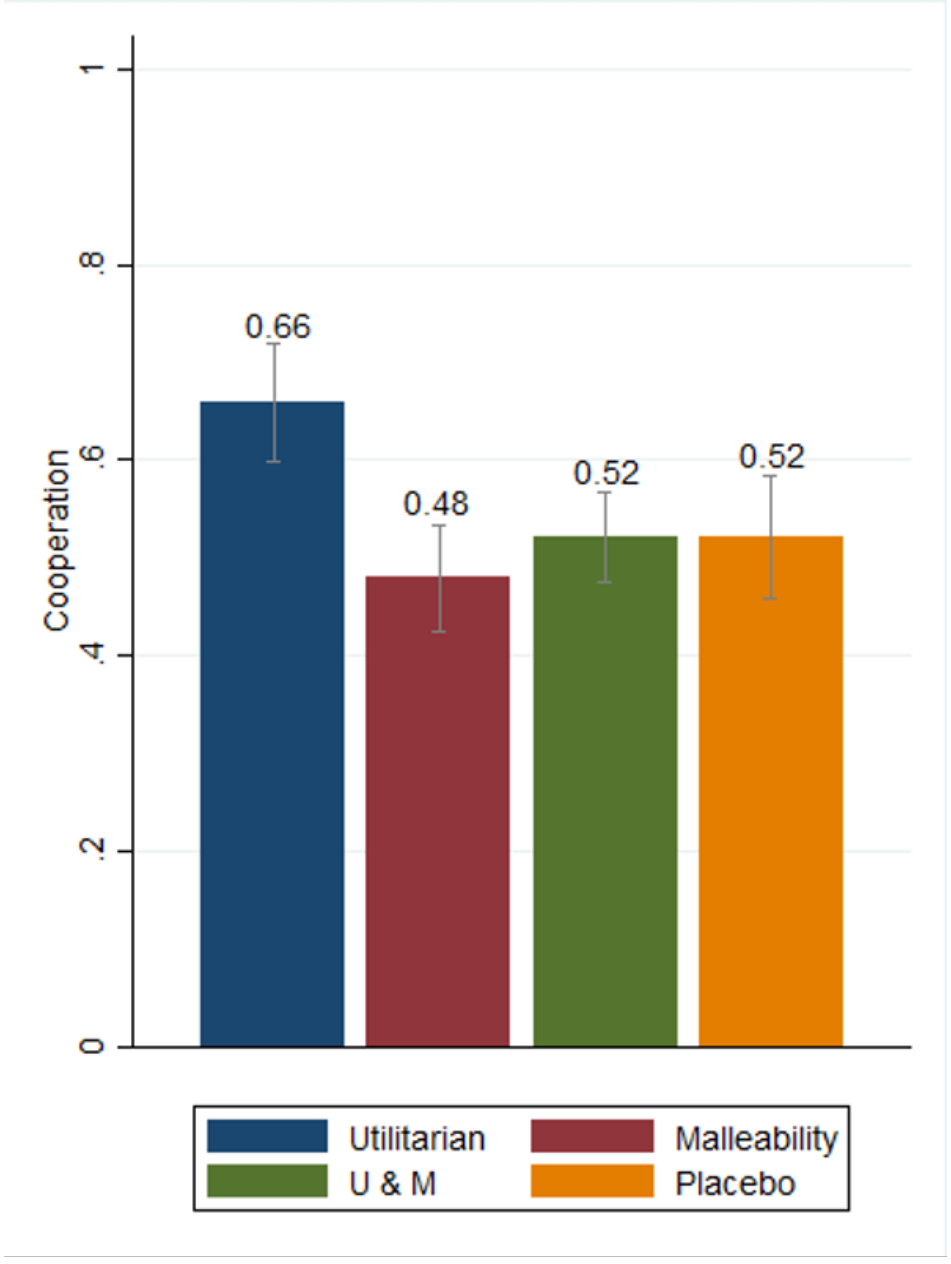
Impact on Altruism



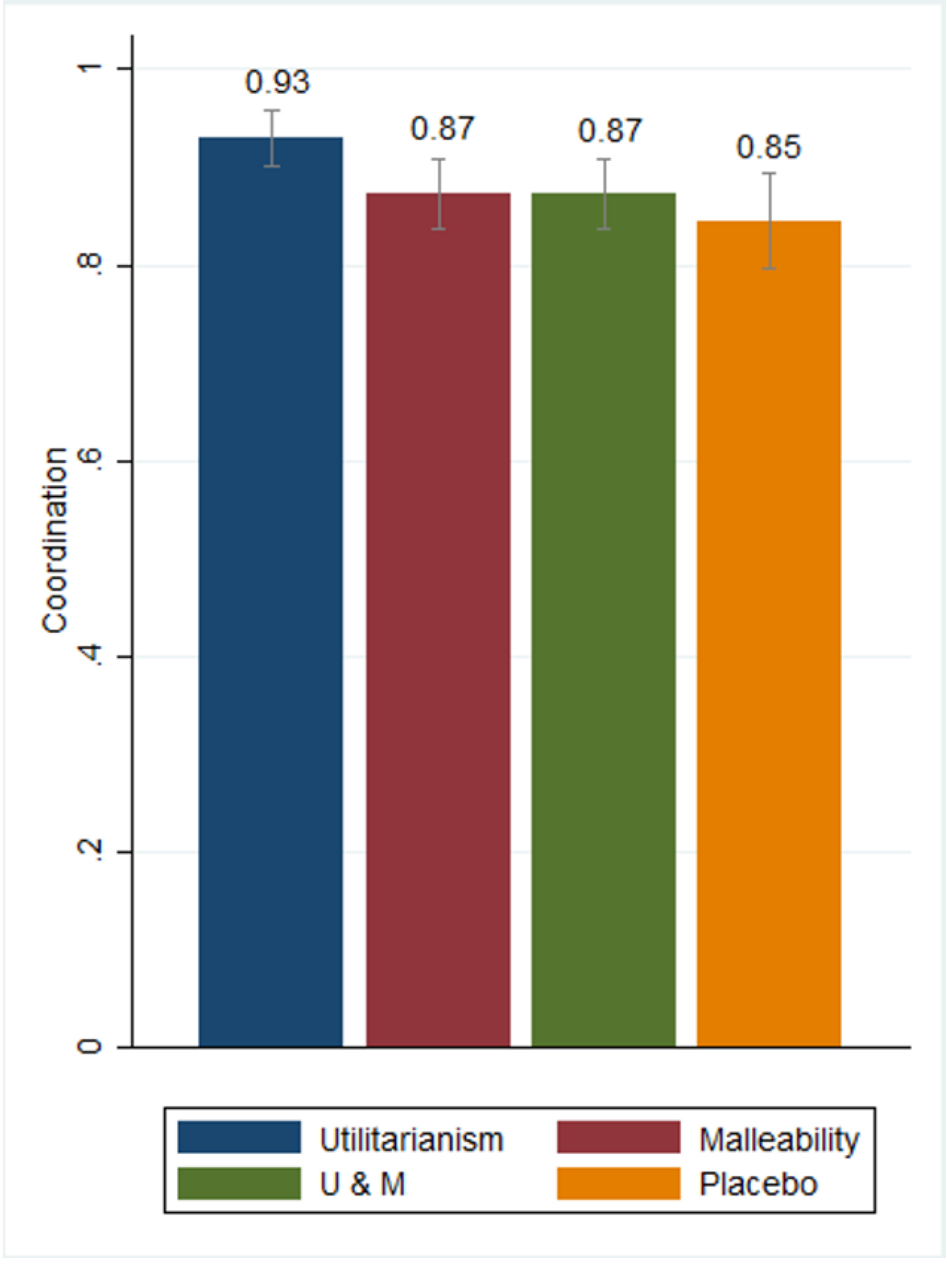
Impact on Charity



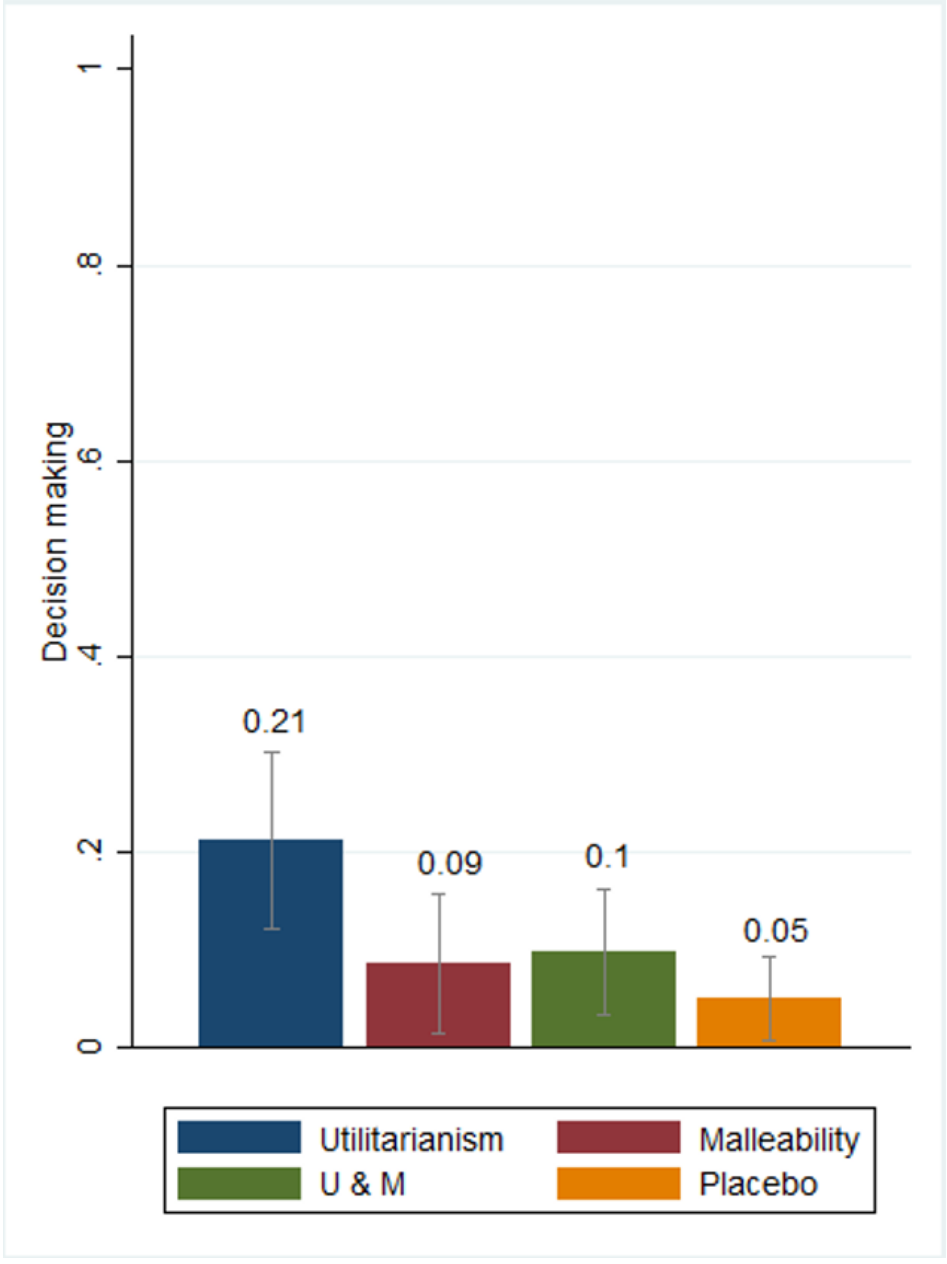
Impact on Cooperation



Impact on Coordination

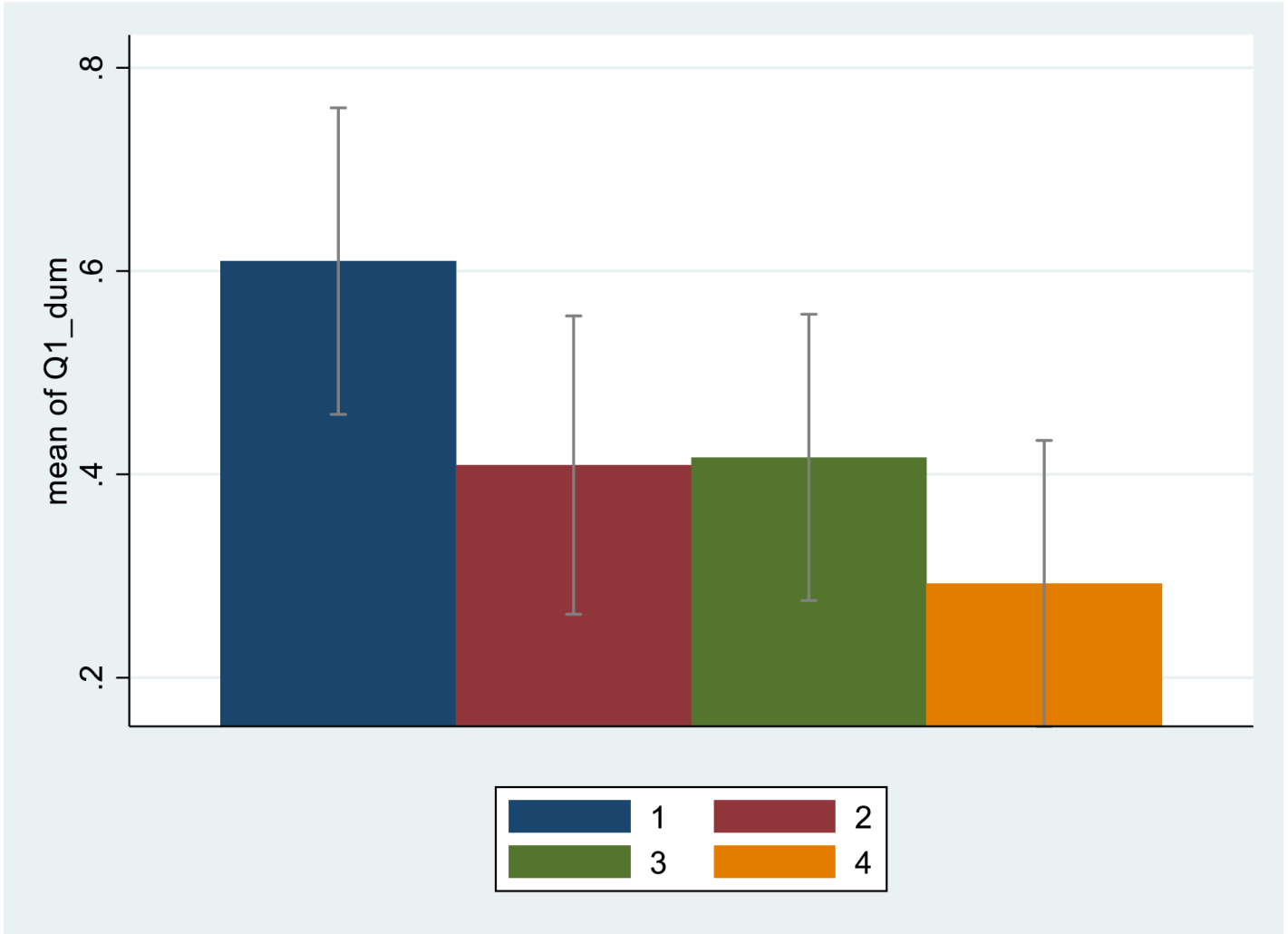


Impact on Theory of Mind



Impact on Blood Donation

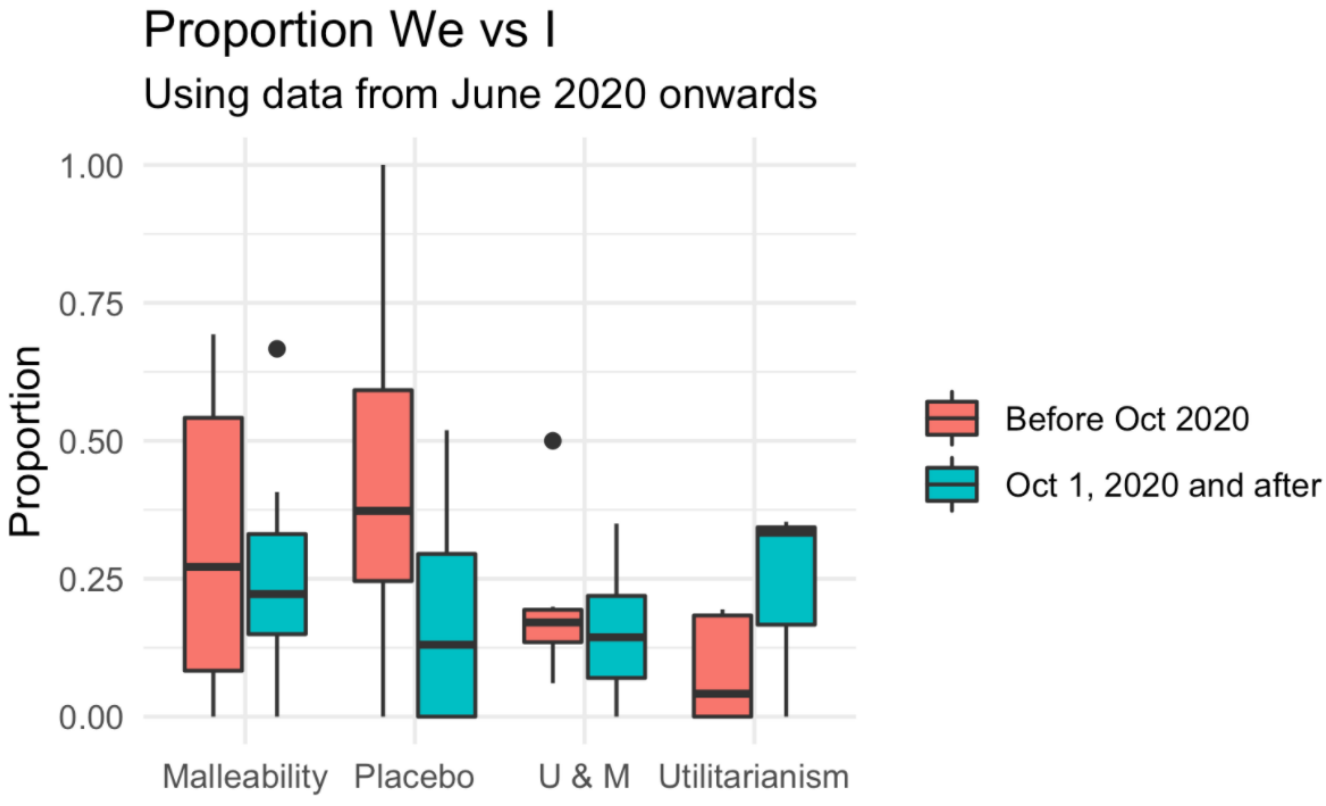
"Donate now or in the future"



Empathy utilitarian treatment increased likelihood to donate by 20 percent

Impact on Thought Leadership

.. in twitter feeds

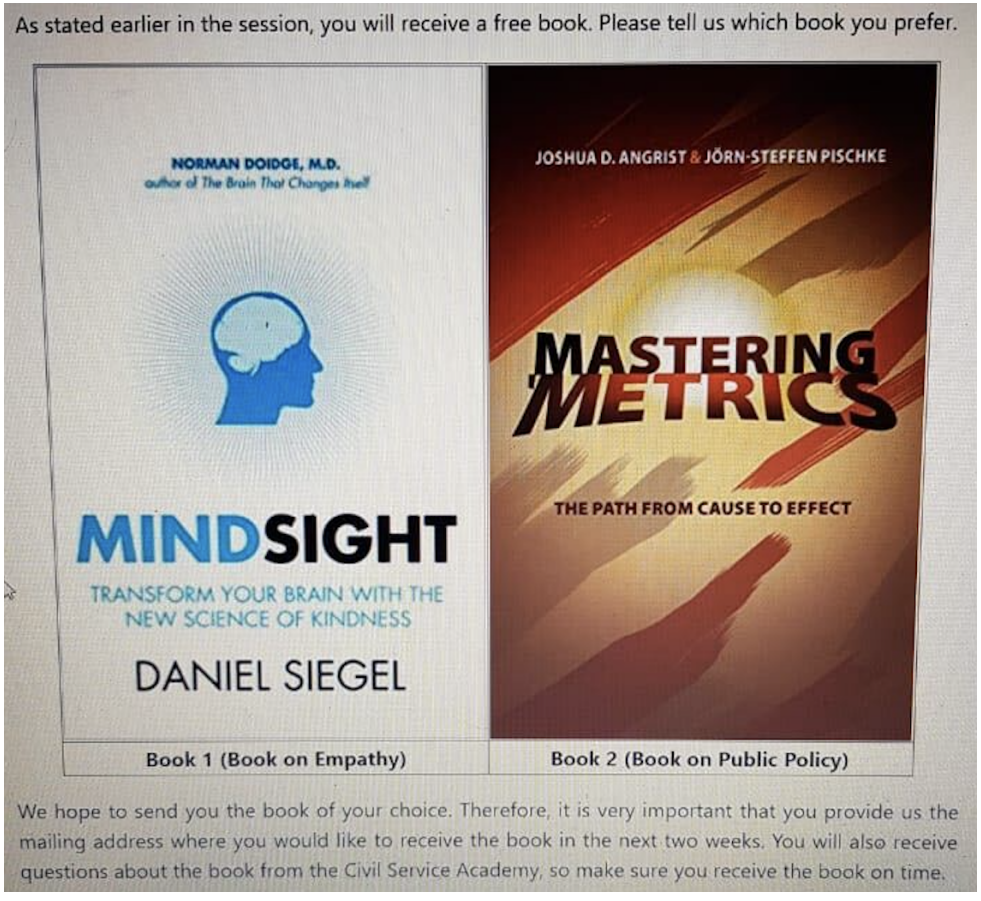


increased % of “We” vs. “I”

Looking ahead

- Impact on bureacratic performance
- Impact on twitter/social media posts
  - and impacts on followers
- Impact of learning causal inference

Book choice (lottery)



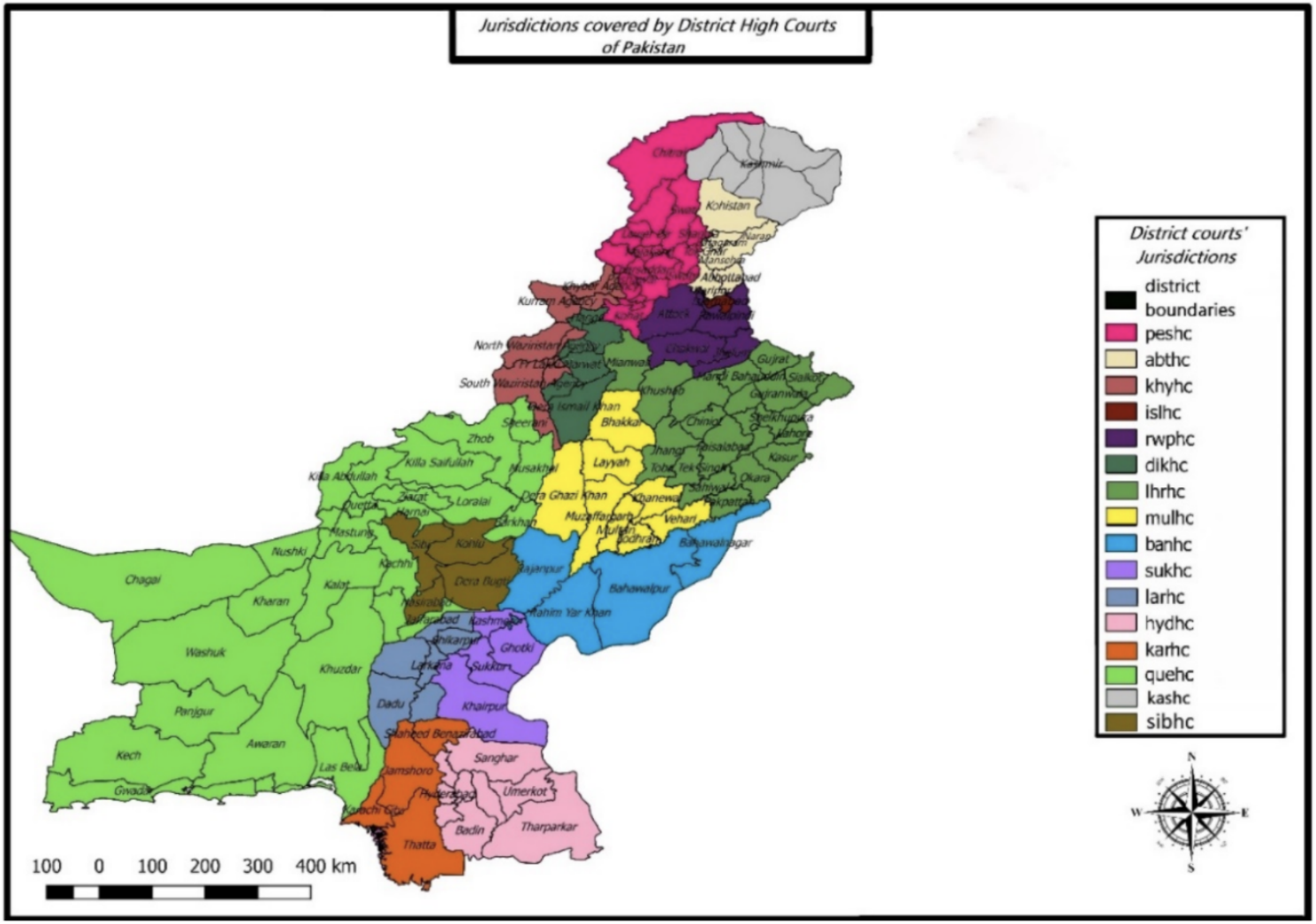
- Graded 1500 word essay & 1500 word application to prospective career

What is the impact of judicial quality in pakistan?

insights from 0.1% sample

1950-2016, 16 District High Courts (*ReStud R&R*, Mehmood 2020)

