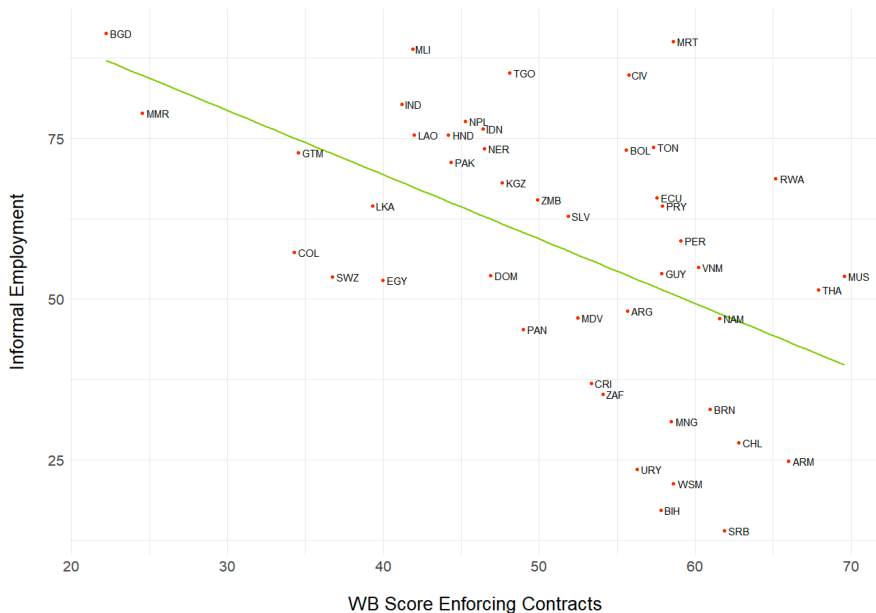


DE JURE (Data and Evidence for Justice Reform)

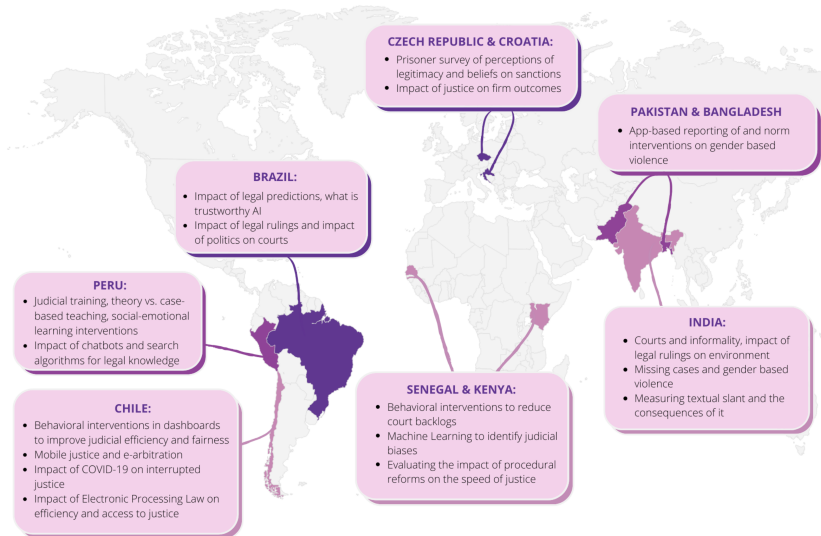
Innovations in Data with Policy Implications

Daniel L. Chen, Manuel Maqueda, and Sandeep Bhupatiraju

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



Ministarstvo pravosuđa

SI 1.2. Statistika troškova u borbi protiv korupcije po godinama i na delatnostima po vrsti postupka

Godina	Delatnost	Postupak	Broj postupaka	Prosječna vrijednost	Ukupna vrijednost
2017	...	...	...	...	...
2018	...	...	