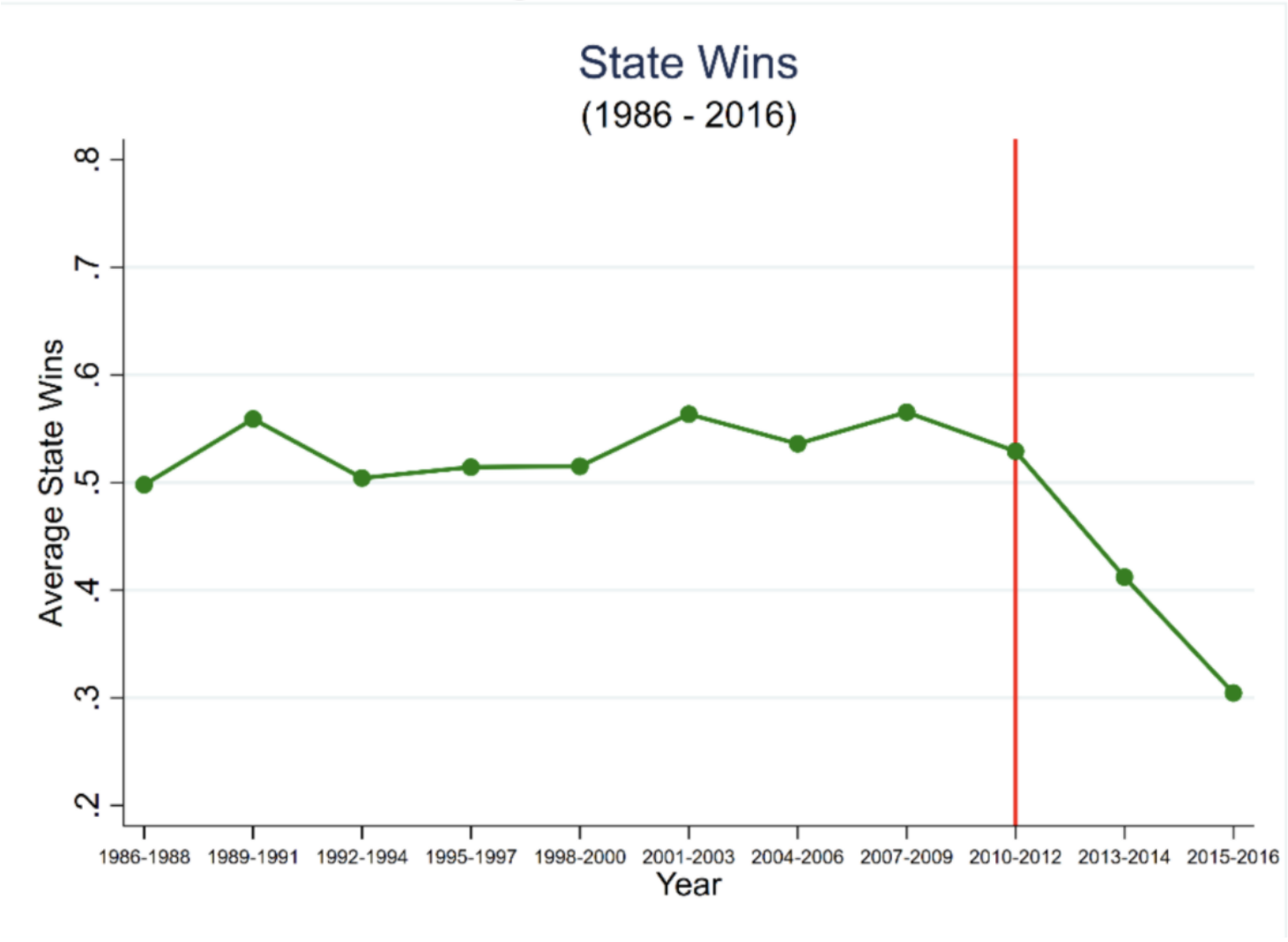
Figure 3: Jurisdictions covered by District High Courts of Pakistan



Impact of Judicial Quality

Shift from Presidential appointment to peer judge appointment impacts judicial independence

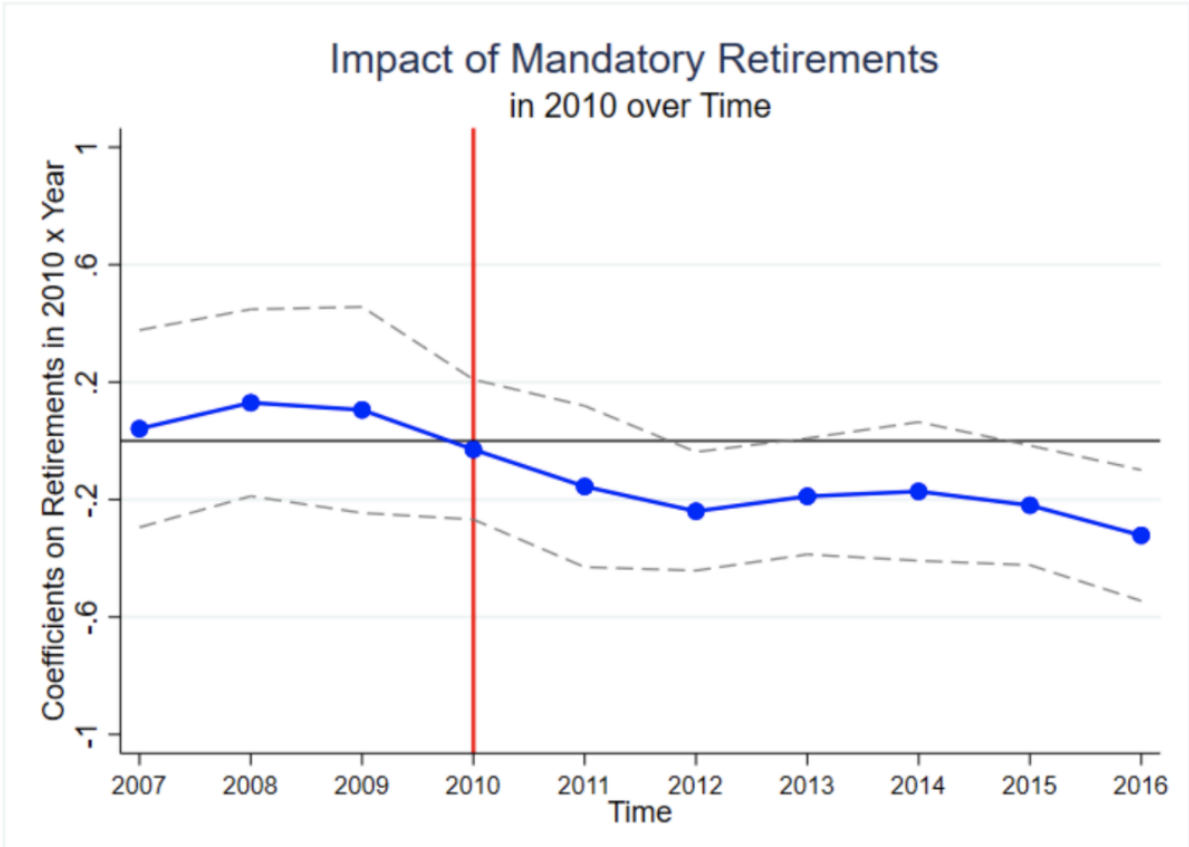
Panel B: Average State Victories over Time



Impact of Judicial Quality

Exploit share of judges due for mandatory retirement to infer causality

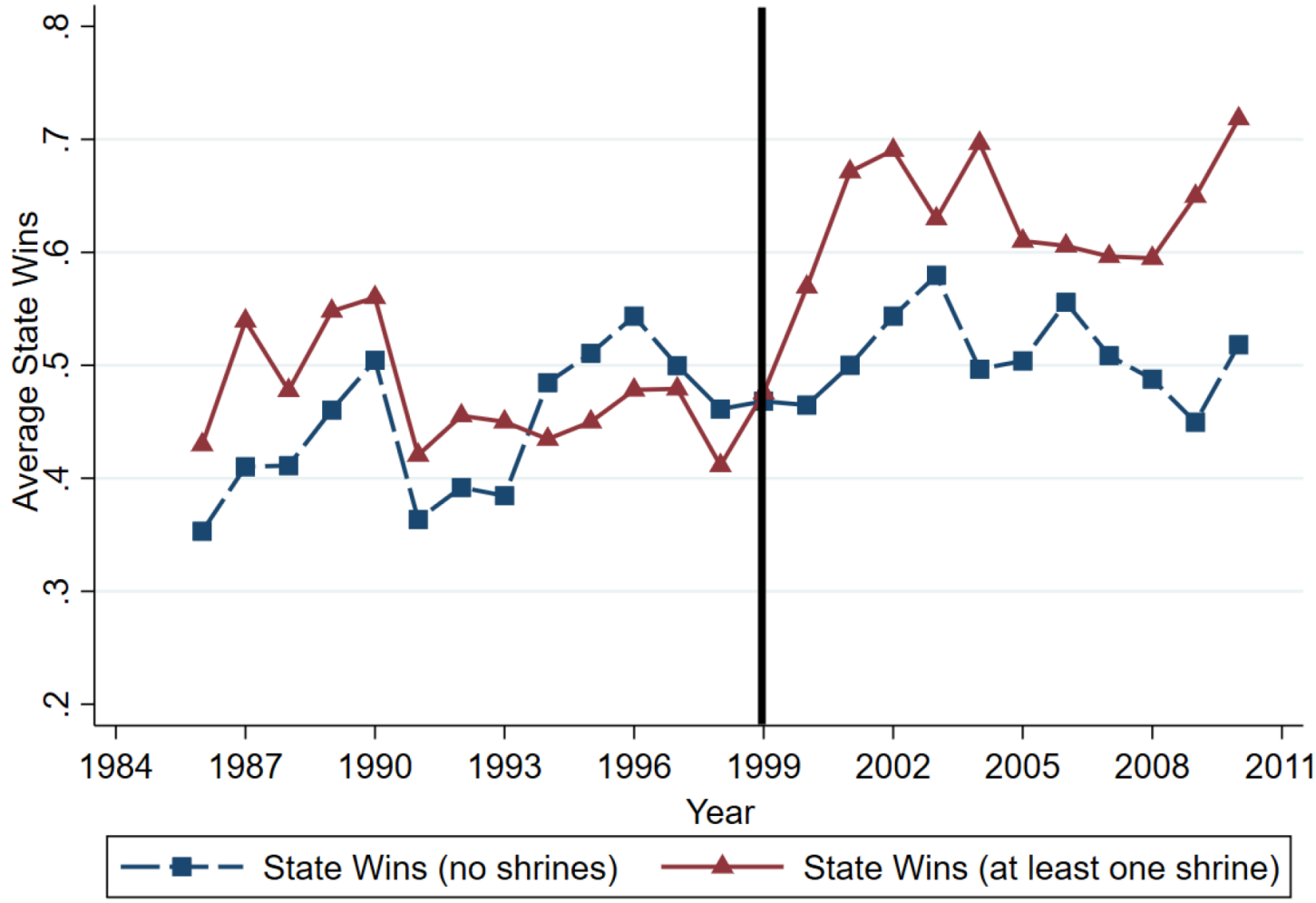
Figure 4: Impact of Mandatory Retirements in 2010 on State Wins over Time



Judicial independence also improves decision quality

Impact of Judicial Quality (Mehmood and Seror 2020)

Pro-government rulings from high shrine districts increased

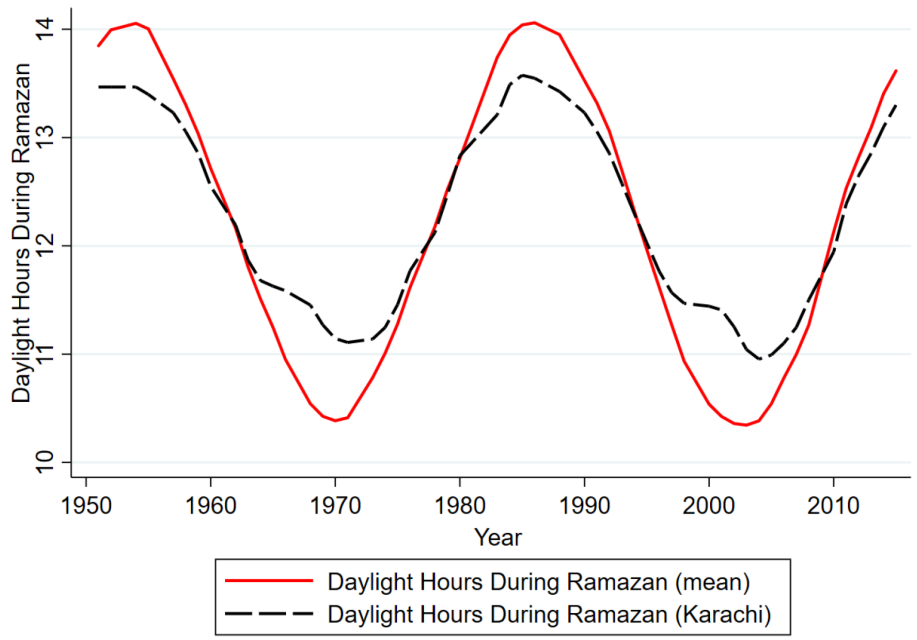


after a military coup brought shrine leaders to political office

Impact of Judicial Quality (Chen, Mehmood, and Seror 2020)

Exogenous variation in length of daily fasting due to rotating Islamic calendar and a district court's geographic latitude

Figure 1: Daily Ramadan Fasting Hours over Time



Ramadan winter: daily fasting will be longer in Karachi

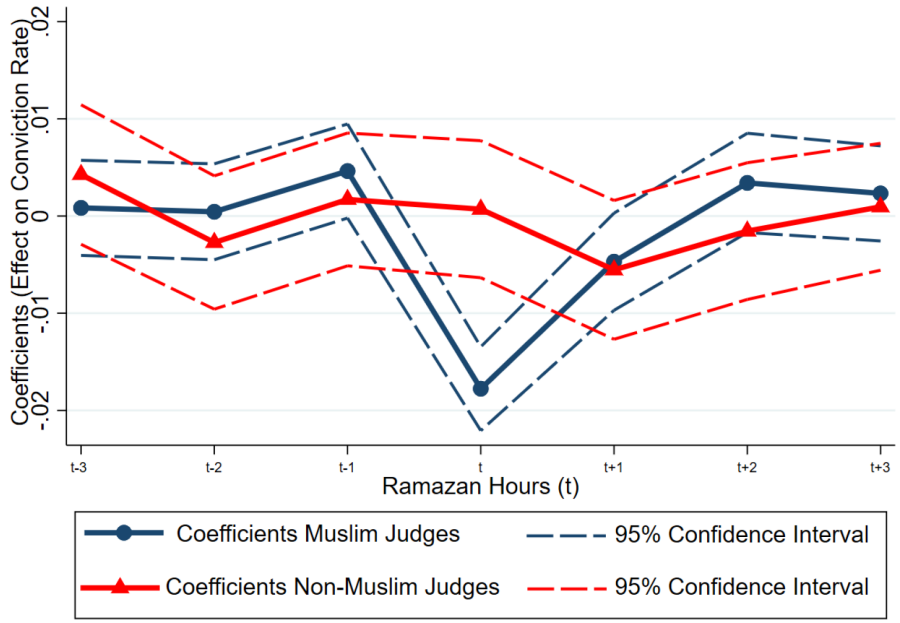
Ramadan summer: daily fasting will be shorter in Karachi

Impact of Judicial Quality

Judges become more lenient when fasting

Averse to Type II error (convicting the innocent)

Figure 3: Ramadan Dip for Muslims and No Effect for Non-Muslim Judges



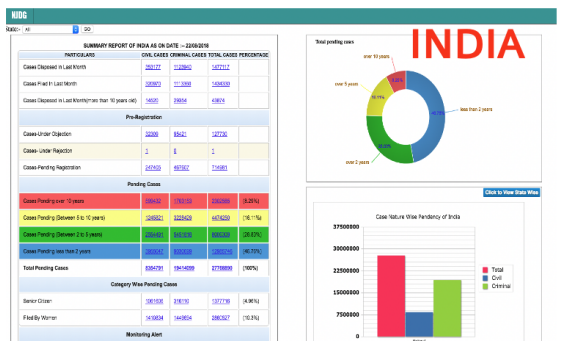
Fasting also decreases decision quality

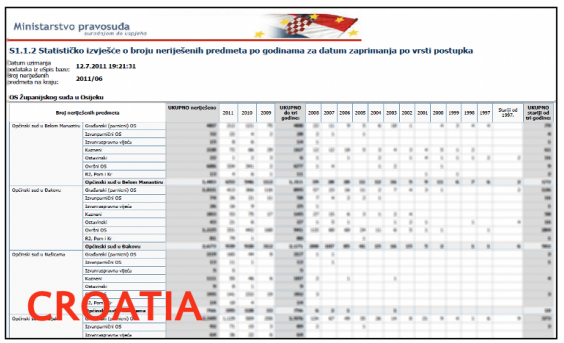
JUDICIAL DIVERSITY MATTERS FOR DECISION DELAY AND QUALITY

DOES IT REPLICATE IN INDIA AND INDONESIA?

(1) Data Ecosystems

PAUSE FOR QUESTIONS





- Recent innovations have opened up new opportunities for delivery of justice
  - Increasingly digitized **large-scale datasets**
  - ML applications to produce interpretable data from unstructured text
  - Predictive models of decision-making to better **understand biases** and address them with digital interfaces

(2) Recognition-Dignity

- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - ML applications to produce interpretable data from unstructured text
  - Predictive models of decision-making to better **understand biases** and **address them with digital interfaces**

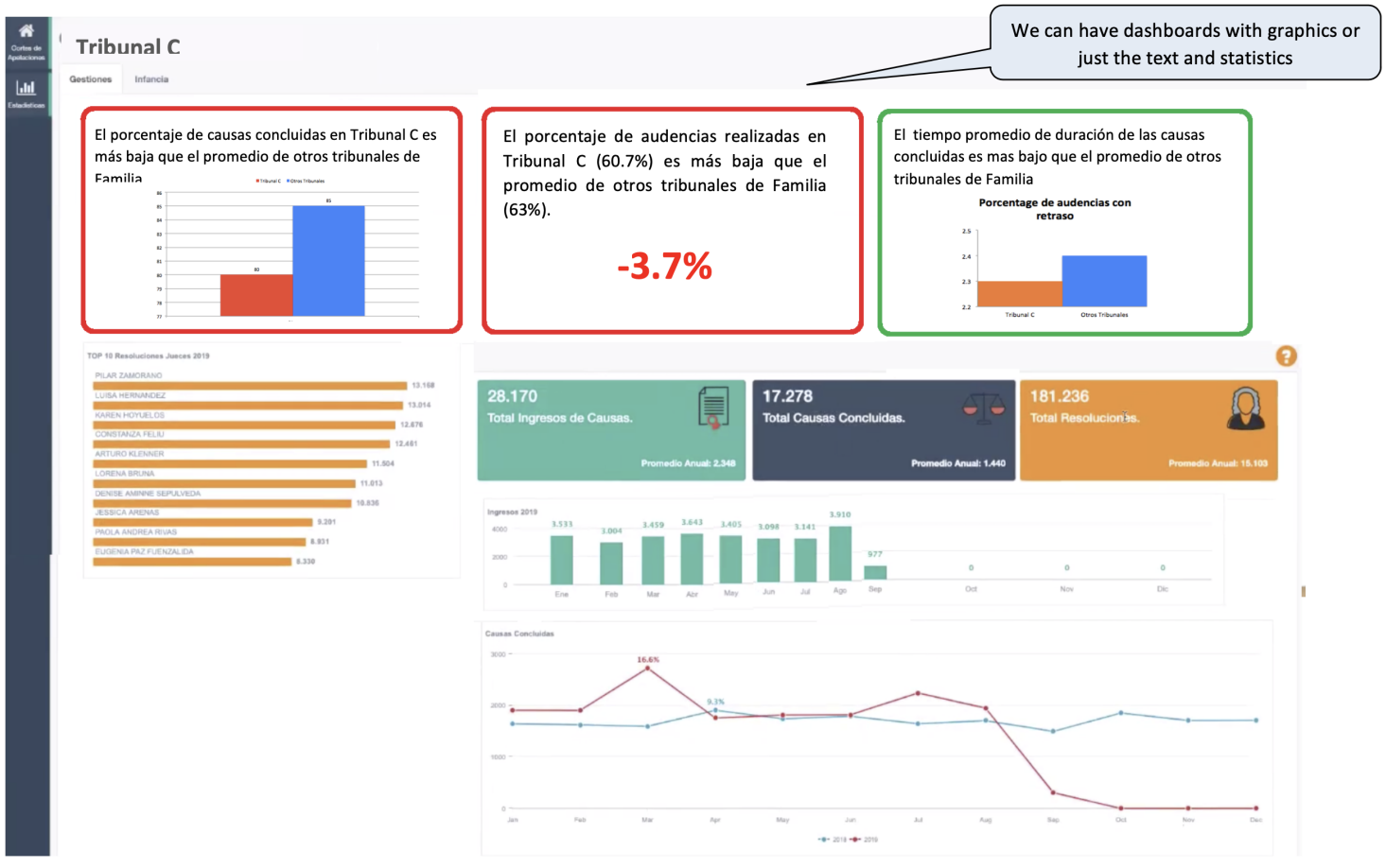
SEGUE BRIEFLY TO GLOBAL WORK (PILOT GRANT RECEIVED FOR PAKISTAN)

SHOW HOW JUSTICE SECTOR INDICATORS CAN FEED INTO CYCLE OF CHANGE

Personalized Interventions (Carrillo, Chen, Maqueda, Silvera 2020)

This kind of data can be used to personalize interfaces for judges.

Another possibility for an algorithm is to choose the **three worst metrics** as oppose to just one.



Recommending Actions (Chemin, Chen, Maqueda 2020)

Lending Agreement with Kenya: Judicial Performance Improvement (P105269)

REPUBLIC OF KENYA

COURT MONTHLY FEEDBACK REPORT
Baricho Magistrate Court
NOVEMBER 2018

"By the end of my tenure in December 2020, we shall have no cases in court older than 3 years"

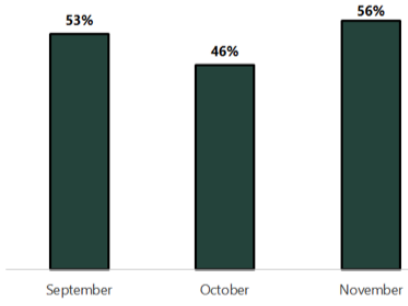
Honorable Justice David Maraga, Chief Justice

CRIMINAL CASES

SUMMARY OF KEY COURT EVENTS FOR OCTOBER 2018

Cases filed	456
Cases resolved	234
Rulings and judgments	130
Adjournments	104

CASE CLEARANCE RATE (CCR) PREVIOUS THREE MONTHS



TOP THREE REASONS FOR ADJOURNMENT

Reason	Number	Percent
Prosecutor not present	44	30%
Typed proceedings not ready	34	20%
Both parties not present	17	13%

RECOMMENDED ACTION

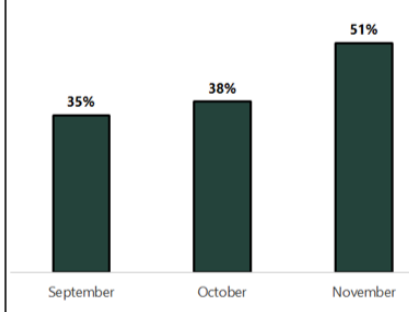
Addressing	Prosecutor not present	increases CCR by	30%
Addressing	Typed proceedings not ready	increases CCR by	20%
Addressing	Both parties not present	increases CCR by	13%

CIVIL CASES

SUMMARY OF KEY COURT EVENTS FOR OCTOBER 2018

Cases filed	422
Cases resolved	203
Rulings and judgments	80
Adjournments	123

CASE CLEARANCE RATE (CCR) PREVIOUS THREE MONTHS



TOP THREE REASONS FOR ADJOURNMENT

Reason	Number	Percent
Court not sitting	57	21%
Both parties not present	44	12%
Ruling not ready	12	9%

RECOMMENDED ACTION

Addressing	Court not sitting	increases CCR by	8%
Addressing	Both parties not present	increases CCR by	7%
Addressing	Ruling not ready	increases CCR by	4%

Notes:

Case Clearance Rate (CCR)- Case Clearance Rate (Resolved ÷ Filed) × 100 measures the extent to which the court system is able to dispose of cases relative to the cases filed within a specified time period. A clearance rate of 100% implies that the court is coping with its workload. More than 100% clearance rate indicates that the court is reducing its case backlog while less than 100% means that the court is accumulating more cases.

Resolved Case (RC) - Any case where a judgement or a final ruling closing the case has been made at the end of period under reference. It also means a finalized case.

Filed Cases (FC)- Any case that is registered in court of law for arbitration in a given period.

"Endless adjournments of cases on frivolous grounds" are a major cause of case backlog (Chief Justice Maraga 2019)

- Nation-wide experiment using the first digitized daily court records
  - Developed an algorithm to identify the greatest source of court delays
  - T1: provide actionable information
  - T2: + accountability (one-pager also sent to Court User Committees)
  - Control: status quo (no information), RCT across all 124 court stations

Data-Driven Recommendations

Efficiency in Kenya:
Can low cost, 'actionable' information improve performance?

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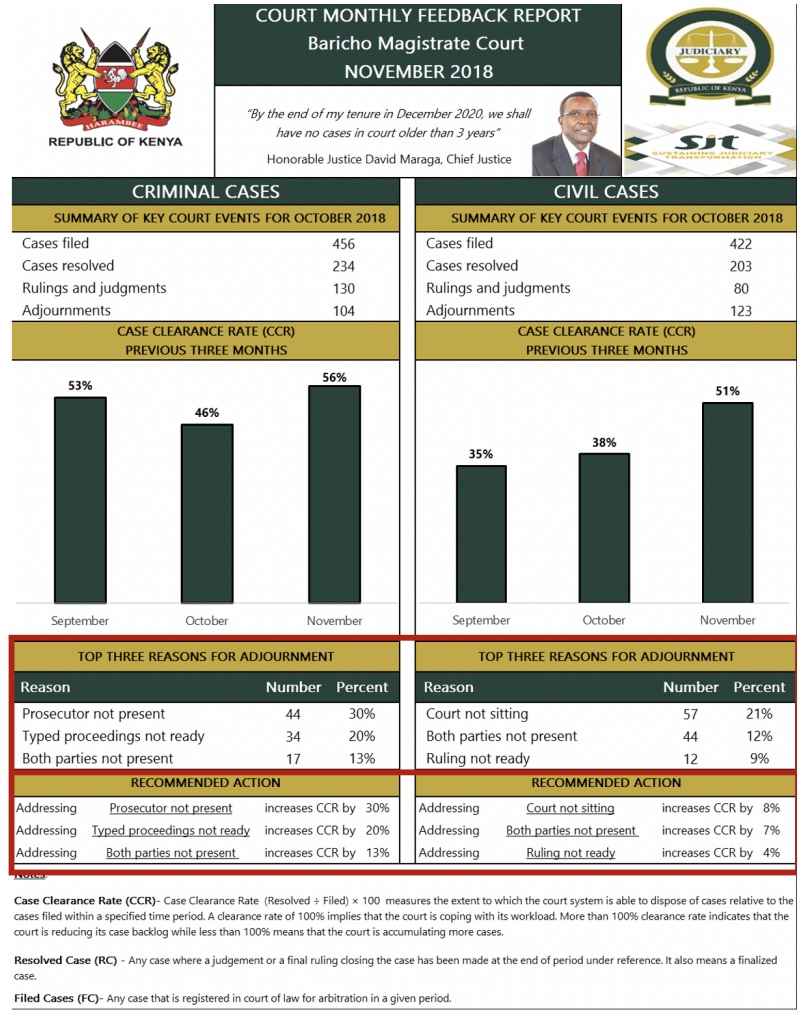

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Adjournments	104

CASE CLEARANCE RATE (CCR)
PREVIOUS THREE MONTHS

TOP THREE REASONS FOR ADJOURNMENT

Reason	Number	Percent
Prosecutor not present	44	30%
Typed proceedings not ready	34	20%
Both parties not present	17	13%

RECOMMENDED ACTION

Addressing	Prosecutor not present	increases CCR by	30%
Addressing	Typed proceedings not ready	increases CCR by	20%
Addressing	Both parties not present	increases CCR by	13%

CIVIL CASES

SUMMARY OF KEY COURT EVENTS FOR OCTOBER 2018

Cases filed	422
Cases resolved	203
Rulings and judgments	80
Adjournments	123

CASE CLEARANCE RATE (CCR)
PREVIOUS THREE MONTHS

TOP THREE REASONS FOR ADJOURNMENT

Reason	Number	Percent
Court not sitting	57	21%
Both parties not present	44	12%
Ruling not ready	12	9%

RECOMMENDED ACTION

Addressing	Court not sitting	increases CCR by	8%
Addressing	Both parties not present	increases CCR by	7%
Addressing	Ruling not ready	increases CCR by	4%

Case Clearance Rate (CCR)- Case Clearance Rate (Resolved ÷ Filed) × 100 measures the extent to which the court system is able to dispose of cases relative to the cases filed within a specified time period. A clearance rate of 100% implies that the court is coping with its workload. More than 100% clearance rate indicates that the court is reducing its case backlog while less than 100% means that the court is accumulating more cases.

Resolved Case (RC) - Any case where a judgement or a final ruling closing the case has been made at the end of period under reference. It also means a finalized case.

Filed Cases (FC)- Any case that is registered in court of law for arbitration in a given period.

Analyze and present correlates of delay

Accountability reduced adjournments

.. especially initiated by external parties (potentially frivolous)

	Adjournment	External Adjournment	Internal Adjournment
OnePager * February 2019	-0.014	-0.017	0.000065
	(0.012)	(0.011)	(0.0043)
OnePager CUC * February 2019	-0.031**	-0.030**	-0.0042
	(0.015)	(0.013)	(0.0043)
OnePager * March 2019	0.0016	0.0028	-0.00028
	(0.013)	(0.011)	(0.0041)
OnePager CUC * March 2019	-0.017	-0.022*	0.0014
	(0.015)	(0.011)	(0.0040)
OnePager * April 2019	-0.012	-0.0044	-0.0076
	(0.014)	(0.012)	(0.0063)
OnePager CUC * April 2019	-0.025	-0.023*	-0.0070
	(0.016)	(0.012)	(0.0063)
OnePager * May 2019	0.012	0.018	-0.0020
	(0.017)	(0.015)	(0.0053)
OnePager CUC * May 2019	-0.013	-0.012	-0.0026
	(0.017)	(0.015)	(0.0049)
OnePager * After June 2019	0.0058	0.0064	0.00013
	(0.014)	(0.012)	(0.0038)
OnePager CUC * After June 2019	-0.0070	-0.015	-0.00027
	(0.016)	(0.013)	(0.0043)
OnePager * Month Before	-0.0089	-0.0030	-0.0069
	(0.013)	(0.0091)	(0.0053)
OnePager CUC * Month Before	-0.0074	-0.010	-0.0084
	(0.013)	(0.011)	(0.0053)
Observations	6162668	6399868	6399868

Starting after Covid, will become monthly

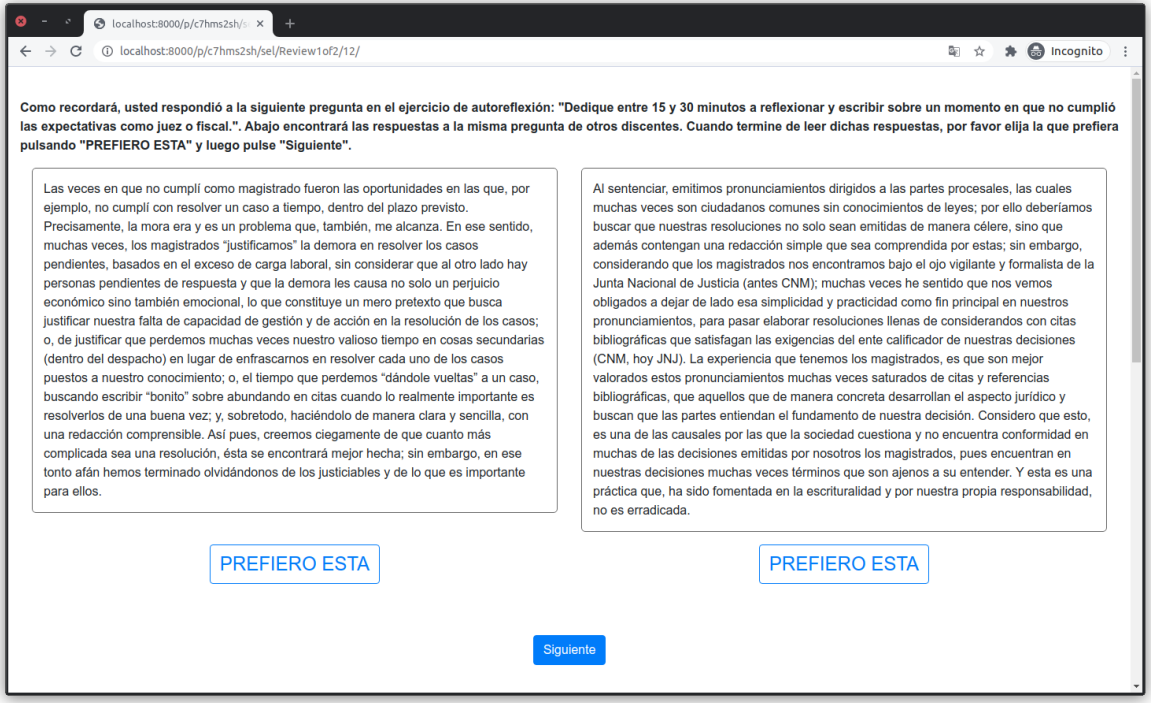
- Effect size of 3% are large relative to baseline of 18%

ADVICE IS TOP-DOWN BASED ON DATA ALREADY COLLECTED

CAN WE HELP COUNTRIES GENERATE THEIR OWN BETTER POLICIES?

Self Reflection (Chen, Maqueda, Silvera 2020)

Social-Emotional Learning Exercises - Advice Giving & Grading



3 of 10 SEL exercises (related to self-distancing) positively impact grades

Closing workshop involves a few SEL measures, trolley, IAT

willingness to find out about IAT

and choice of book: law & econ vs. moral philosophy

Recommending Actions to Each Other (Chen, Maqueda, Silvera 2020)

Conciliator App | About | National Analysis | Conciliators | Legal Aid Centers | Login

All Centers
Geospatial Analysis
Temporal Analysis
Type of Case

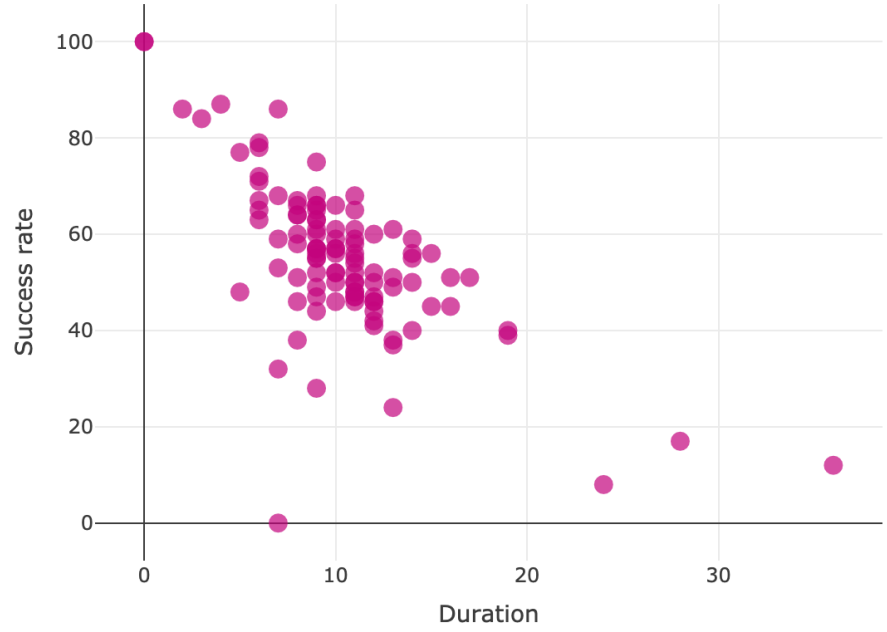
Download CSV
Download PDF

Year of
2014 — 2020
2014 2019 2020

X: Duration
Y: Success rate

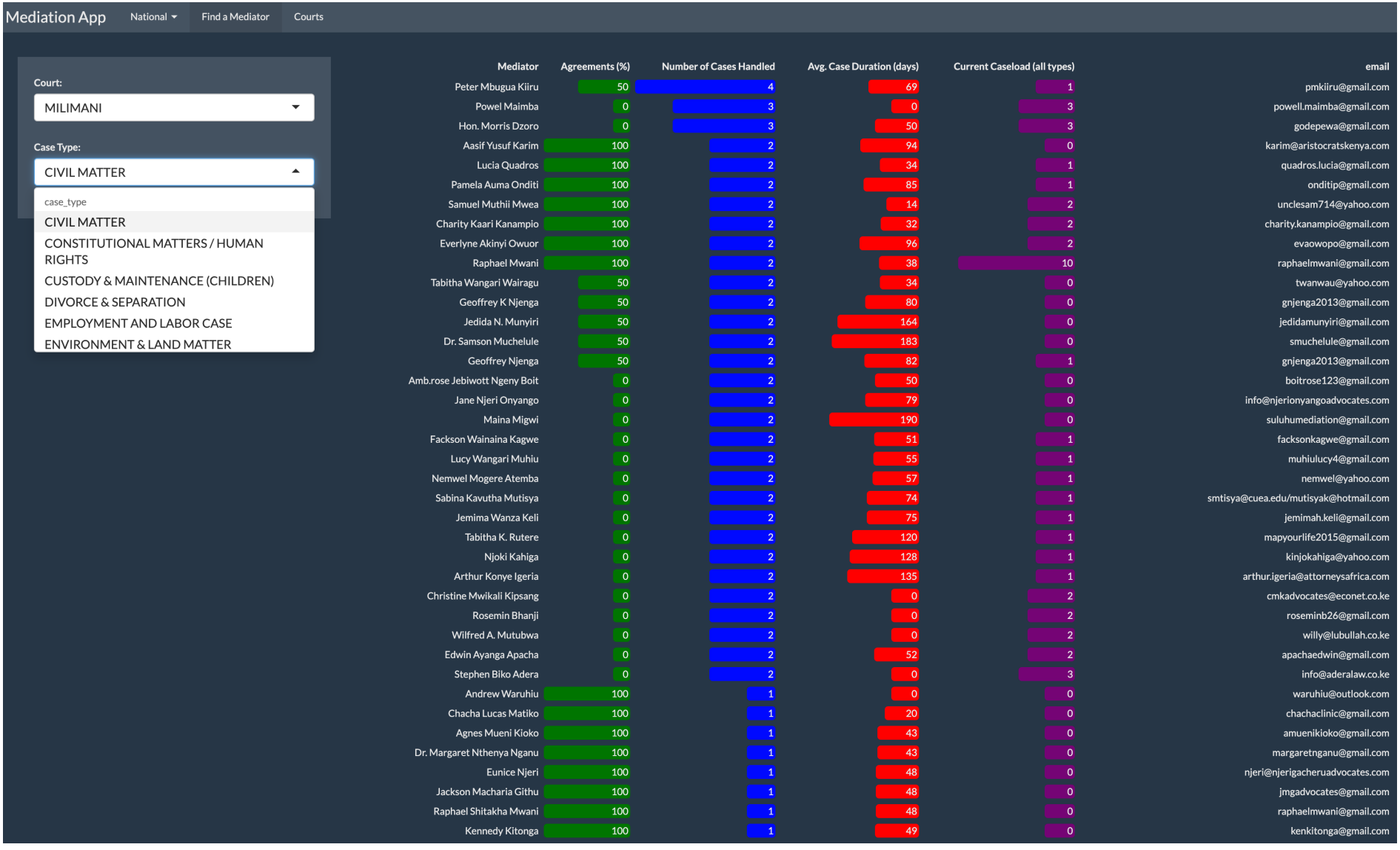
Show 25 entries Search:

	Legal Aid Center	Number of cases	Success rate (%)	Duration of cases (days)	Avg. monthly caseload
1	CERCADO DE LIMA	2950	39	19	36
2	CHINCHA ALTA	972	47	12	19
3	MUNICIPALIDAD PROVINCIAL DE SATIPO	951	64	8	19
4	ICA	3648	60	9	36
5	AREQUIPA	1110	67	8	21
6	AMBO	85	58	11	8
7	HUANCAYO	1232	71	6	23



OR, AS MANAGEMENT TOOL, OBSERVING REGRESSIONS THAT THEY RUN

Recommending Mediators (Chen, Kasy, Maqueda, Teytelboym 2020)



Mediator	Agreements (%)	Number of Cases Handled	Avg. Case Duration (days)	Current Caseload (all types)	email
Peter Mbugua Kiiru	50	4	69	1	pmkiiru@gmail.com
Powel Maimba	0	3	0	3	powell.maimba@gmail.com
Hon. Morris Dzoro	0	3	50	3	godepewa@gmail.com
Aasif Yusuf Karim	100	2	94	0	karim@aristocratskenya.com
Lucia Quadros	100	2	34	1	quadros.lucia@gmail.com
Pamela Auma Onditi	100	2	85	1	onditip@gmail.com
Samuel Muthii Mwea	100	2	14	2	unclesam714@yahoo.com
Charity Kaari Kanampio	100	2	32	2	charity.kanampio@gmail.com
Everlyne Akinyi Owuor	100	2	96	2	evaowopo@gmail.com
Raphael Mwani	100	2	38	10	raphaelmwani@gmail.com
Tabitha Wangari Wairagu	50	2	34	0	twanwau@yahoo.com
Geoffrey K Njenga	50	2	80	0	gnjenga2013@gmail.com
Jedida N. Munyiri	50	2	164	0	jedidamunyiri@gmail.com
Dr. Samson Muchelule	50	2	183	0	smuchelule@gmail.com
Geoffrey Njenga	50	2	82	1	gnjenga2013@gmail.com
Amb.rose Jebiwott Ngeny Boit	0	2	50	0	boitrose123@gmail.com
Jane Njeri Onyango	0	2	79	0	info@njerionyangoadvocates.com
Maina Migwi	0	2	190	0	suluhumediation@gmail.com
Fackson Wainaina Kagwe	0	2	51	1	facksonkagwe@gmail.com
Lucy Wangari Muhiu	0	2	55	1	muhiulucy4@gmail.com
Nemwel Mogere Atemba	0	2	57	1	nemwel@yahoo.com
Sabina Kavutha Mutisya	0	2	74	1	smtisya@cuea.edu/mutisyak@hotmail.com
Jemima Wanza Keli	0	2	75	1	jemimah.keli@gmail.com
Tabitha K. Rutere	0	2	120	1	mapyourlife2015@gmail.com
Njoki Kahiga	0	2	128	1	kinjokahiga@yahoo.com
Arthur Konye Igeria	0	2	135	1	arthur.igeria@attorneysafrica.com
Christine Mwikali Kipsang	0	2	0	2	cmkadvocates@econet.co.ke
Rosemin Bhanji	0	2	0	2	roseminb26@gmail.com
Wilfred A. Mutubwa	0	2	0	2	willy@lubullah.co.ke
Edwin Ayanga Apacha	0	2	52	2	apachaedwin@gmail.com
Stephen Biko Adera	0	2	0	3	info@aderalaw.co.ke
Andrew Waruhiu	100	1	0	0	waruhiu@outlook.com
Chacha Lucas Matiko	100	1	20	0	chachaclinic@gmail.com
Agnes Mueni Kioko	100	1	43	0	amuenikioko@gmail.com
Dr. Margaret Nthenya Nganu	100	1	43	0	margaretnganu@gmail.com
Eunice Njeri	100	1	48	0	njeri@njerigacheruadvocates.com
Jackson Macharia Githu	100	1	48	0	jmgadvocates@gmail.com
Raphael Shitakha Mwani	100	1	48	0	raphaelmwani@gmail.com
Kennedy Kitonga	100	1	49	0	kenkitonga@gmail.com

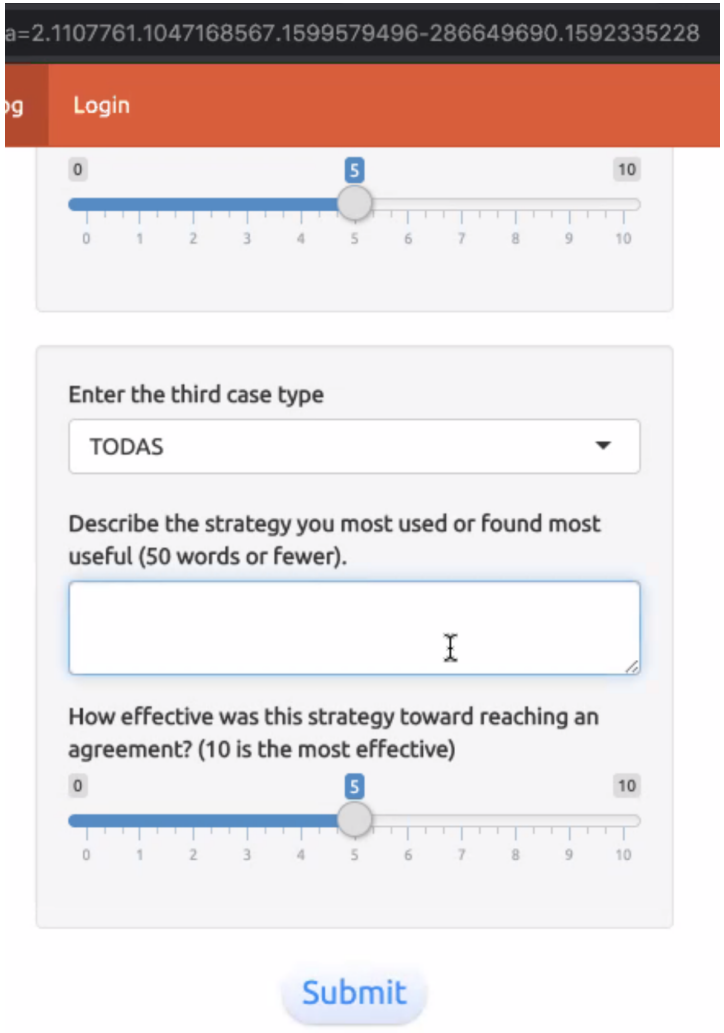
API to create own dashboards

Victim's defense, public defense, psychological support

DECENTRALIZED, CAPACITY-BUILDING

Note: this comes in Non-harmonized Excel files, we do capacity-building as well as open-source tools coded in R - which we proposed teaching IT in Colombia

Incentivize Case Logs (Chen, Maqueda, Silvera 2020)



Record and present correlates of improvement

Transfer learning within and across decision-makers

Looking Ahead

- Pakistan land revenue administration (a quasi-judicial body)

where teammember previously worked

- **diagnostic tools** to allocate resources & attention efficiently
  - **information about** one's own performance and **biases**
    - ★ self and social image motivations
  - **incremental** decision-support platform
  - statistics training modules on decision quality & motivated reasoning
  - preliminary interviews with stakeholders also indicate
    - ★ need for clerks (**physical legal aid**)
    - ★ legal search engine (**virtual legal aid**)

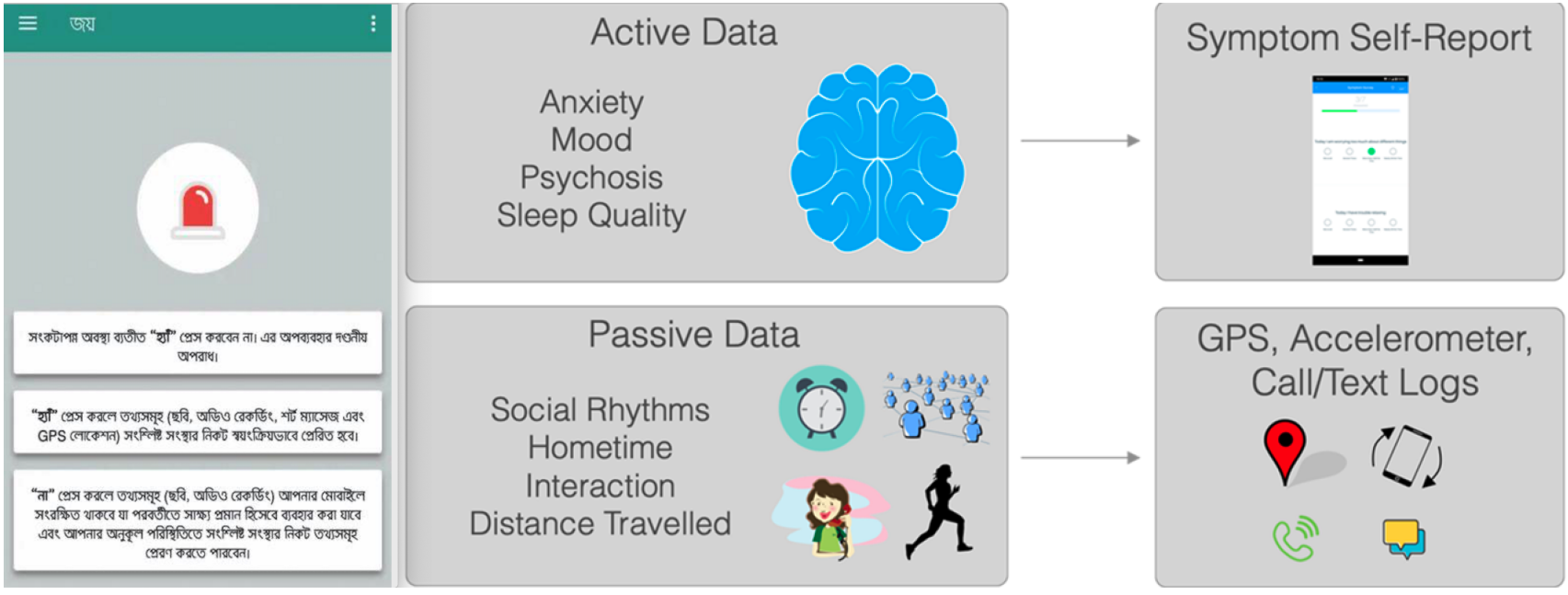
(2) Recognition-Dignity

PAUSE FOR QUESTIONS

www.oTree.org

- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - ML applications to produce interpretable data from unstructured text
  - Predictive models of decision-making to better **understand biases** and **address them with digital interfaces**

(3) Gender-Based Violence (& sexual harassment)



- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - **ML applications to produce interpretable data** from unstructured text
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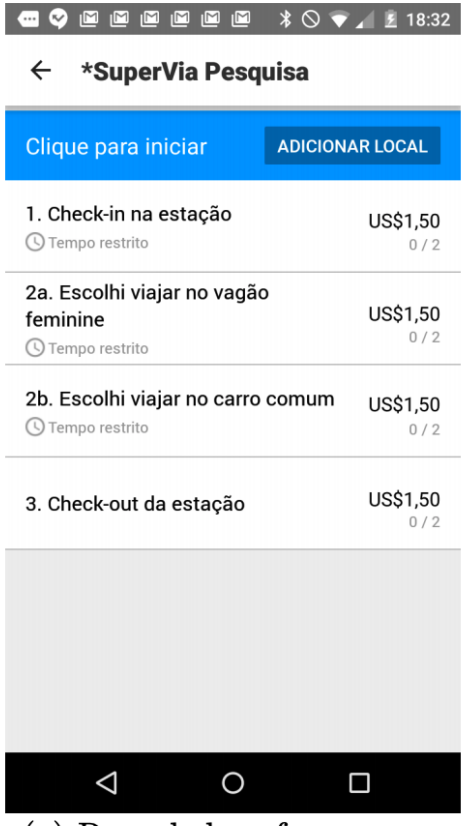
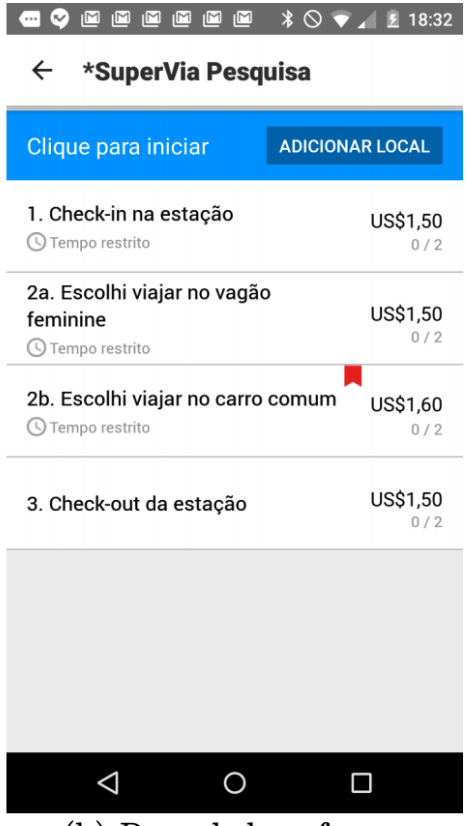
Demand for Safe Spaces (Kondylis, Legovini, Vyborny, Zwager, Andrade 2020)

Randomize the price of women-reserved "safe space" in Rio de Janiero

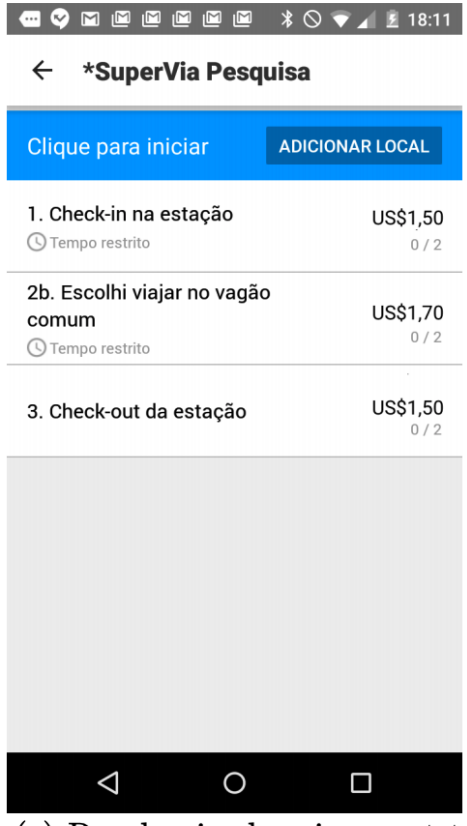
Made salient within-app



(a) Revealed preference: zero cent opportunity cost



(b) Revealed preference: positive opportunity cost



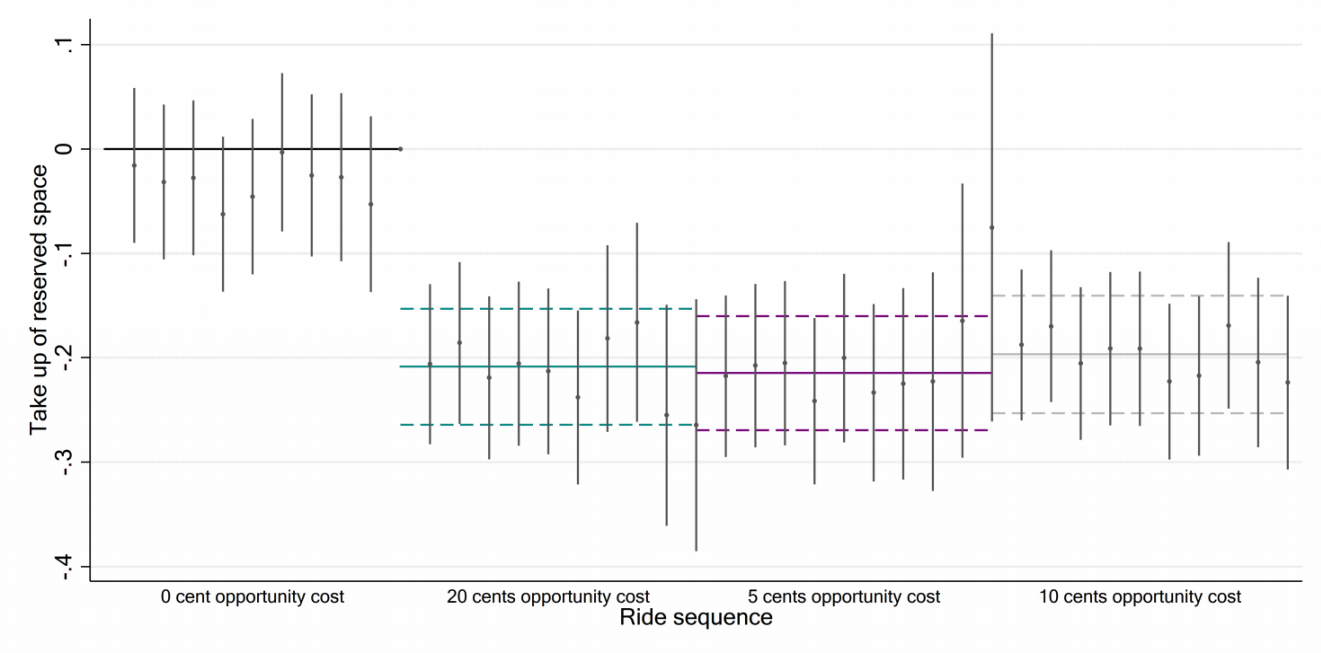
(c) Randomized assignment to space

Demand for Safe Spaces

Probability to choose reserved space declines by 20 percent

by offering higher payment to ride in public space

Figure 2: Rides sequence and take-up of reserved space - Take up of reserved space over common ride sequence

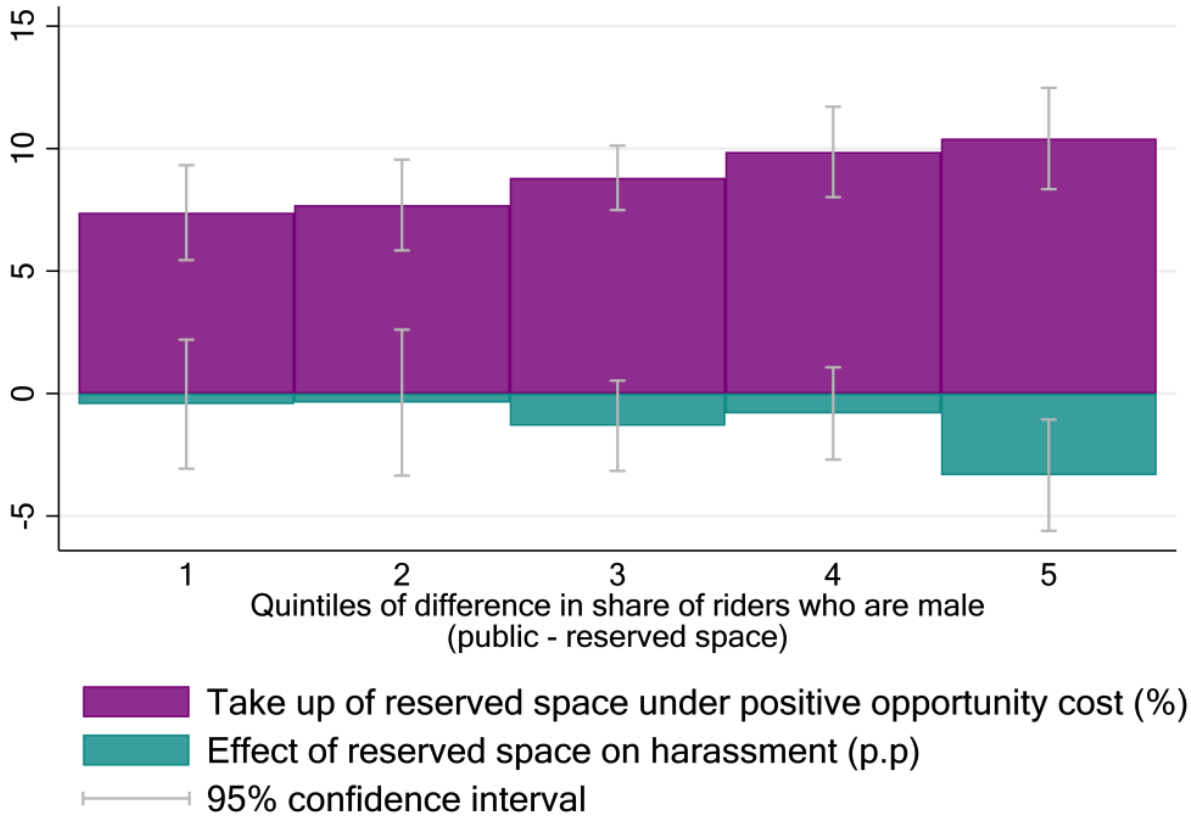


Notes: Sample includes all riders who started willingness to pay rides, and includes only the last ten rides each user took for each premium level. Displayed values are point estimates and 95% confidence intervals from a regression of take-up of reserved space on dummies for order in which the rides happened. Omitted ride (take up = 0) is the last ride with no opportunity cost.

Demand for Safe Spaces

Randomly assigning riders to "safe space" reduces harassment by 50 percent

Figure 4: Joint distribution of take-up and harassment by presence of men



difference yields cost of harassment

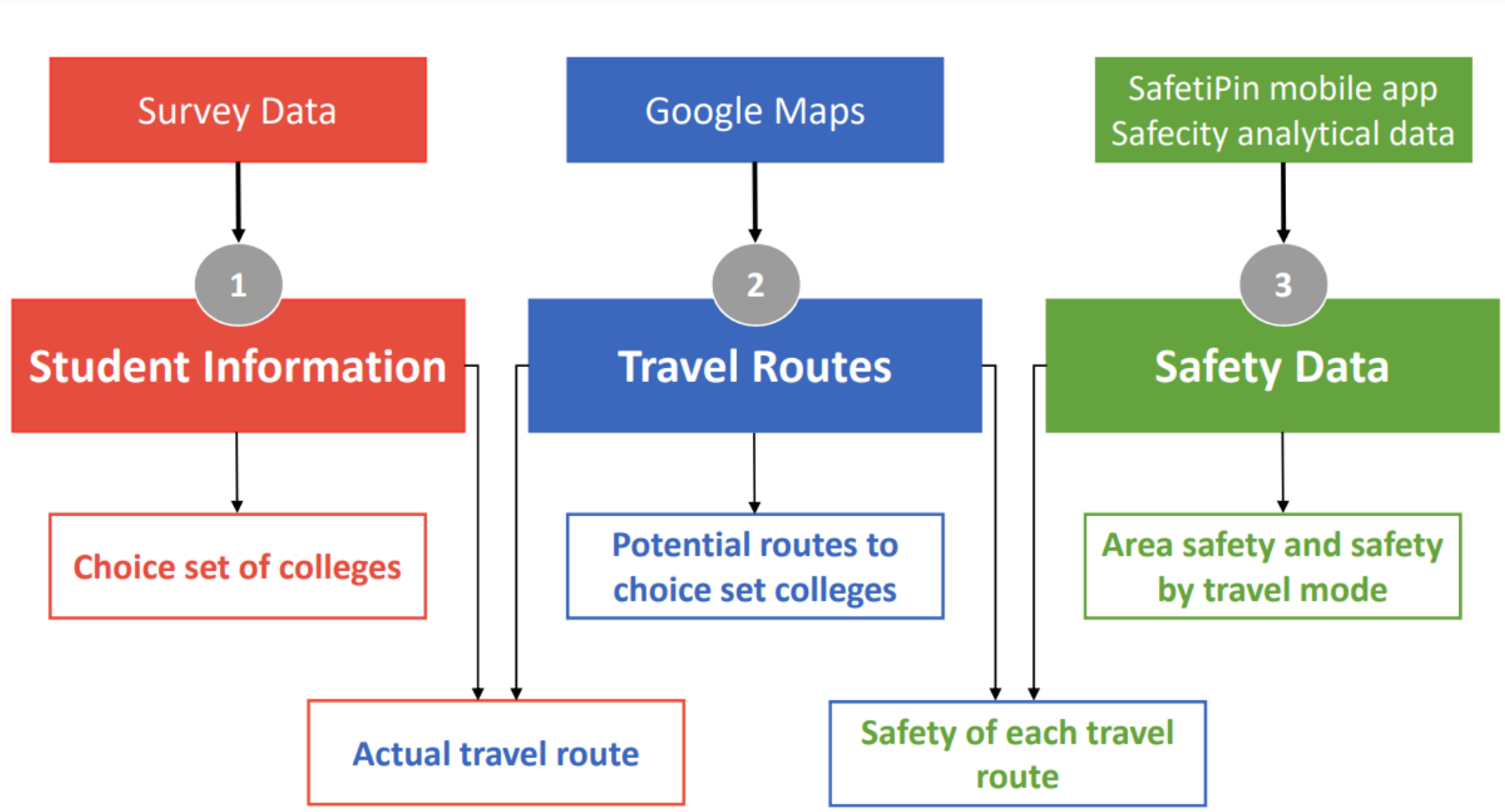
Risk of Harassment and Educational Choices (Borker 2020)

Street Harassment

- 95% of females aged 16 to 49 years in Delhi feel unsafe in public spaces *(ICRW 2013)*
- 84% women under 40 in India report avoiding an area in their city because of harassment *(Livingston 2015)*
  - Delhi college students = 71%

Risk of Harassment and Educational Choices

Data Overview



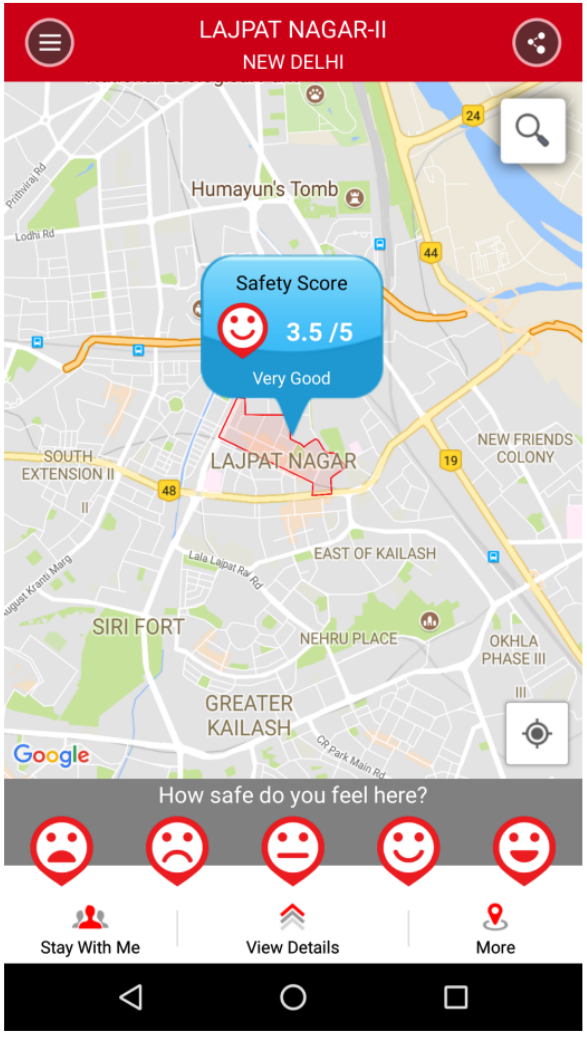
Risk of Harassment and Educational Choices

Safety Data

SafetiPin mobile app data on perceived safety (November 2013 - January 2016)

- characterizes the safety of location based on 9 parameters
- partially crowdsourced and in part collected by trained auditors
  - 98% contributors are 39 years or younger
  - 70% contributors are female
- over 26,000 audits across Delhi National Capital Region
- used as the base level of safety of an area

Details



Risk of Harassment and Educational Choices

Choice Relative to Neighbors

- Case-control match - compare choice of index student with neighbor:
  - lives in a 1.5km radius
  - same gender
  - same major
  - same year of admission

} 1,228 unique pairs

Risk of Harassment and Educational Choices

Choice Relative to Neighbors

△ index student's exam score relative to neighbor →
(changes students' choice set)

△ index student's choice response:

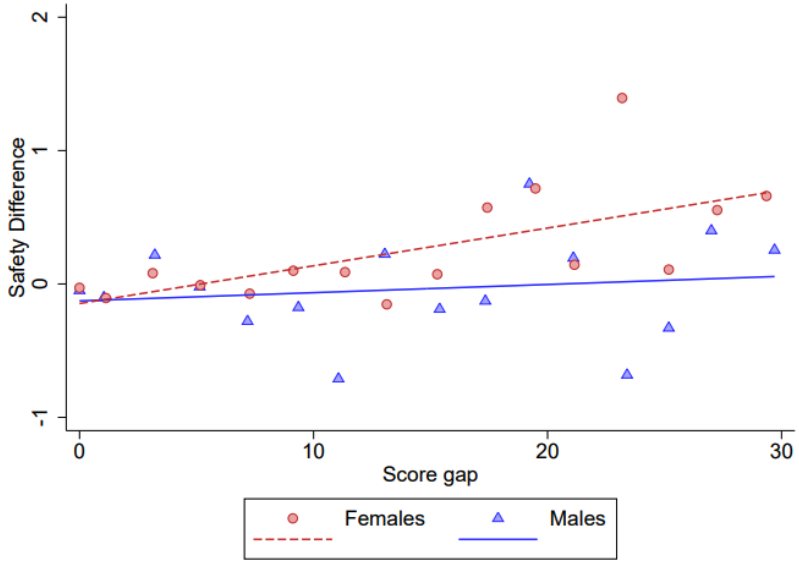
- safety
- quality
- time
- cost

(underlying preferences)

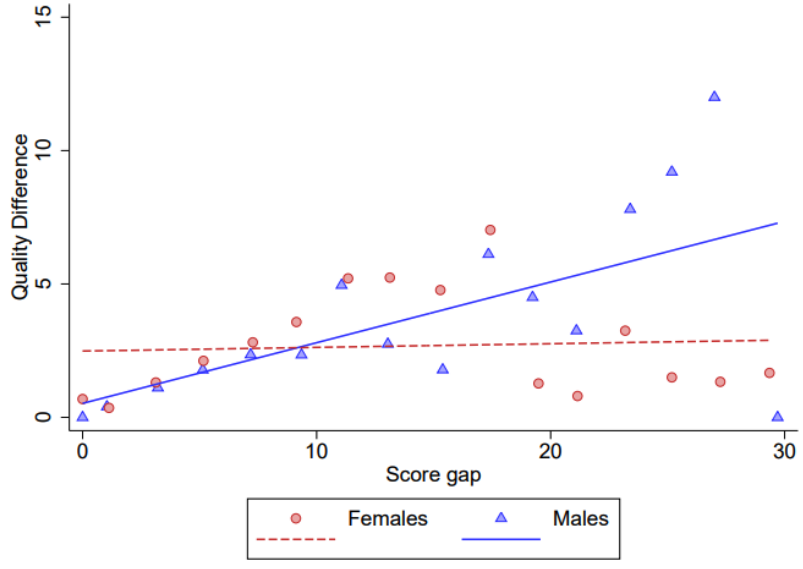
Risk of Harassment and Educational Choices

Travel Safety and College Quality

Safety



Quality

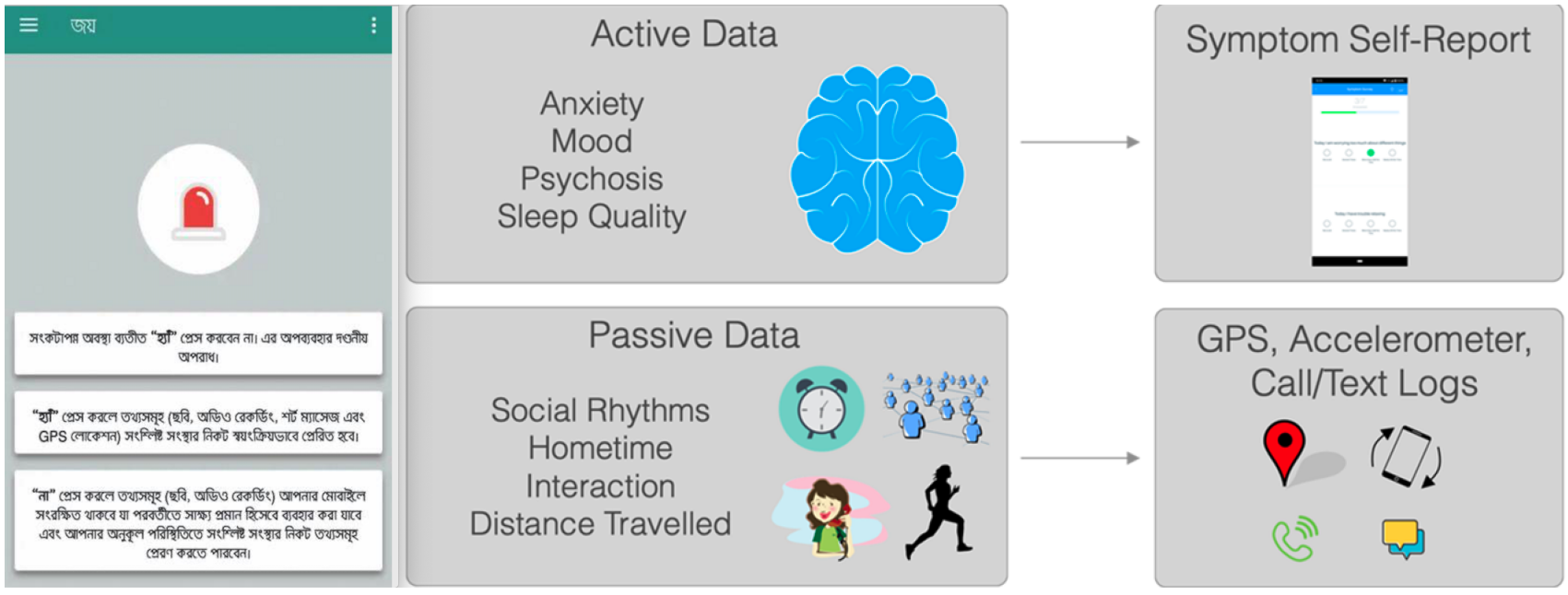


- women choose relatively safer routes as their choice set expands
- men don't respond in terms of safety

- positive quality gradient for both women and men
- significantly greater for men

Apps for Missing Cases Bangladesh app (nationally advertised on July 2018)

smartphone app aiming to address violence against women and children



- Colleague has longstanding links with the Bangladesh Ministry of Women and Children's Affairs that operates a national helpline
  - Emergency button sends the victim's GPS, picture, and audio recording
- and Bangladesh Legal Aid Services Trust (BLAST), the largest dedicated non-governmental legal services organisation in Bangladesh.
  - Information RCT on services by these organisations and monitor usage

Apps for Missing Cases (Chen, Mehmood, Wahhaj 2020)

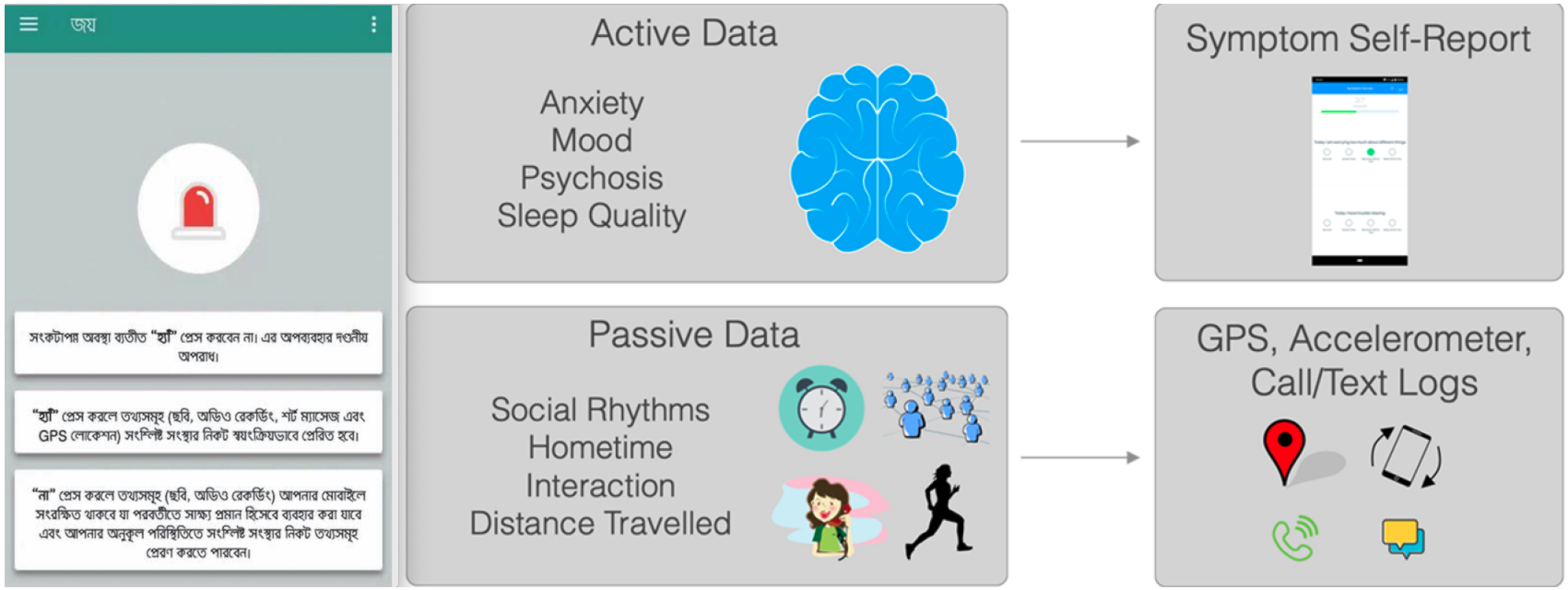
1,483 smartphone app calls from 2018-2020 (4,629 downloads)

13.1% of household heads are aware of hotline or app

mobile phone penetration (99%)

- Provide access to justice
- Test economic theories of cultural change
  - information on access provided only to women
  - both women and men
  - or only to men
- bargaining power & backlash
  - Awareness can shift ability to negotiate
  - Assess second-order beliefs about the prevalence of norms
- Potentially add passive features for additional revealed preference data

Digital phenotyping for mental health

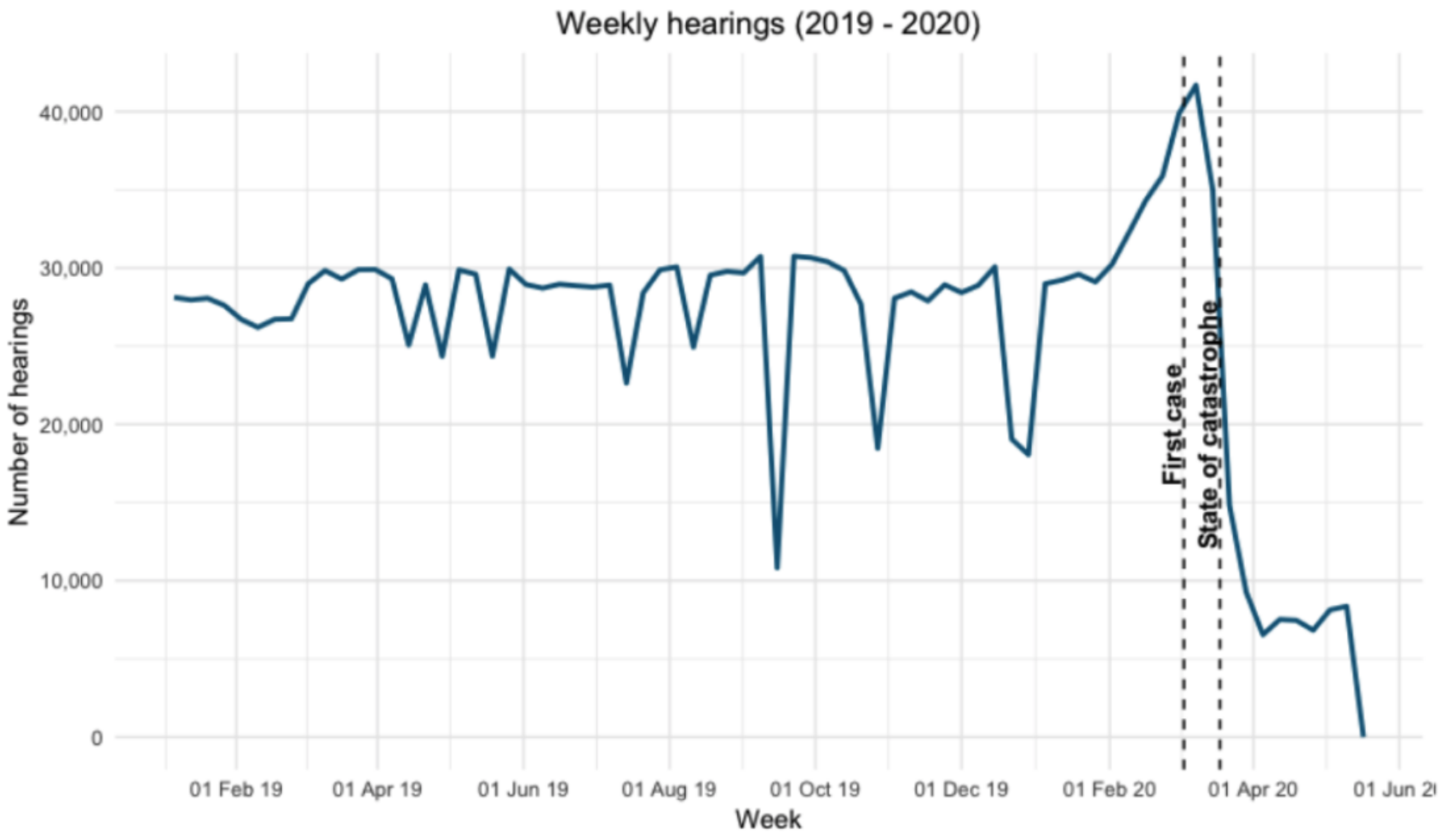


- Sense and mine mental health states
  - Support smart decisions
  - Maximize treatment outcomes
  - Facilitate prevention and surveillance
- affect recognition, cognitive analytics, behavioral anomaly detection, social analytics, and biomarker analytics

Apps might address cases that never file

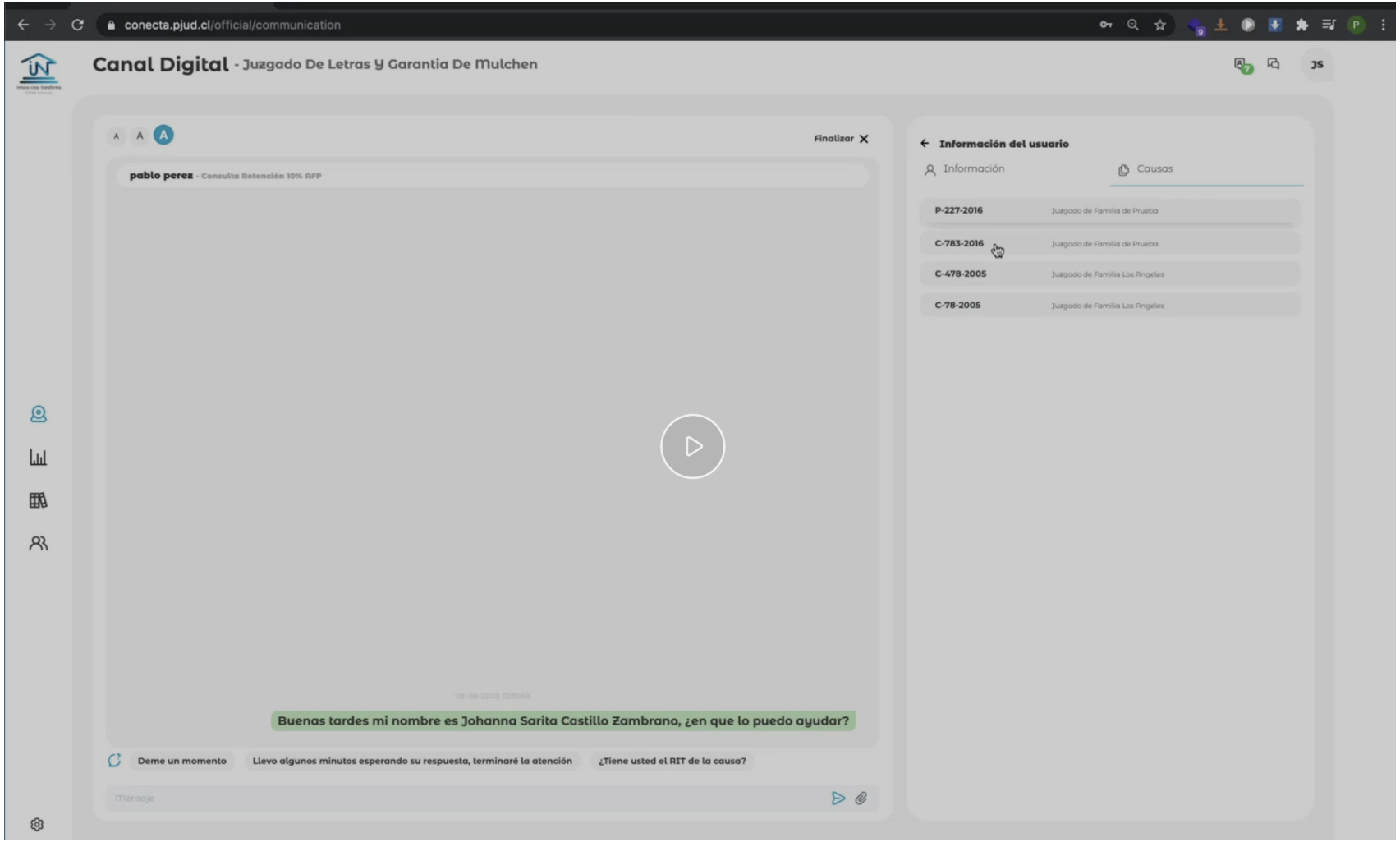
What about cases on the margin of filing?

Covid has decreased court activity around the world



How to facilitate access to justice amid covid?

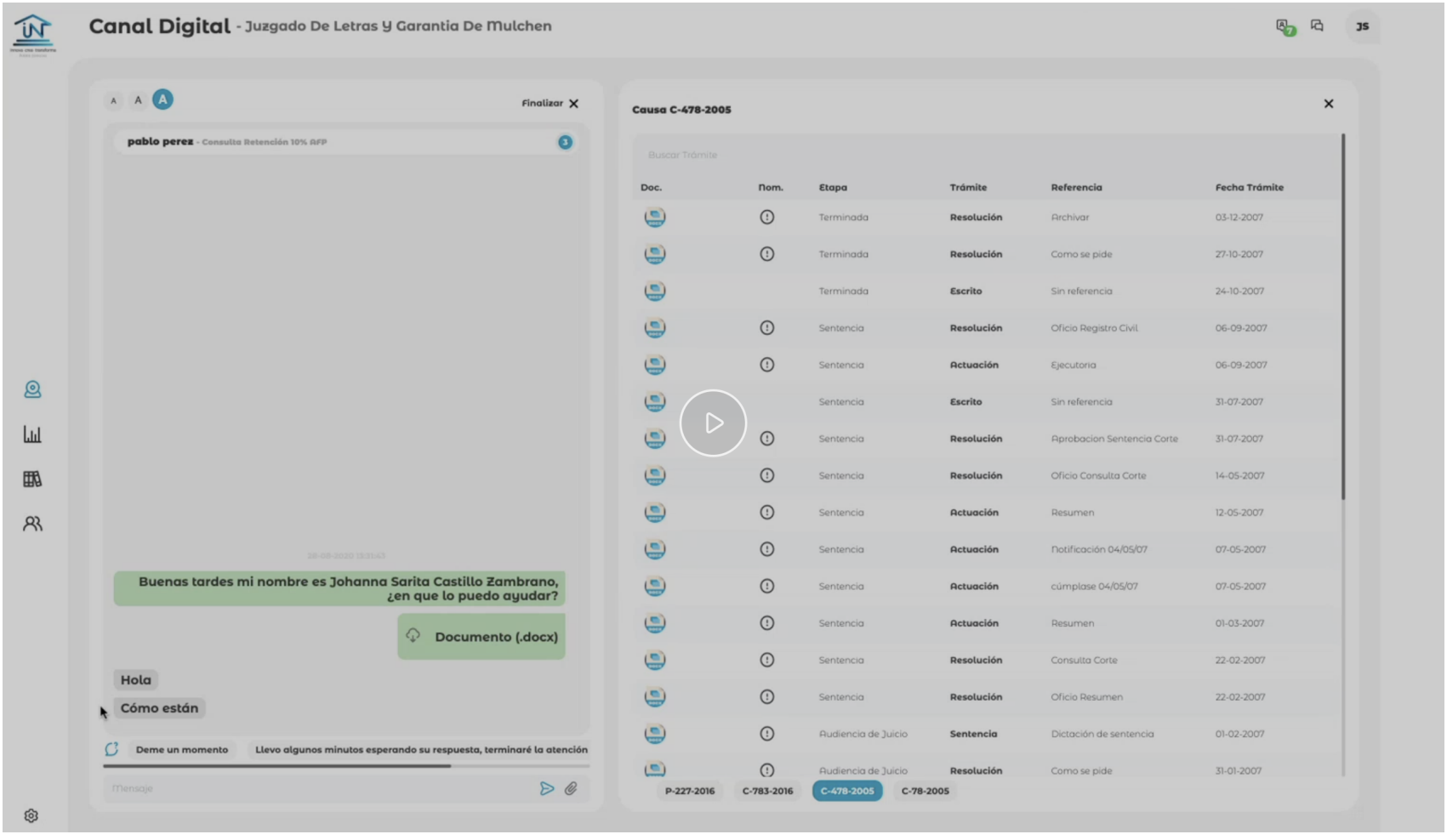
E-Justice during covid: Whatsapp (Chen, Maqueda, Silvera 2020)



for Q&A with courts

video and audio also enabled

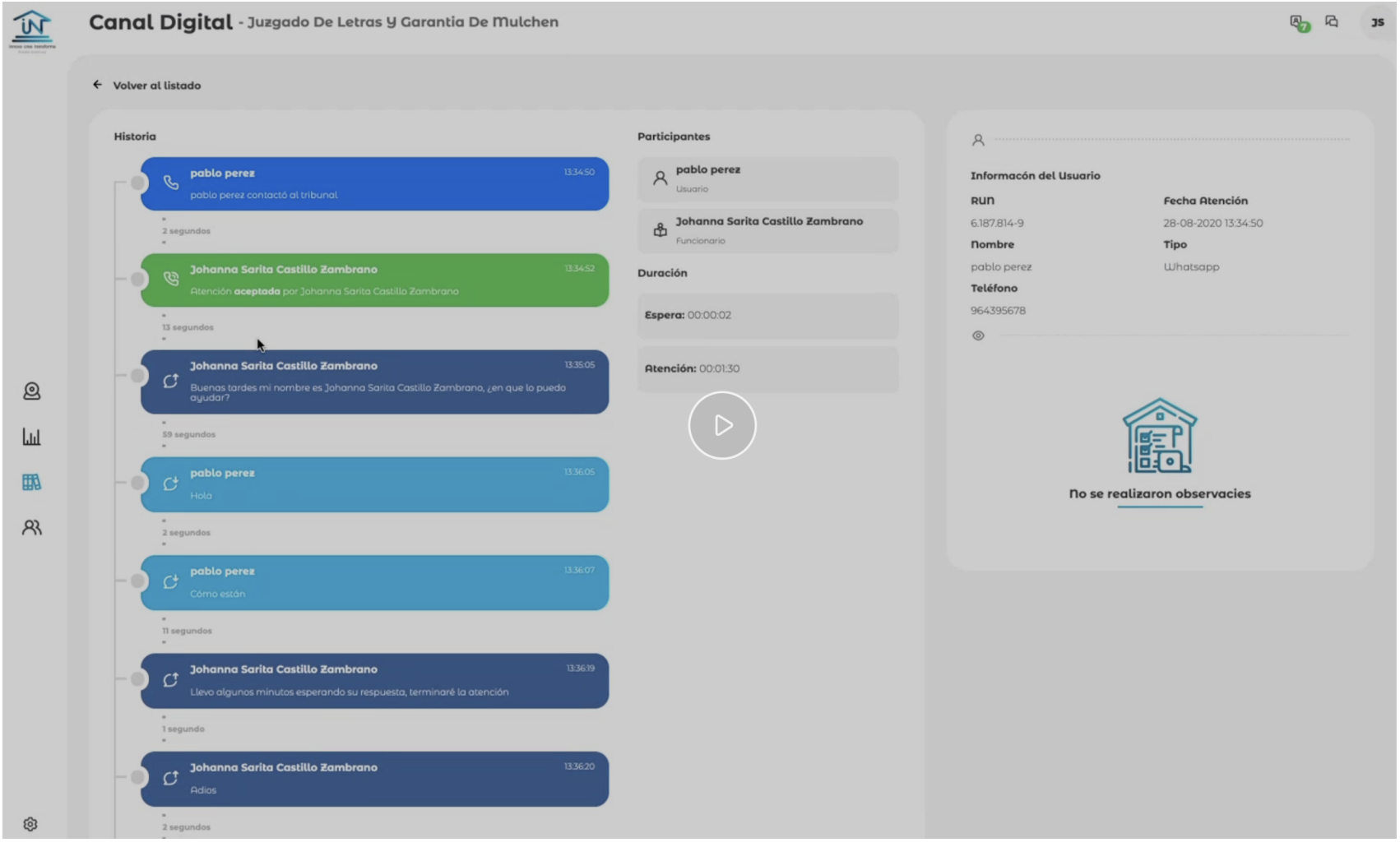
.. Receivers are given text to copy and paste (chatbots/humans?)



documents are linked

Cases are linked across calls

.. and into the courts (Digital interoperability)



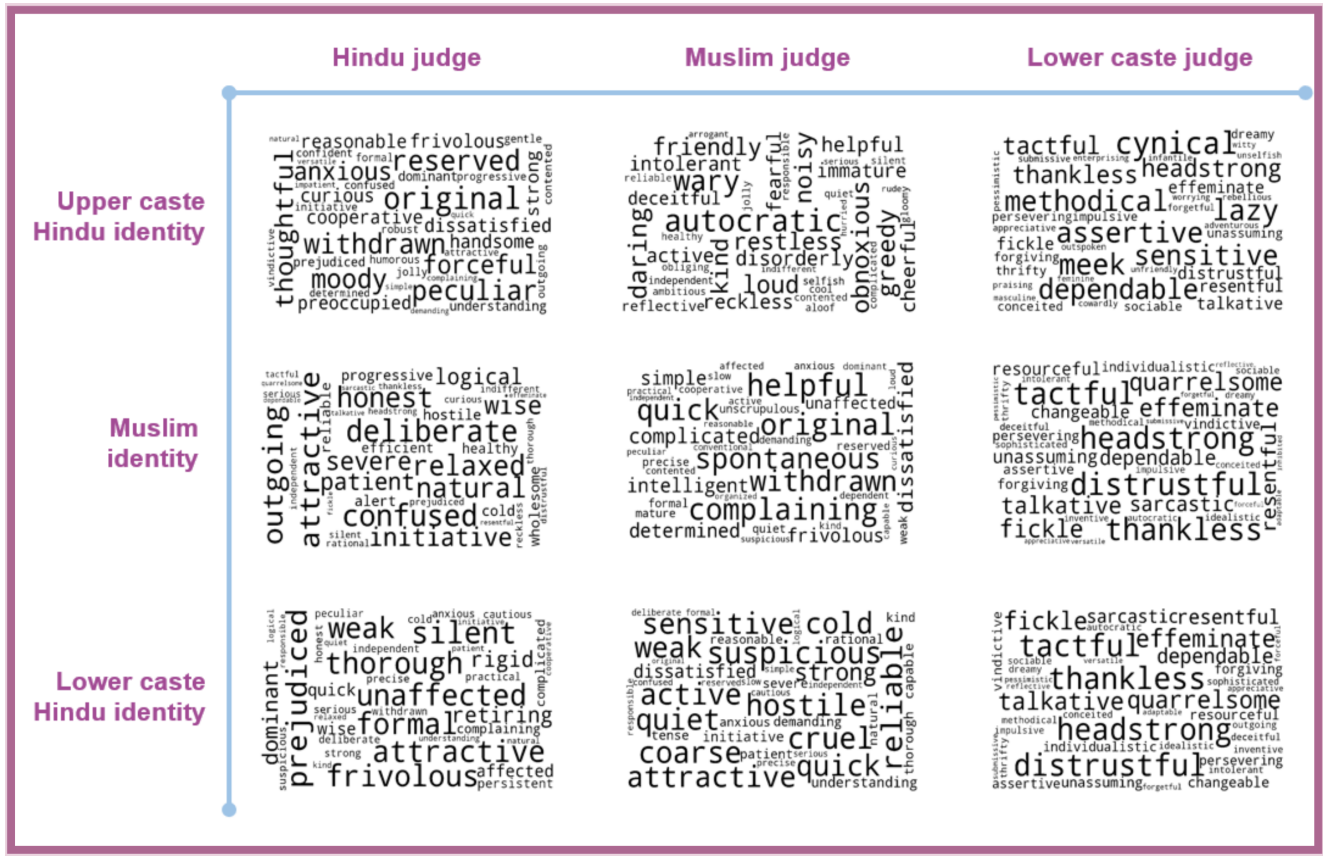
facilitating downstream analysis on consequences

40% of inquiries have been related to alimony

Pilot being rolled out nationally (and advertised on Facebook)

E-ARBITRATION, E-MEDIATION, ..

AI TOOLS AND POTENTIAL BIAS



Preliminary evidence that Hindu judges describe the Hindu identity more positively

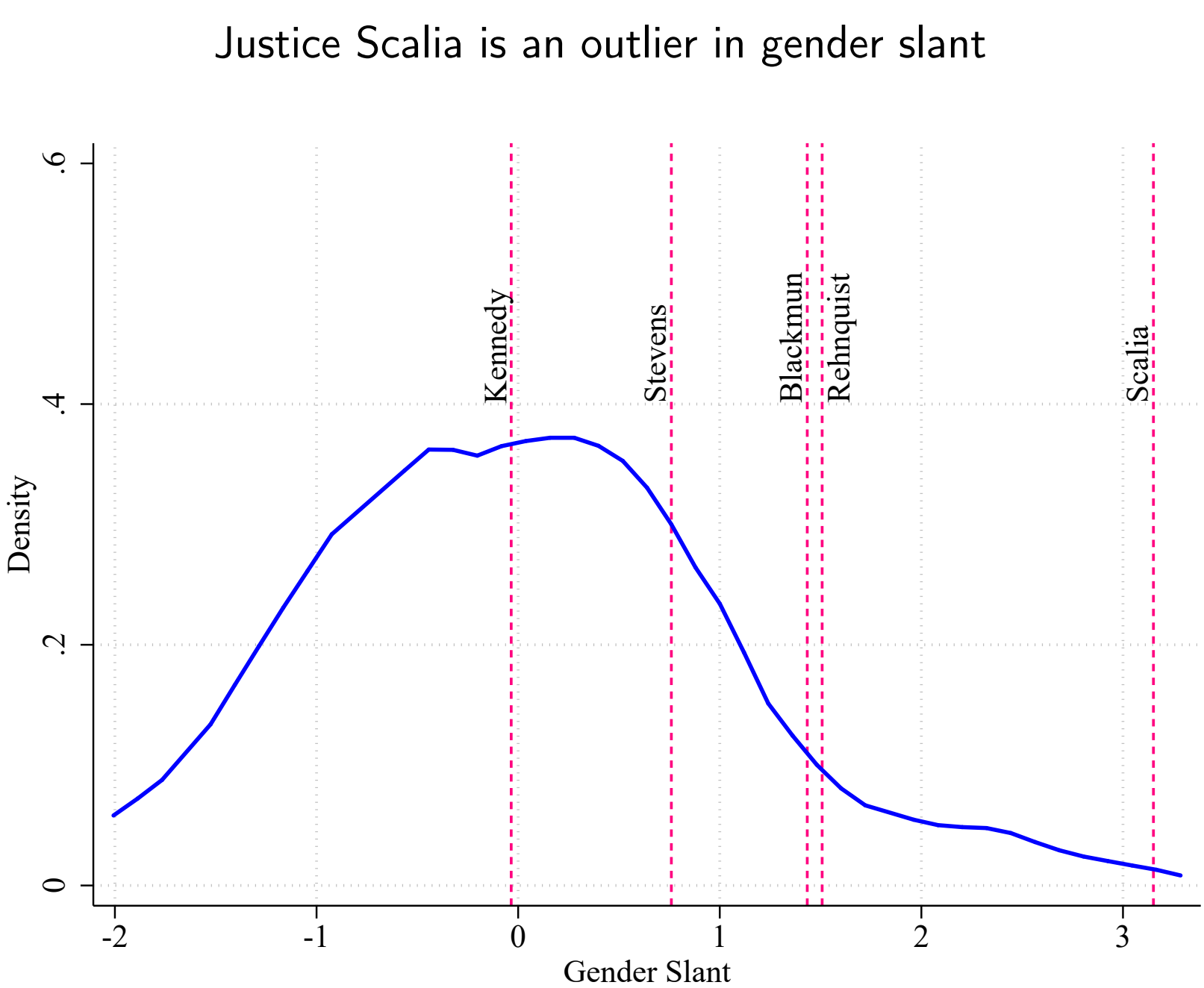
SC/ST judges describe Muslims more negatively (Ash, Bhupatiraju, Chen, Ornaghi 2020)

Implicit Bias in Text (Ash, Chen, Ornaghi 2020)

- Females: Migraine, hysterical, morbid, obese, terrified, unemancipated, battered
- Males: Reserve, industrial, honorable, commanding, conscientious, duty

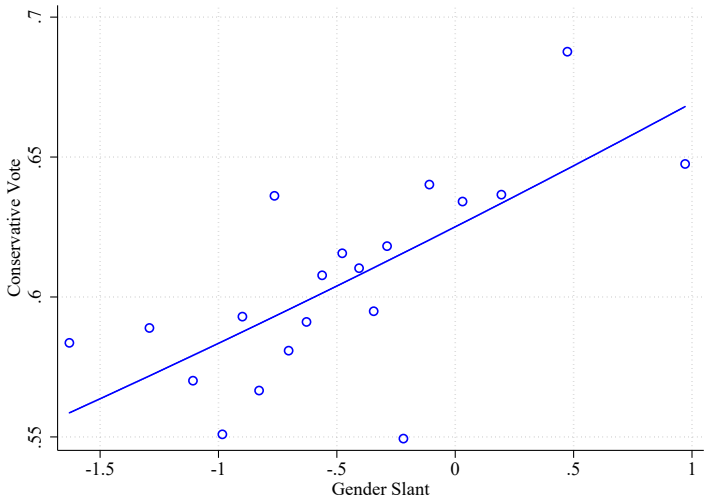
See also *Caliskan, Bryson, Narayaan, Science 2017*

We can do this judge by judge

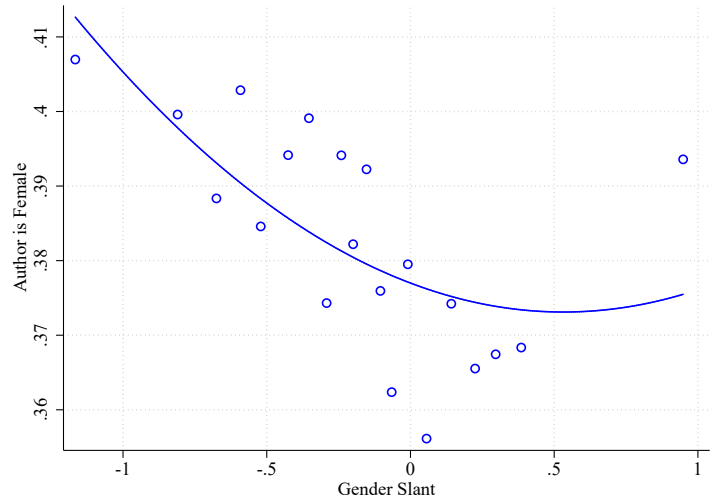


In the Circuit Courts, judges with more gender slant..

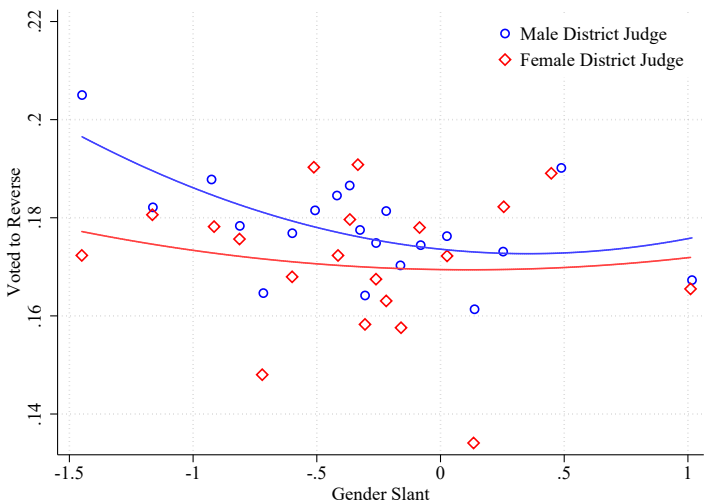
Vote against women's rights issues



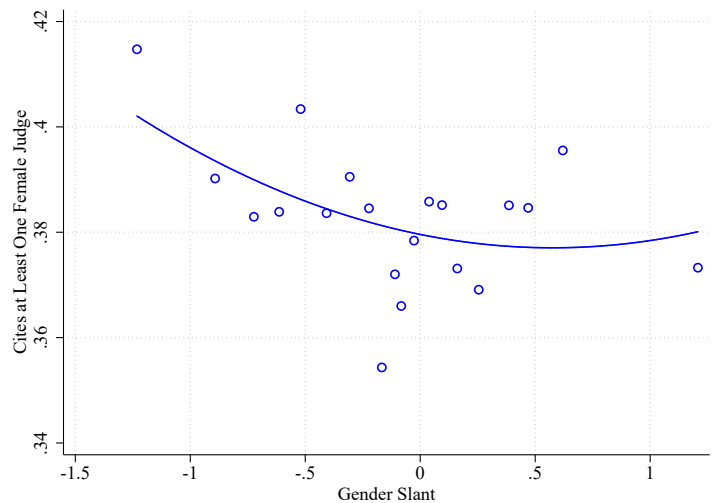
Assign fewer opinions for females to author



Reverse male judges less often



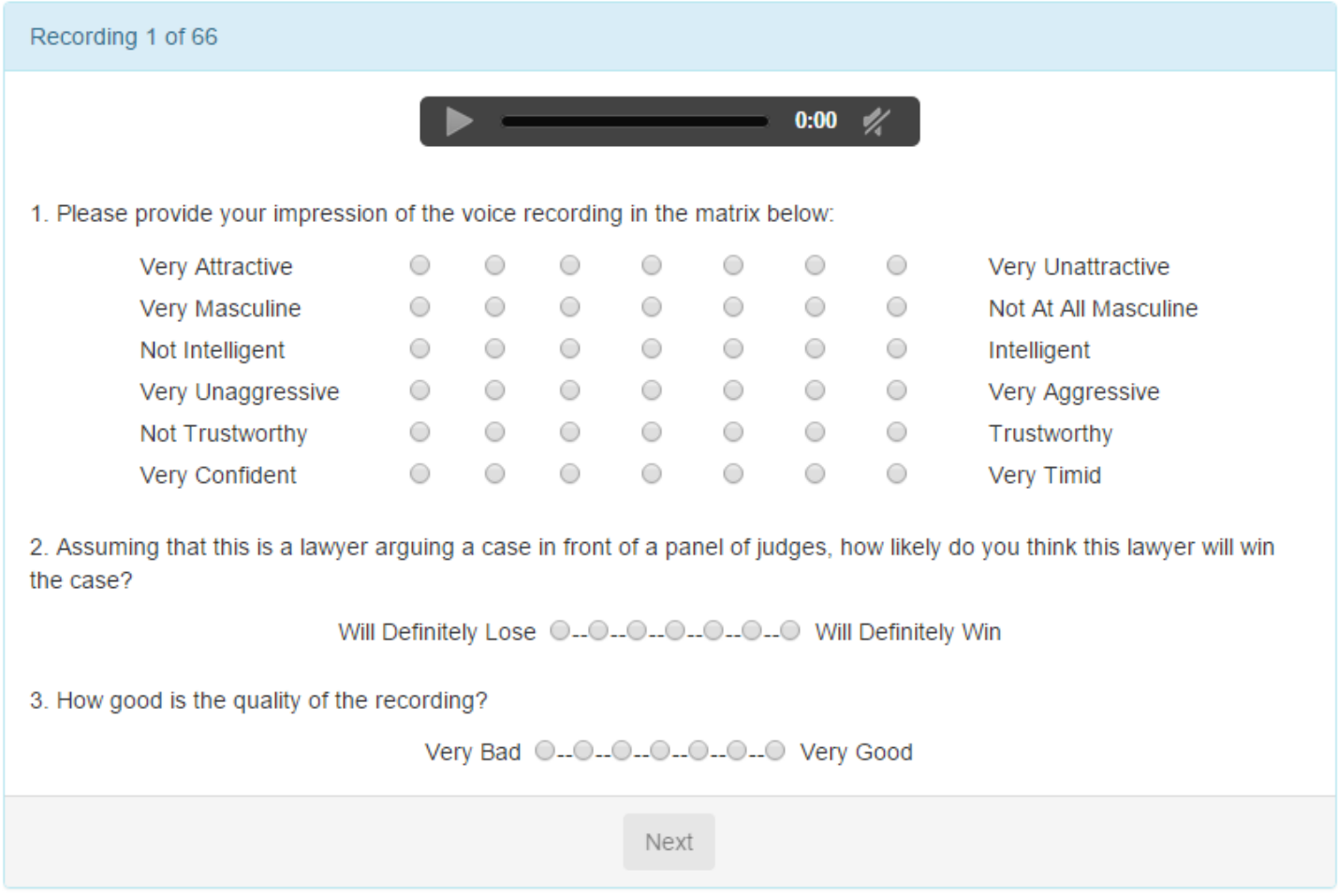
Cite female judges less often



See also *Carlana, QJE 2019, Glover, Pallais, Pariente, QJE 2017*

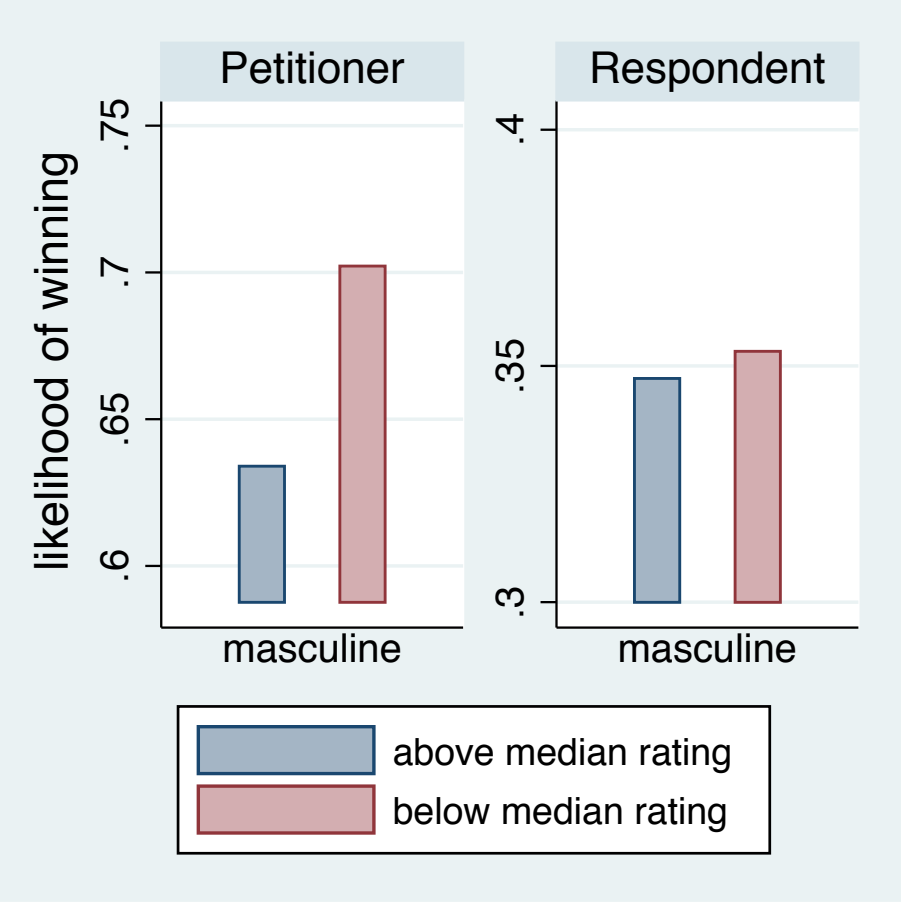
Besides the text, there is voice (*ReStud R&R*, Chen, Halberstam, Yu 2016)

In the US Supreme Court, the first sentence of the lawyers oral arguments are identical



"Mr. Chief Justice, (and) may it please the Court?"

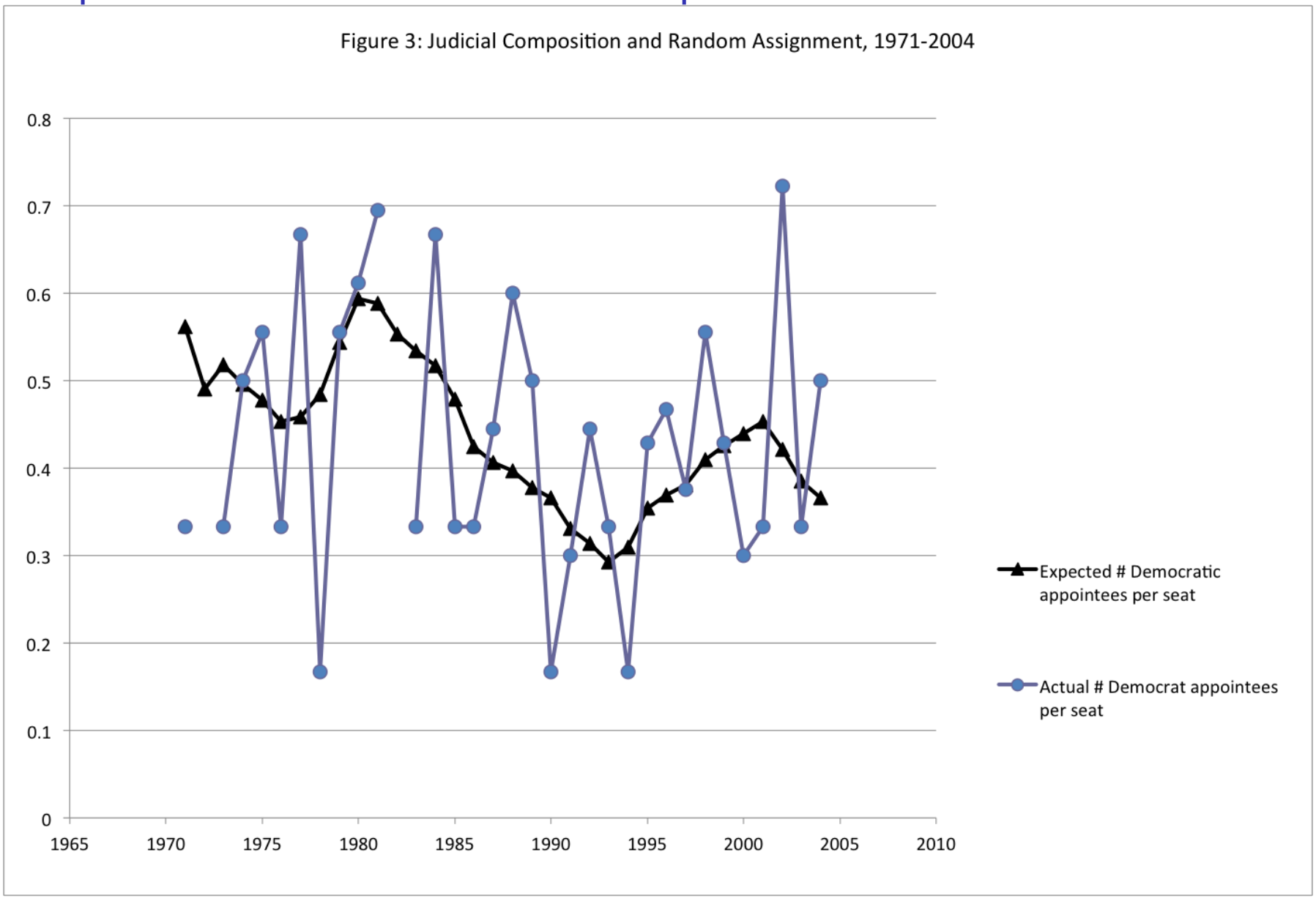
Male petitioners below median in masculinity rating are 7 percentage points more likely to win



Plos-ONE 2016

See also *Dietrich, Enos, Sen, Political Analysis 2018*

Graphical Intuition of "coin flip" (*ReStat R&R*, Chen and Sethi 2017)



Insiders, Outsiders, and Involuntary Unemployment, *Chen and Sethi*, in review

Forbidding Harassment Increases Female Labor Share

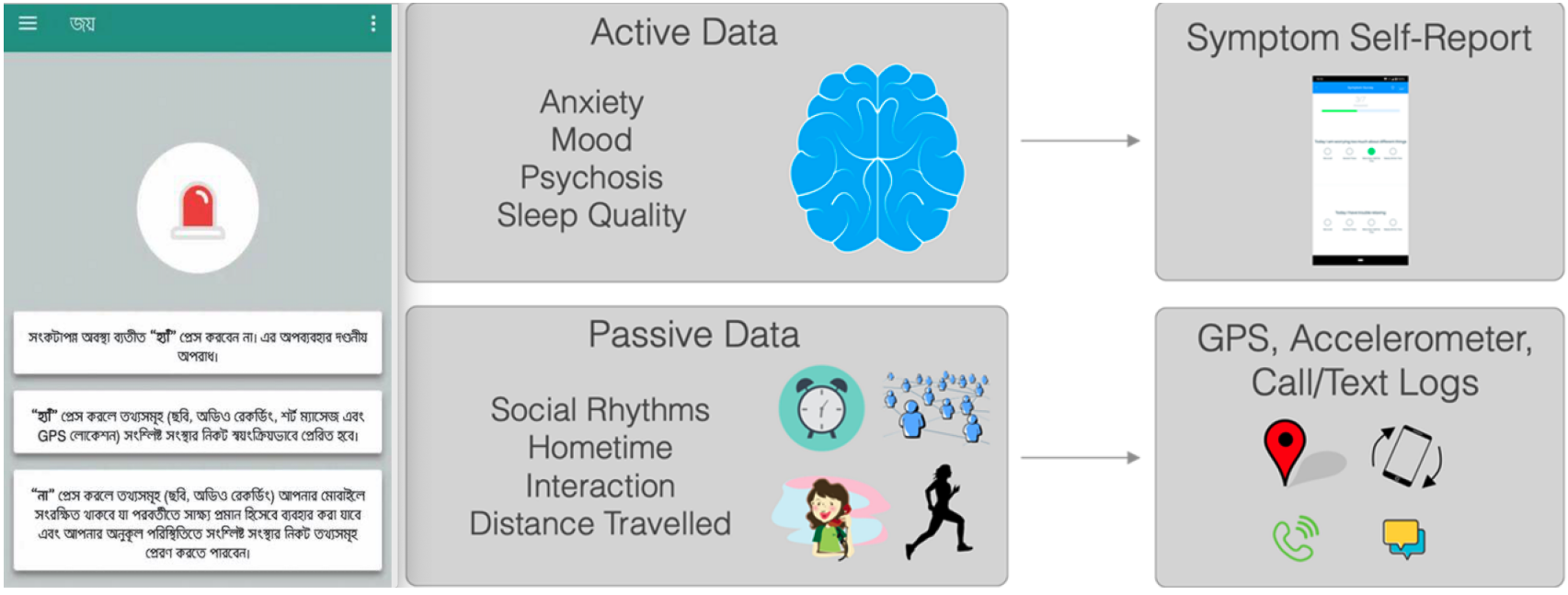
	β_3	Joint F
A. Add Circuit-Specific Trends	0.016	8.35
B. Drop θ_c, θ_t	0.016	8.17
C. Only 1 $\left[M_{ct-n} > 0\right], F_{ict}$	0.017	8.08
D. Add E($\frac{N_{ct}}{M_{ct}}$)	0.016	8.31
E. Add State Fixed Effects	0.016	8.00
F. No CPS Weights	0.013	16.49
G. Add 2-year Lead	0.021	19.25
H. Drop 1 Circuit		
Circuit 1	0.015	6.57
Circuit 2	0.017	14.22
Circuit 3	0.016	13.81
Circuit 4	0.017	17.12
Circuit 5 (TX, LA, MS)	0.007	37.15
Circuit 6	0.017	6.61

EXTENDING THIS ANALYSIS TO SOUTH ASIA

wherever data infrastructure permits (e.g. causal effect of having grievences met)

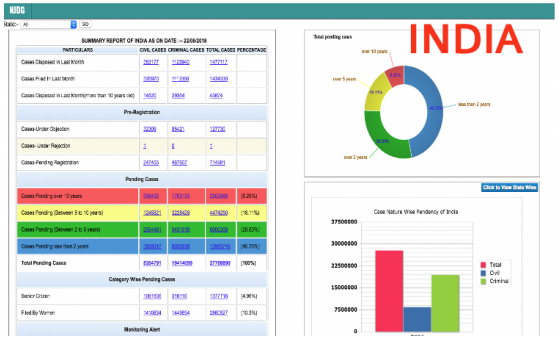
(3) Gender-Based Violence (& sexual harassment)

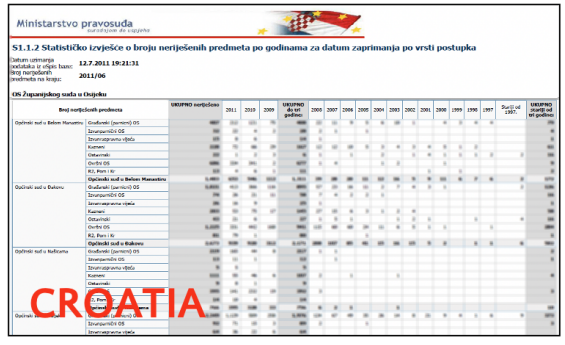
PAUSE FOR QUESTIONS



- **Recent innovations** have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - **ML applications to produce interpretable data** from unstructured text
  - Predictive models of decision-making to better understand biases and address them with digital interfaces

(4) Forward Look & Lessons





- Recent innovations have opened up new opportunities for delivery of justice
  - Increasingly digitized large-scale datasets
  - ML applications to produce interpretable data from unstructured text
  - **Predictive models of decision-making** to better understand biases and address them with digital interfaces

LET ME DISCUSS FIVE OPPORTUNITIES TO EFFECT CHANGE

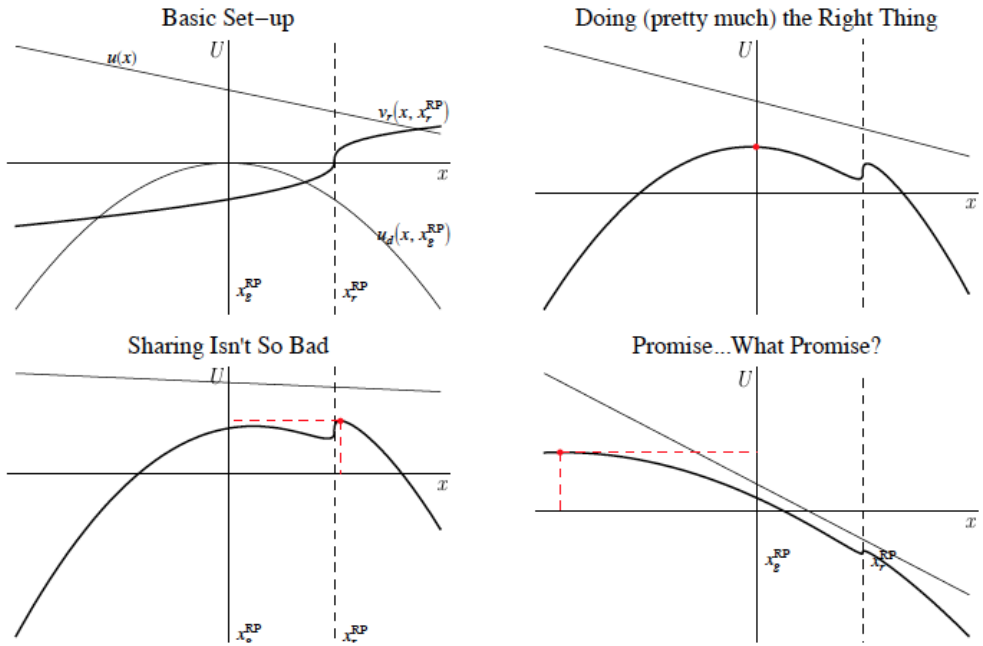
Judicial Analytics and Law *J of Artificial Intelligence & Law*, Chen 2018

Justice: **equal treatment before the law** $(y = f(X) + \varepsilon, a \to X)$
equality based on recognition of difference
$(y \perp W, var(\varepsilon) \perp W, a \nrightarrow W)$

control principle and **merit** principle: individuals responsible only for events that are under their control
W: race, gender, masculinity, name, football, weather, judge's lunchtime, preceding case, ...

Machine Learning and Rule of Law *Computational Analysis of Law*, Chen 2018

- Behavioral anomalies offer intuitive understanding of feature relevance
- "settings where people are closer to *indifference* among options are more likely to lead to detectable effects [of behavioral biases] outside of it." (Simonsohn, JPSP 2011)



A model of recognition-respect and

revealed preference indifference

Research in Experimental Economics, Chen 2017

(1) Judicial Analytics for Recognition and Dignity

- Cognitive science and psychology suggests that humans have limited and imperfect reasoning capacities (*Journal of Business,* Tversky and Kahneman 1986; Handbook of Behavioral Economics, Eyster 2019)

- Gambler's fallacy, mood, time of day, order, ... (*QJE*, Chen, Moskowitz, Shue 2016; Chen and Loecher, 2020; *J of Applied Psych R&R*, Chen, Plonsky, Feldman, Steiner, Nitzer 2020)
  - highlight fragility of courts
    - ★ "In a crowded immigration court, 7 minutes to decide a family's future" (Wash Post 2/2/14)
- Policy discussion tends to revolve around having AI replace humans or suggest the optimal decision
- Consider instead an incremental approach that shows decision-makers their predicted self (X) and then uses predictions of error (X & W) to nudge (*Harvard Business Review*, Babic, Chen, Evgeniou, Fayard 2020)

(2) Five Ways for ML to Diagnose Judicial Inattention

NEW INDICATORS FOR OBJECTIVENESS IN ENFORCING REGULATIONS?

1. Early predictability (*ACM AI and Law,* Chen, Dunn, Sagun, Sirin 2017)
2. Behavioral anomalies
3. Inattentiveness to appellate reversals (Ash and Chen 2020)
4. Implicit risk rankings of litigants (asylees) closer to random (Amaranto, Ash, Ren, and Roper, 2017; QJE, Kleinberg, Lakkaraju, Leskovec, Ludwig, Mullainathan 2017)
5. Is indifference greater for some refugees (e.g., from Global South)?

(3) Empirical Challenges

Medicine, prior to clinical trials

Theories about the effects, but no causal evidence (a century ago)

Randomizing judicial decisions

Violates our notion of justice (equal treatment before the law)

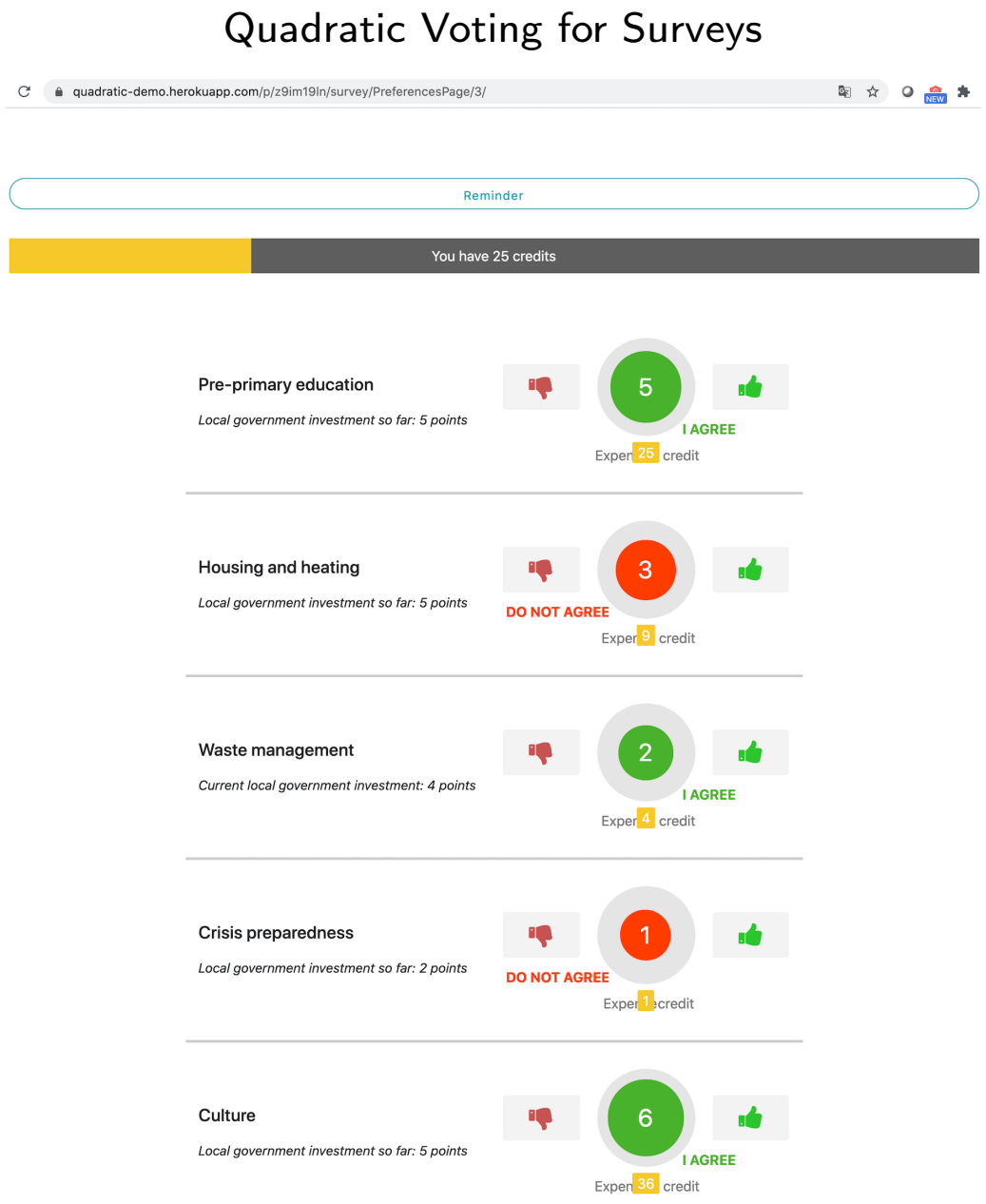
Randomizing judicial assignment

Generates retrospective "clinical trial" (Kling AER 2006; many since "credibility revolution" in economics)

USE MICRODATA FOR MACRO INDICATORS OF JUSTICE SECTOR

AT PARETO FRONTIER, RANDOM JUDGE ASSIGNMENT SHOULD NOT MATTER

(4) New Ways to Elicit Preferences (*U Chi L Rev*, Cavaille, Chen, Straeten 2019; 2020)



(5) AI & Jurisprudence

- Chile's judiciary has suggested support for an AI jurisprudence tool
- Legal search engine like cara or doctraine
  - allow users to easily search and find related jurisprudence
  - the user may highlight fact patterns of a case study, and the platform will show cases with similar fact patterns and how they were resolved.
  - The user may also be curious to understand cases where a specific law and fact pattern takes place, and evaluate the average outcome of such case.
- Assess statistically significant differences on the interpretation of legal terms between different interpreters
- Assess causal effects of jurisprudence and best practices.
  - NLP challenges in identifying low-dimensional vector representation, providing interpretability, and connecting with relevant legal concepts.
- Limited training data
  - apply transfer learning
- Grammar of law
  - 'missing laws' across legal corpora

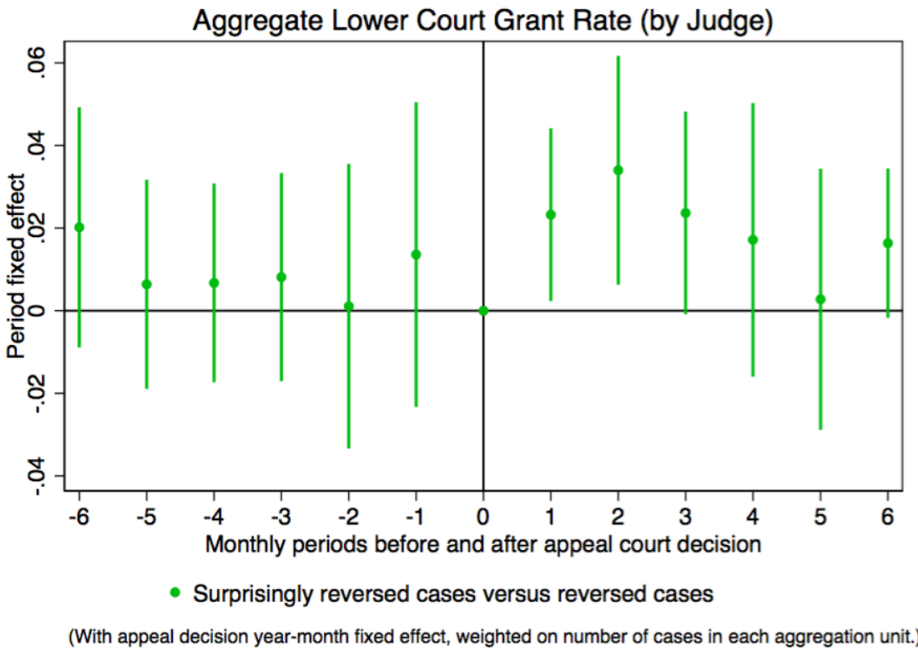
Lessons

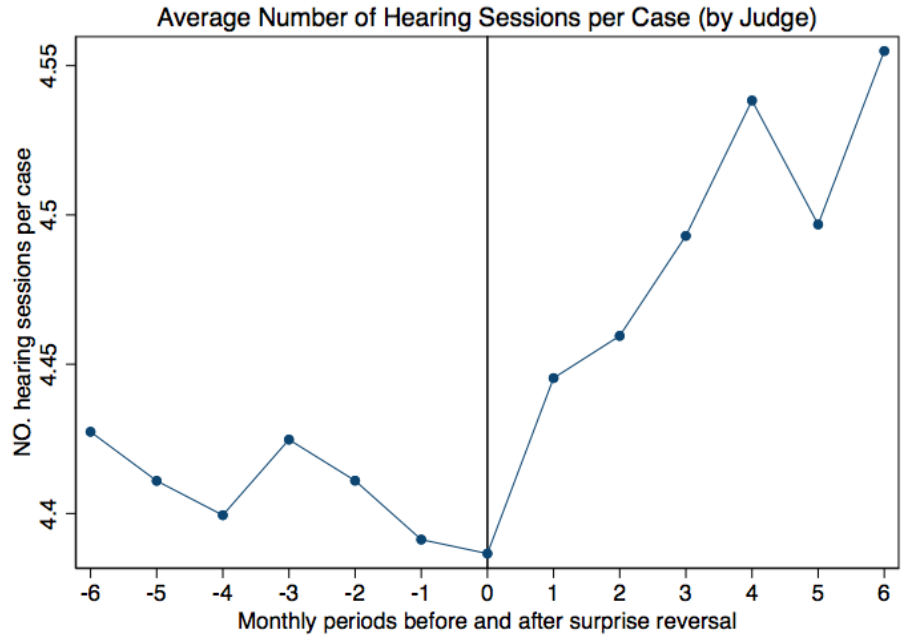
- Listening
  - understanding their goals and aligning to their incentives
  - quantum use, LTE, mediation assignment
- Flexibility
  - within-app, advertising of
- Trust
  - win-win, attention, fluent / fluid communication
  - interactions as equals
- Present new opportunities
  - that they didn't think were possible with their datasets
  - shinyapps, decision-support, information exchange of best practices
- Finding the right teams interested in collaborating/innovating
- Currents in scientific literature / Curiosity
  - different theories of imparting empathy, self-reflection
- Openness to new collaborations/learning
  - irregular migrants
- Funding
  - Peru, Kenya

Strengths of DE JURE Program @ DIME

- Design
- Deploy
- Evaluating effects of justice reforms
- Developing technologies to do so
- Dialogue with country partners
  - Look forward to hearing how this model synergizes with your work

After "Surprise" Reversals, Judges Grant More Asylum and Hold More Hearing Sessions

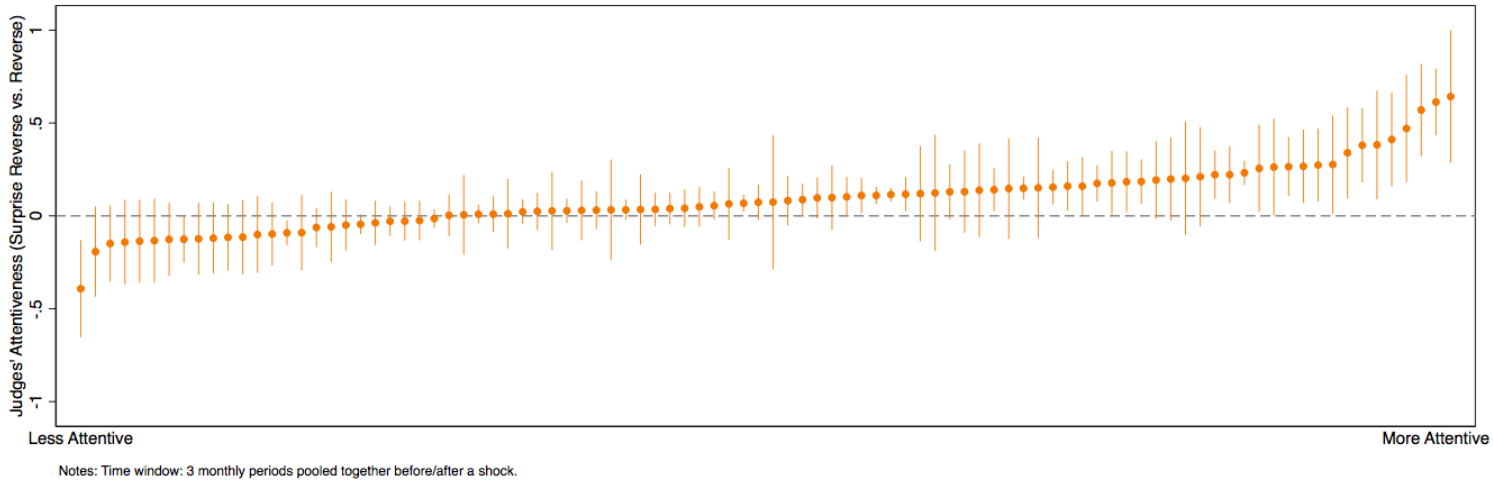




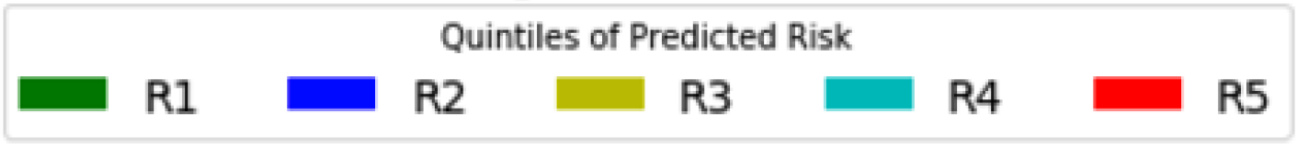
Surprise Reversal is a reversal of a decision that was predicted to be "Affirm"

See also *Posner, HUP 2010*

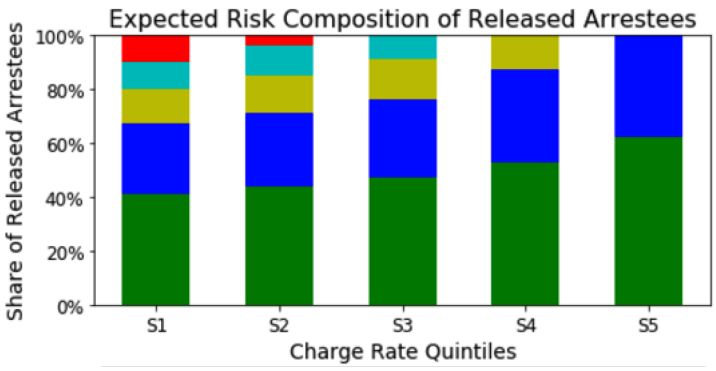
Judges Vary in Responsiveness to Reversal



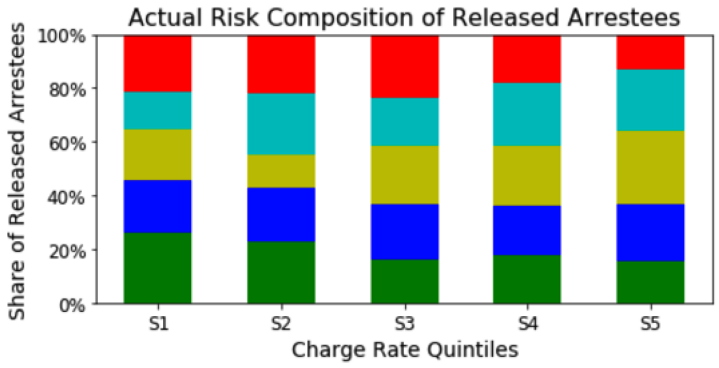
Do less attentive judges have implicit risk rankings closer to random?



Robot Prosecutors



Human Prosecutors



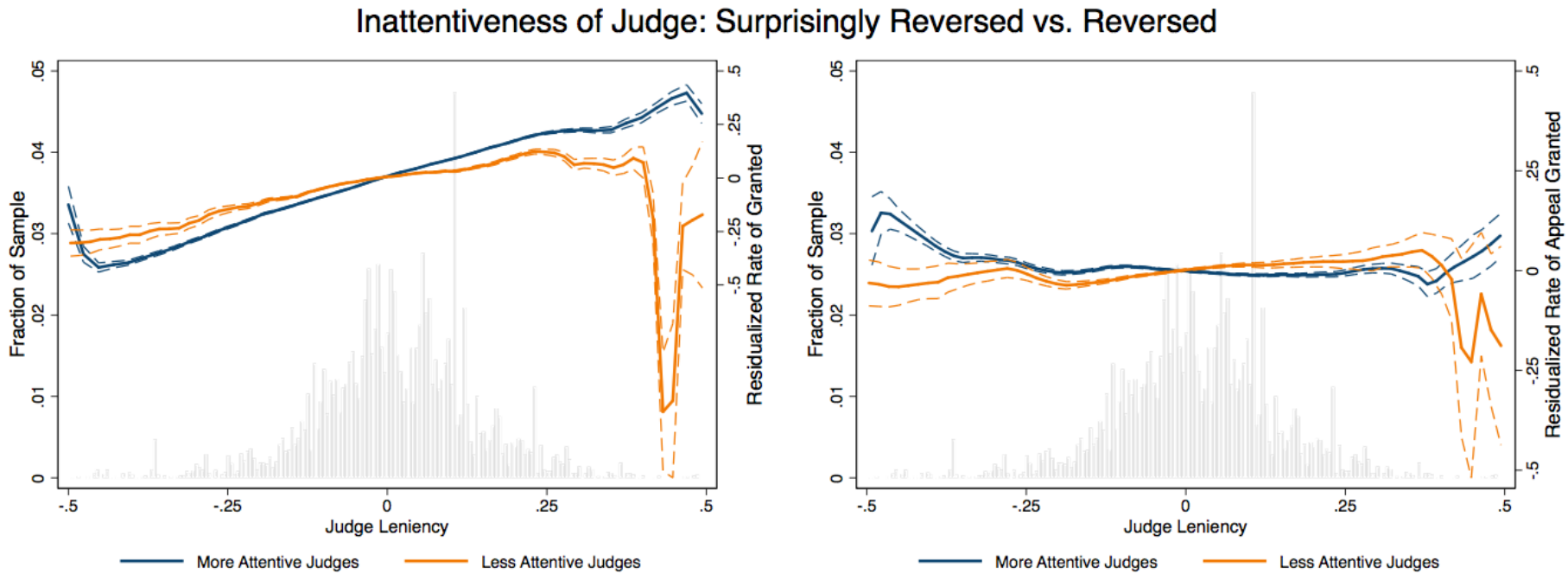
- If defendants released based only on risk score, the harshest prosecutors would only be releasing low-risk defendants.
- Distribution of risk scores for released defendants is similar for most lenient and least lenient prosecutors.

- Are the lenient asylum judges, only denying the 'riskiest' applicants
  - i.e., seeing the lowest reversal rates (of their asylum denials)?

See also *Kleinberg, Lakkaraju, Leskovec, Ludwig, Mullainathan, QJE 2017*

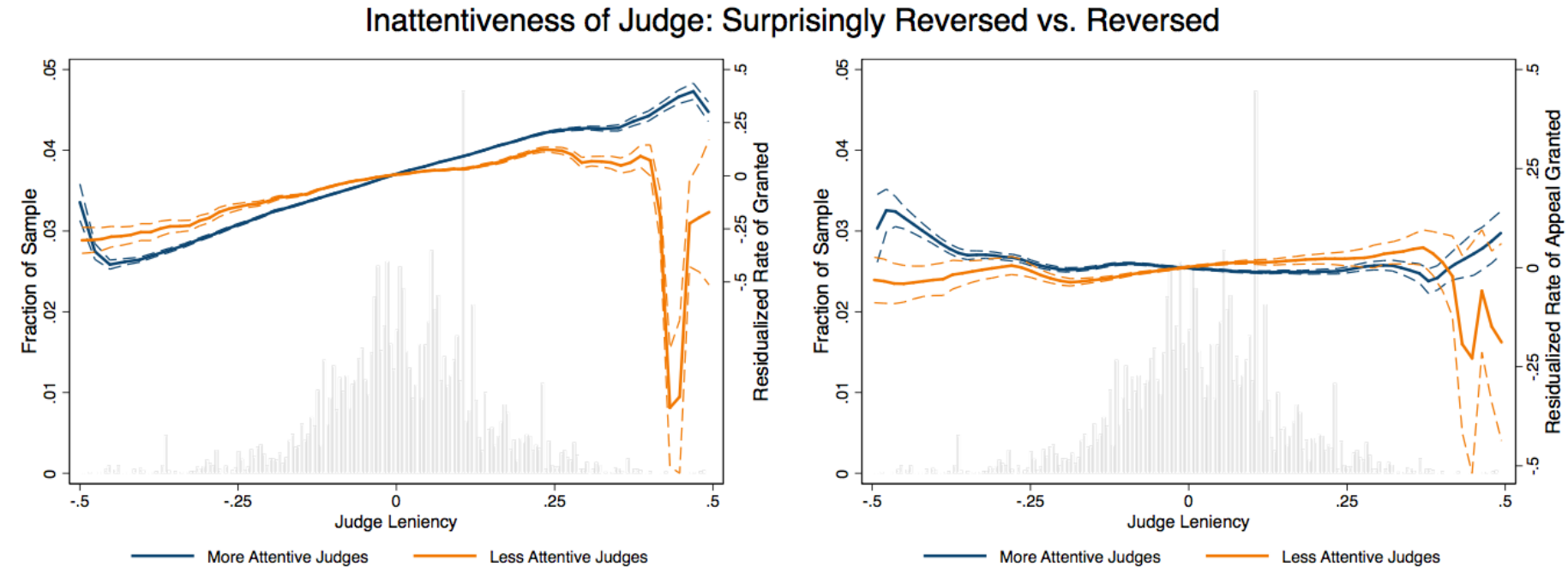
Left Figure: Judges have strong habits

A judge who is generally lenient in other cases is likely to be lenient in a given case



(Time window: 3 monthly periods pooled together before/after shock. More attentiveness: the coefficient of interaction of surprisingly reversed dummy and time-period dummy is bigger)

Right Figure: Assess implicit risk ranking

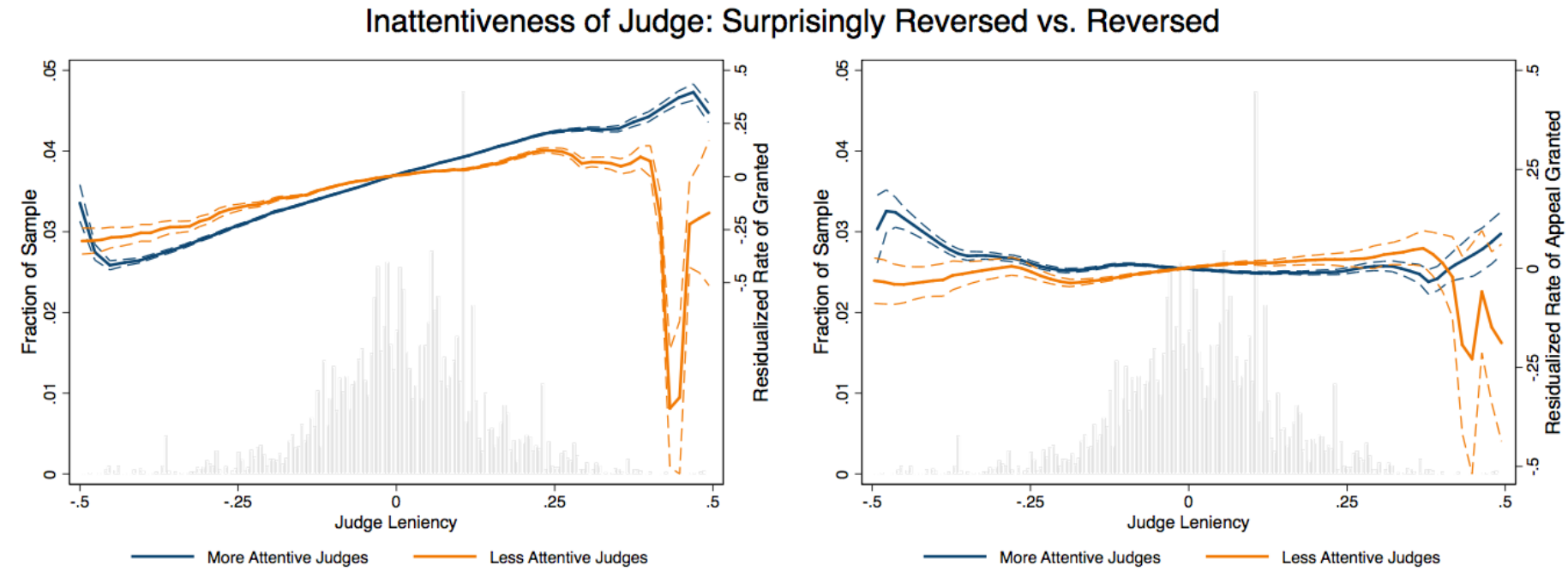


(Time window: 3 monthly periods pooled together before/after shock. More attentiveness: the coefficient of interaction of surprisingly reversed dummy and time-period dummy is bigger)

If judges are 'ordering' their asylees, the most lenient judge letting in the most applicants should be rejecting only the "least safe" applicants

Their appeal success should be lower, which we see among more attentive judges

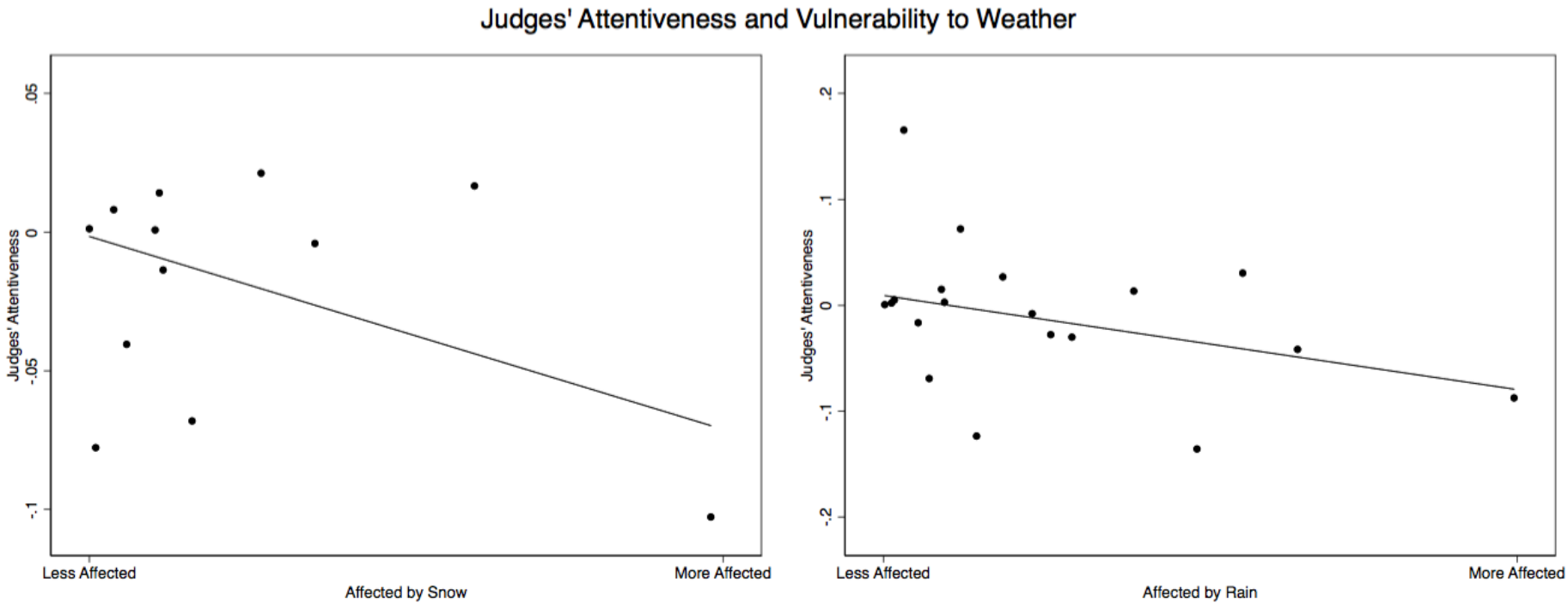
.. but not less attentive judges



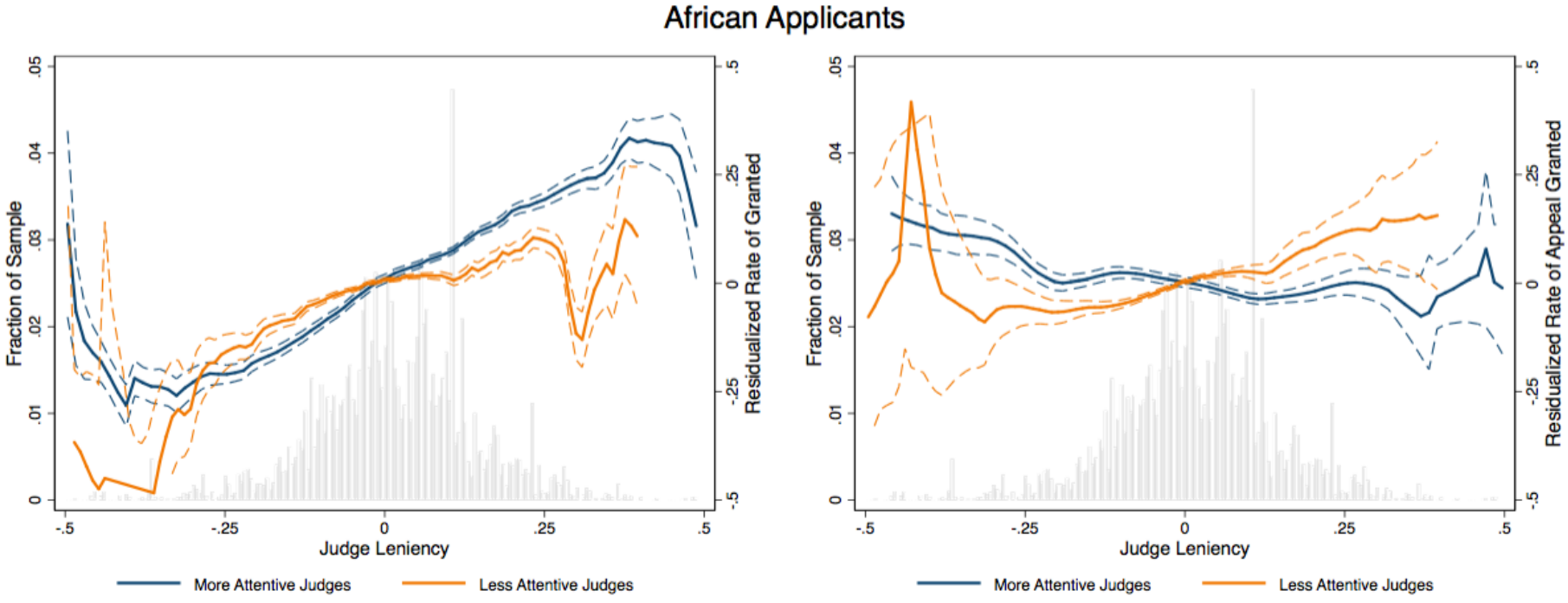
(Time window: 3 monthly periods pooled together before/after shock. More attentiveness: the coefficient of interaction of surprisingly reversed dummy and time-period dummy is bigger)

.. who may be more prone to other extraneous factors

.. such as weather



Difference in Indifference for asylees from the Global South



See also *Arnold, Dobbie, Yang, QJE 2017*

Judicial Analytics for Recognition and Dignity

- Cognitive science and psychology suggests that humans have limited and imperfect reasoning capacities (Tversky and Kahneman 1986; Eyster 2019)
- Gambler's fallacy, mood, time of day, order, ...
  - highlight fragility of courts
    - ★ "In a crowded immigration court, 7 minutes to decide a family's future" (Wash Post 2/2/14)
- Policy discussion tends to revolve around having AI replace humans or suggest the optimal decision
- Consider instead an incremental approach that shows decision-makers their predicted self and then uses predictions of error to nudge

Stage 1: Predicted Self

- In Stage 1, people use AI as a support tool, speeding up existing processes (for example, by prefilling forms)
  - An AI-based recommender system offers a decision-maker the best prediction of themselves, based on their previous decision-making, from a model using only legally relevant features X.
    - ⋆ assess judges vs. their predicted self
  - (1) Increase consistency across similar cases by offering the relevant reference points and cabining the influence of extraneous factors.
  - (2) Seeing the predicted self leverages self-image motives of pro-social decision-makers (Benabou and Tirole QJE 2011).
  - (3) Deviating from defaults facilitates conscious deliberation.
- self-image (predicted self)

Stage 2: Prediction of Error

- A deviation that is more likely to render an error (from a model using all available features X and W) can be accompanied by a nudge to "be more attentive" or spend more time to make a better decision.
  - (1) A nudge, instead of a checklist, might impose less bandwidth.
  - (2) Save time and energy to focus on novel, complex cases.
- self-improvement **(nudges)**

Stage 3: Explanations

- A decision-maker may want interpretable machine learning **and** request a reason for why the deviation may lead to mistakes.
  - (1) Stage 3 elevates the AI to the role of a more general coach, providing feedback on choices.
  - (2) The more people feel that their autonomy is protected and that they are in control of the conversation—able to choose when feedback is given—the better they respond to it. (West and Thorson 2018)
- self-understanding (why)

Stage 4: Dialogue

- Of course, it is always possible that the AI system's suggestion would not take into account some reliable private information that the decision-maker might have access to.
  - Where this happens, the AI system would be steering the decision-maker off course rather than correcting for their inconsistencies.
  - Therefore, a dialogue, encouraged between the decision-maker and the AI system, allowing for the AI to learn from the user as well.
- self-expression (autonomy)

Stage 5: Community of Experts

- AI brings in other people's decision histories and patterns, serving as a platform for a community of experts.
  - A decision-maker may want to access a community of experts by seeing what the algorithm predicts other to do.
  - This can be accessible as a dropdown menu, to seek advice from a particular decision-maker,
    - ★ or as a statistical distribution to protect privacy.
- community of practice (self vs. others)

Stages 6+

- Stage 6, experts advised it helps train novices
  - who tend to make more mistakes
  - experts can input a preferred decision
  - or use prediction if appealed
- Stage 7, WebMD for litigants, increasing access to justice
  - and transparency & accountability
- Stage 8, use feedback from dialogue stage as recommender system
  - with A|B testing to generate personalized causal inference

Addresses Common Criticisms of AI in Law

- Reduces Bias
  - Assess judges vs. their predicted self
- Increase Autonomy
  - Support tool / default
- Enhance Learning
  - Pointing out when predicted to error + community of practice
- Explainable Transparency
  - Interpretable ML
- Incorporate Private Information / Changed Circumstances
  - AI can ask why user deviates

Empirical Challenges

Medicine, prior to clinical trials

Theories about the effects, but no causal evidence (a century ago)

Randomizing judicial decisions

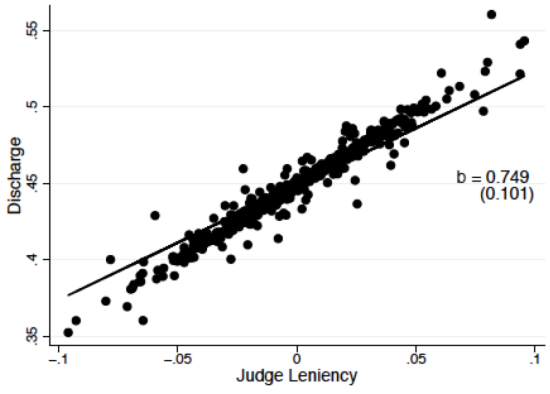
Violates our notion of justice (equal treatment before the law)

Randomizing judicial assignment

Generates retrospective "clinical trial" (Kling AER 2006; many since "credibility revolution" in economics)

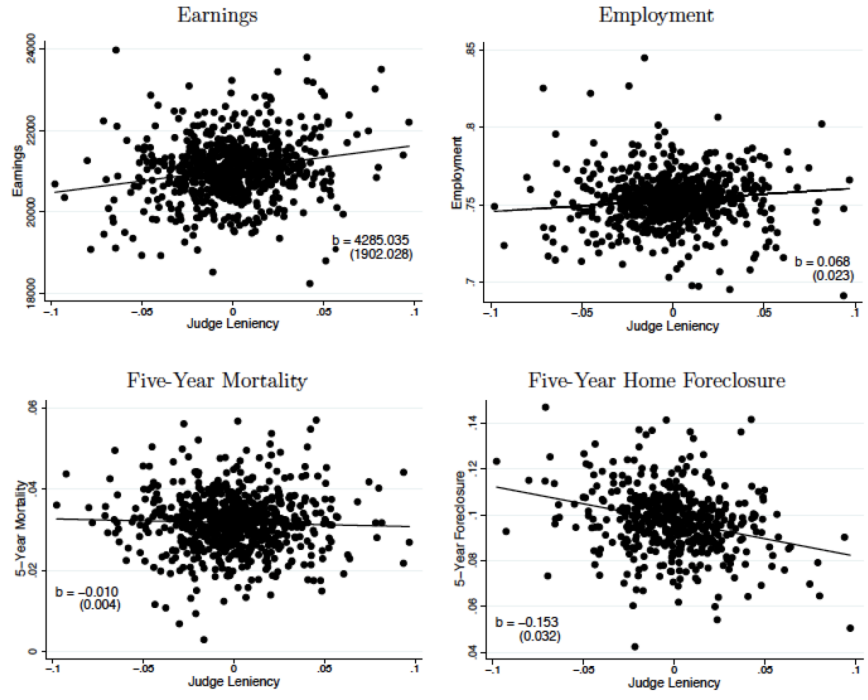
Debt Relief and Debtor Outcomes (AER Dobbie 2014)

Figure 1
Chapter 13 Judge Leniency and Chapter 13 Bankruptcy Protection



Notes: This figure plots Chapter 13 discharge vs. our leave-one-out measure of judge leniency. The sample consists of all first-time Chapter 13 filers between 1992 and 2005 in the 42 offices that randomly assign filings to judges. Judge leniency is the leave-one-out mean rate of granting Chapter 13 bankruptcy protection for the assigned judge minus the leave-one-out mean rate of granting bankruptcy protection for the court in the same filing year. To construct the binned scatter plot, we first regress an indicator for discharge on office by month-of-filing fixed effects and calculate residuals. We then take the mean residual in each judge by year bin, adding the mean discharge rate to each residual to aid in the interpretation of the plot. The solid line shows the best linear fit estimated on the underlying micro data estimated using OLS. The coefficients show the estimated slope of the best-fit line including office by month-of-filing fixed effects, with standard errors clustered at the office level reported in parentheses.

Figure 3
Chapter 13 Judge Leniency and Labor Supply, Mortality, and Home Foreclosure

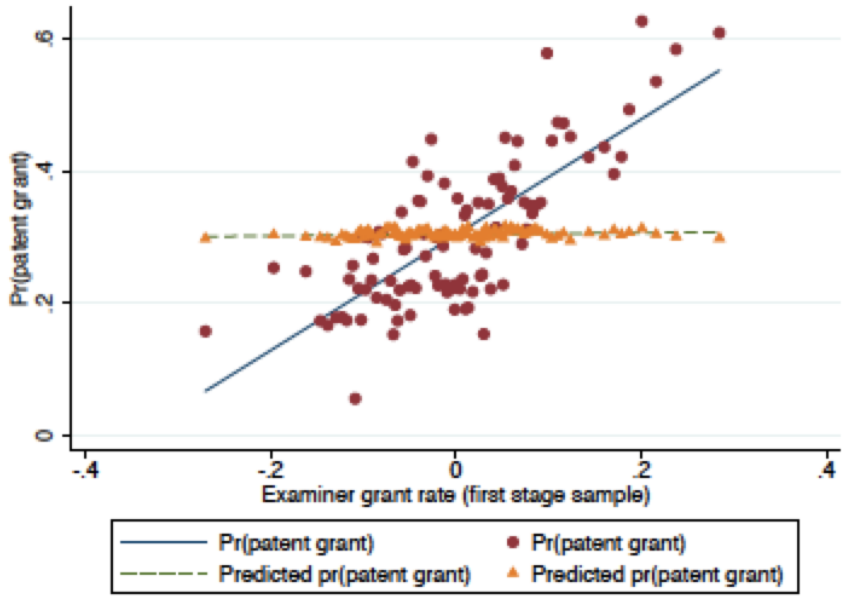


Notes: These figures plot earnings, employment, five-year mortality, and five-year foreclosure vs. our leave-one-out measure of judge leniency. The earnings and mortality sample includes all first-time filings between 1992 and 2005 in the 42 offices that randomly assign cases to judges. The foreclosure sample includes the subset of those filings originating in county by year bins with foreclosure data coverage. Judge leniency is the leave-one-out mean rate of granting Chapter 13 bankruptcy protection for the assigned judge minus the leave-one-out mean rate of granting bankruptcy protection for the court in the same filing year. To construct the binned scatter plot, we first regress each outcome on office by month-of-filing fixed effects and calculate residuals. We then take the mean residual in each judge by year bin, adding the mean discharge rate to each residual to aid in the interpretation of the plot. The solid line shows the best linear fit estimated on the underlying micro data estimated using OLS. The coefficients show the estimated slope of the best-fit line including office by month-of-filing fixed effects, with standard errors clustered at the office level reported in parentheses. Earnings are winsorized at the top and bottom one percent. Employment is an indicator for non-zero wage earnings on the W-2. All monetary values are expressed in real 2000 dollars. Mortality is an indicator for being deceased in or before the indicated year using information from the Death Master File. Foreclosure is an indicator for a filer's home receiving a notice of default, receiving a notice of transfer or sale, or being transferred to a REO or a guarantor in or before the indicated year.

↑Earnings, ↑Employment, ↓Mortality, ↓Foreclosure

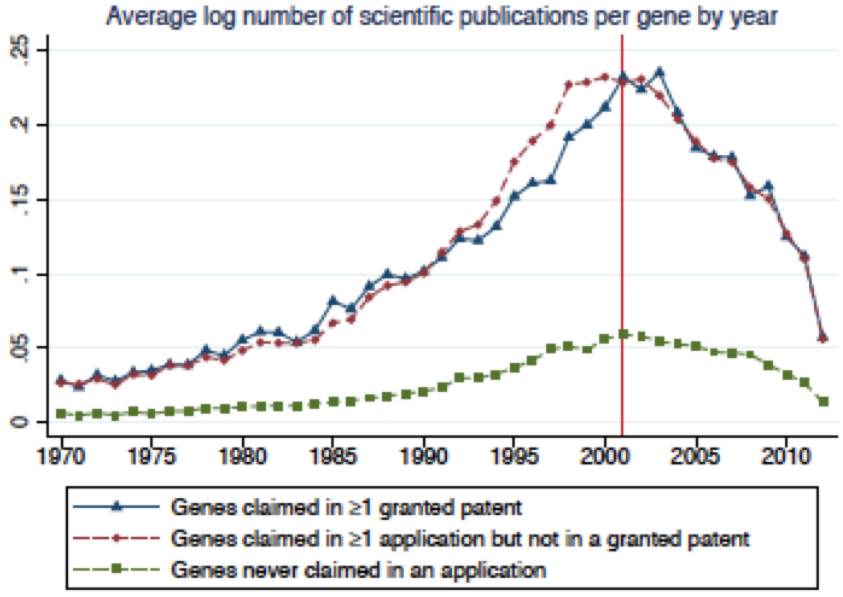
Patents examiners have strong habits (AER Sampat and Williams 2019)

Figure 3: **Probability of Patent Grant by Examiner Leniency**

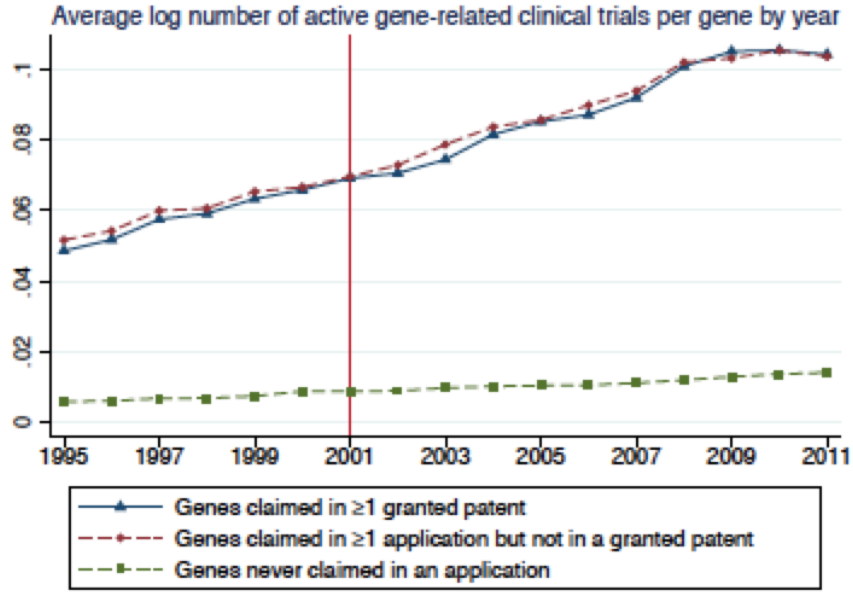


Notes: The figure relates our examiner leniency measure, residualized by Art Unit-by-application year fixed effects, to two variables: (1) the patent grant rate and (2) the predicted patent grant rate, where we predict patent grant as a function of our two measures of patent value fixed at the time of application (patent family size and claims count). All measures are constructed in our first stage sample (N=14,476).

Genes accepted & rejected for patents are similar



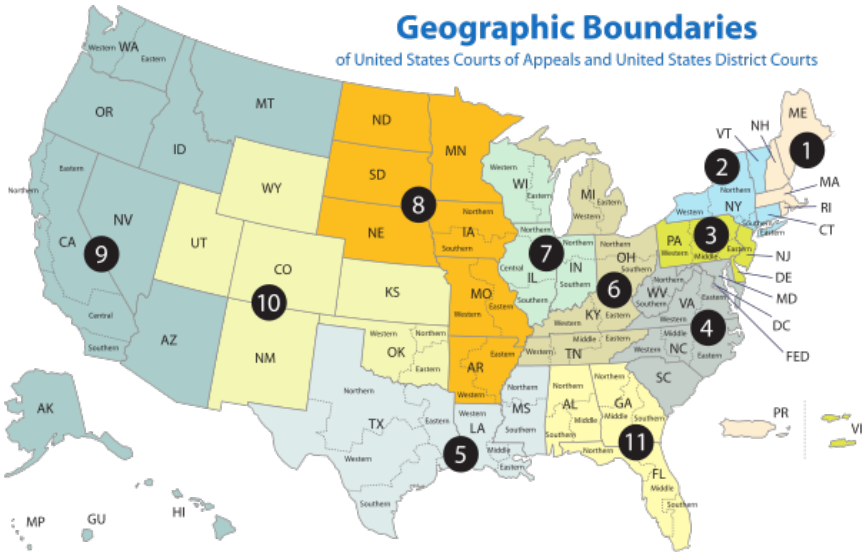
(b) Gene-Level Scientific Publications



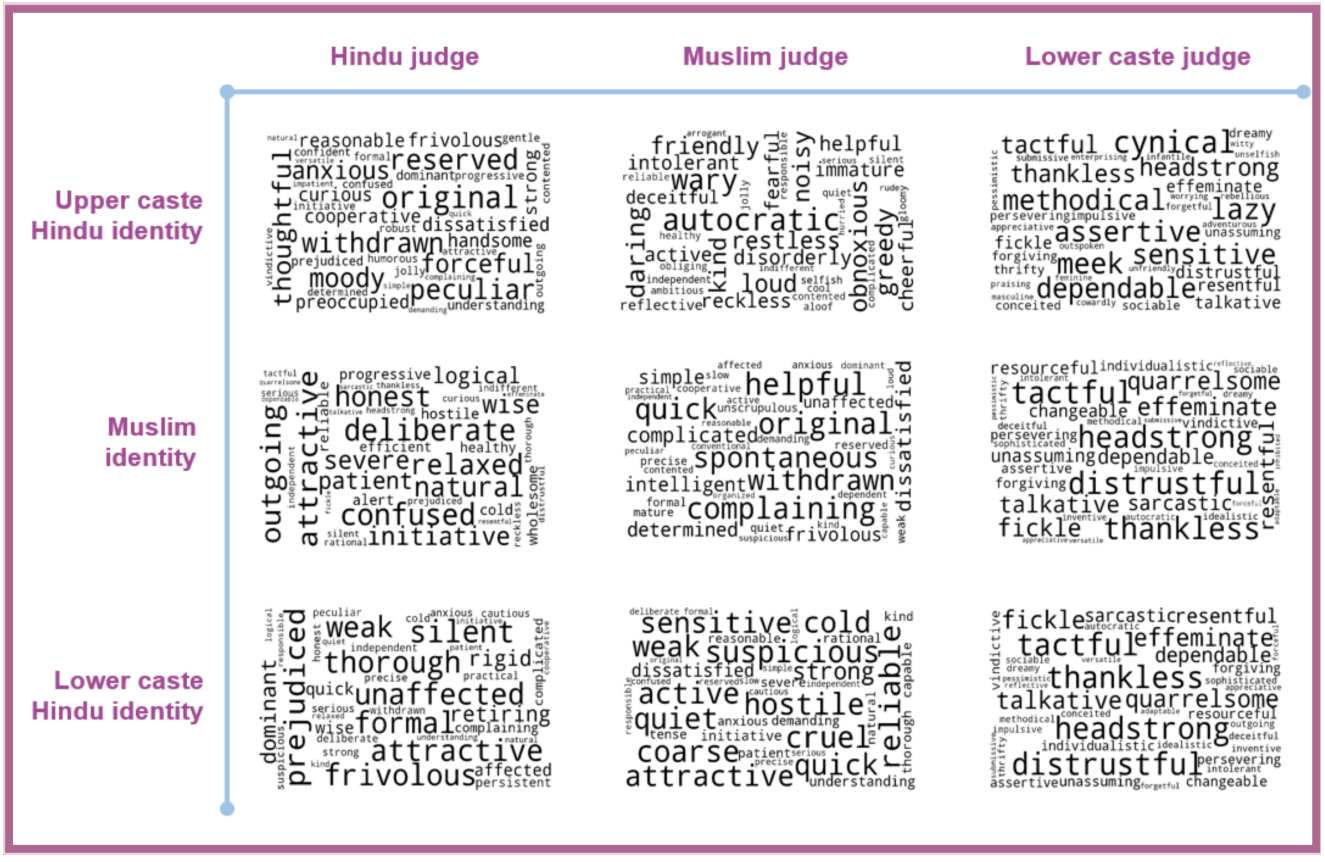
(c) Gene-Level Clinical Trials

Notes: This figure plots trends in patenting and follow-on innovation by year separately for three groups of genes: genes claimed in at least one granted patent; genes claimed in at least one patent application but never in a granted patent; and (in Panels (b) and (c)) genes never claimed in a patent application. The figure is constructed from gene-level data. Panel (a) documents the share of genes receiving a patent grant by year; by construction, this is zero for the circle-denoted red dashed line in all years and reaches one for the triangle-denoted blue line in 2010; the intermediate years simply illustrate the time path of patent grants between 2001 and 2010 for the triangle-denoted blue line. Panel (b) uses gene-level scientific publications as a measure of follow-on innovation and plots the average log number of scientific publications by year in each year from 1970 to 2012. Panel (c) uses gene-level clinical trials as a measure of follow-on innovation and plots the average log number of clinical trials by year in each year from 1995 to 2011. The vertical line in the calendar year 2001 in Panels (b) and (c) denotes that, because this figure focuses on patents that were filed in or after November 2000, all years prior to 2001 can be considered a pre-period and used to estimate the selection of genes into patenting based on pre-patent filing measures of scientific research (publications) and commercialization (clinical trials).

Random Variation in Precedent



- **Random** assignment of judges
  - Judge characteristics **predict** decisions
- Binding precedent **within** circuit
  - 98% of decisions are final



Preliminary evidence that Hindu judges describe the Hindu identity more positively

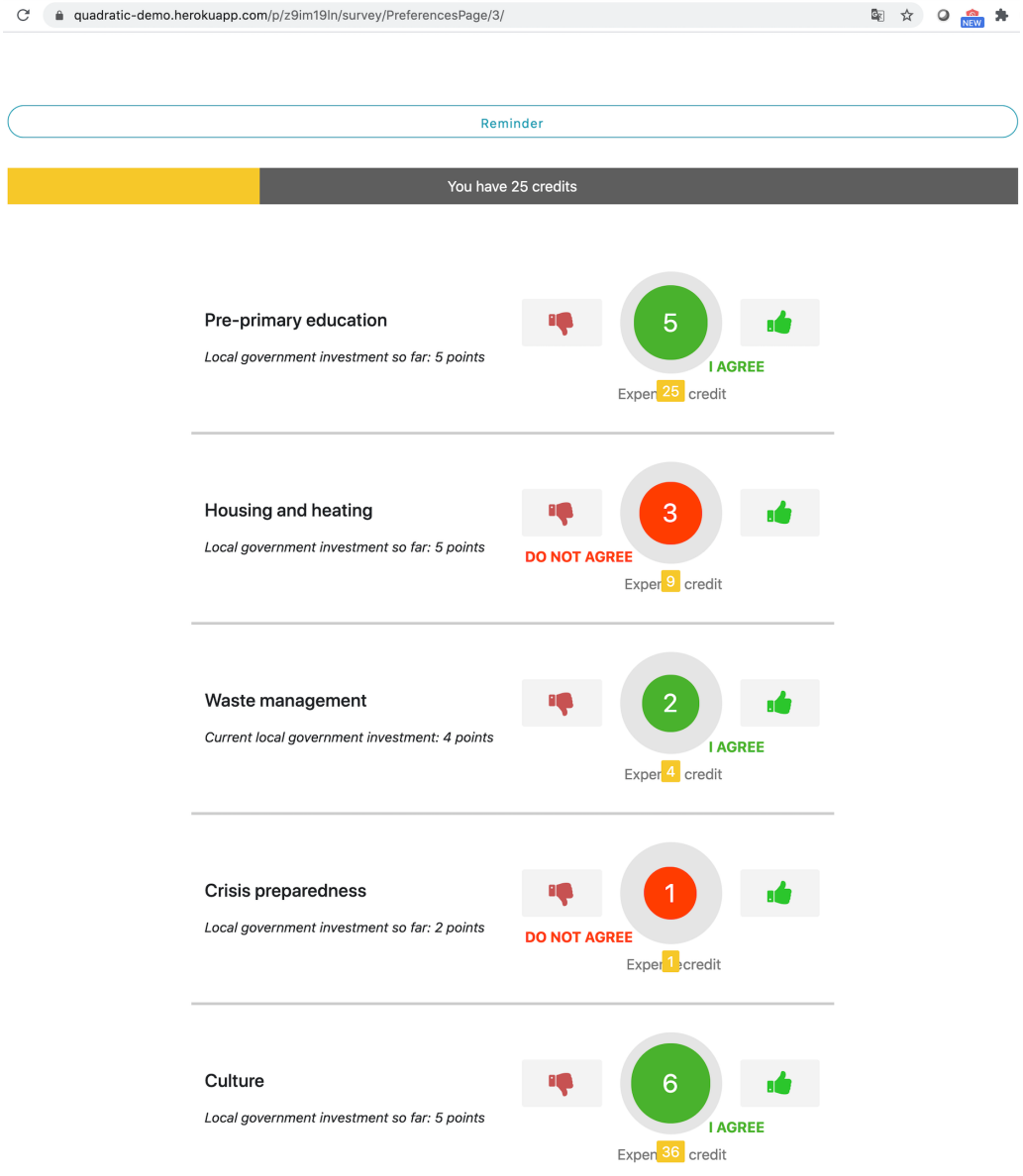
SC/ST judges describe Muslims more negatively

- Can we measure "missing cases" and access to justice? (if so, how?)
- Can we measure impact of justice on confidence in law? (if so, how?)

Can we move beyond likert scales of user satisfaction?

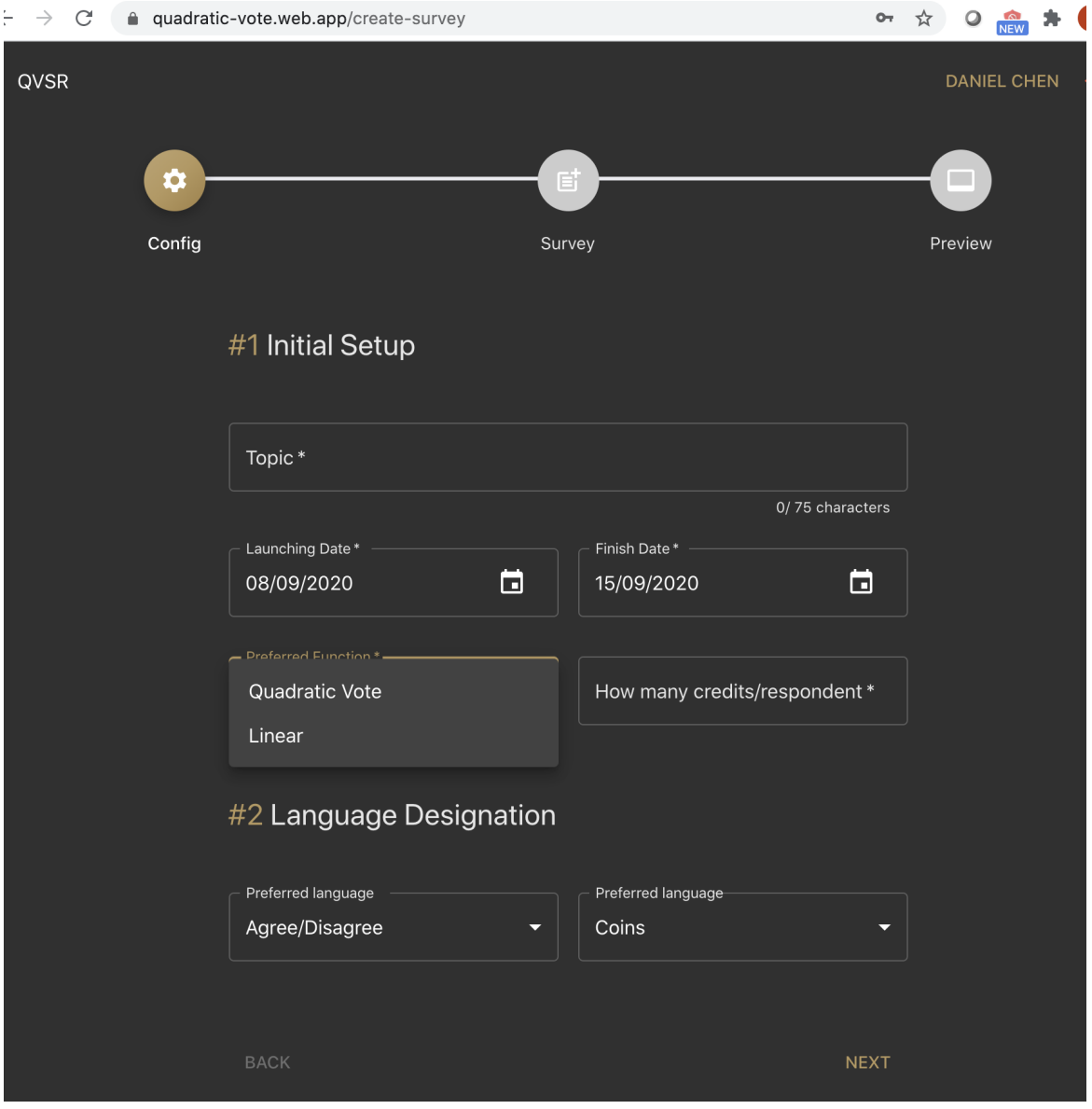
Quadratic Voting for Surveys

Estonian IE of public-facing dashboard for local government accountability

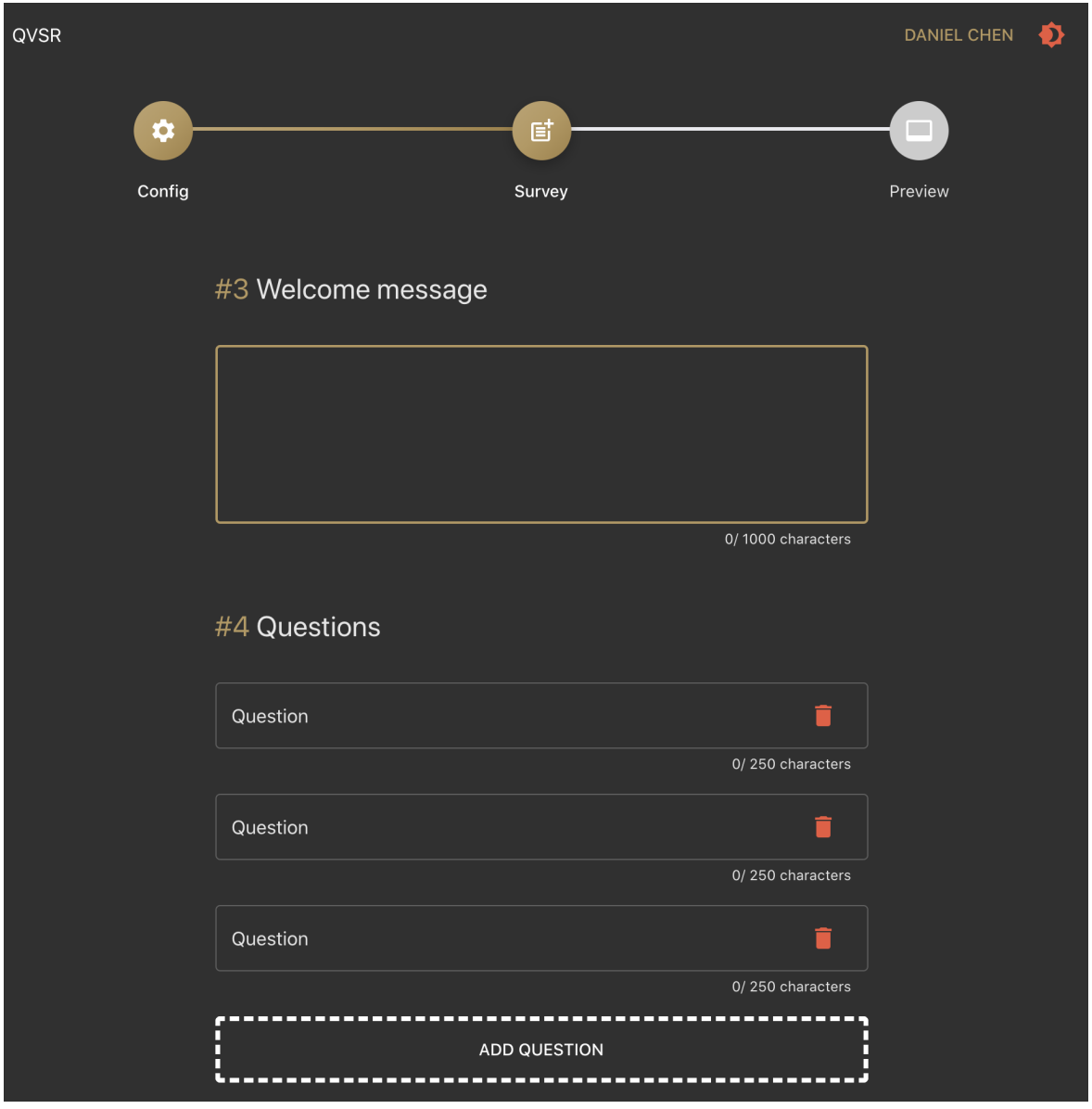


Self-service Quadratic Voting

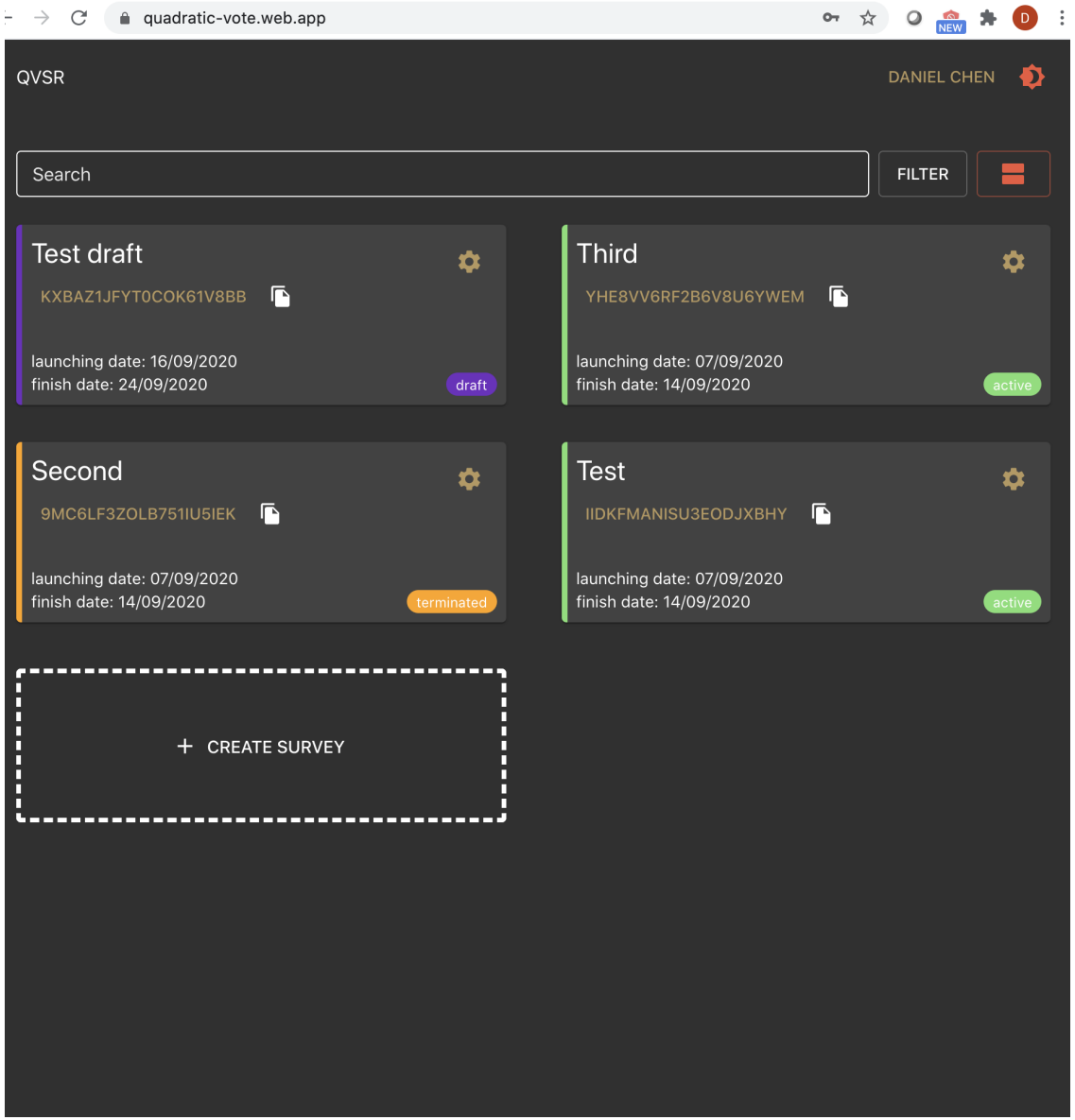
Giving civil servants and citizens the ability to ask questions of each other



Self-service Quadratic Voting



Self-service Quadratic Voting



- Kenya: Propose measuring court satisfaction to better target infrastructure improvements

Open-source platform for lab, web, and field experiments

(*Journal of Behavioral and Experimental Finance*, Chen, Schonger, Wickens 2016)

www.oTree.org

- Estonia, Peru, Pakistan, France
  - allowing interactive experiments, socially-distanced
- Czech: Measure trust in the law (through revealed preference questionnaires)
  - Does trust correlate with legal compliance?
  - Do revealed preferences predict recidivism beyond psychometric surveys?

Looking Ahead

- Country counterparts have asked
  - e-arbitration
  - AI for scheduling
  - AI in civil justice (to manage evidence)
  - blockchain technologies for follow-up of compliance of cases
  - online judicial auction platform (ebay for bankruptcy judges)

Training

- Theory vs. case-based teaching (diff-in-diff)
  - vs. personalized case-based teaching - using own decisions (digital module RCT)
- Social-emotional learning interventions (15 minute self-reflection writing exercises)
  - self-affirmation, advice giving (RCT treatment vs. control treatment)
  - advice displayed to new judges who evaluate two random writings (RCT)
- Monitoring & debrief $\approx$ "community of practice"
  - of teachers (RCT)
- Algorithmic search
  - do off-the-shelf search algorithms lead to polarization vs. de-polarization ML (RCT)
- Legal Aid / Mediation
  - knowledge of one's effectiveness as public defender (RCT)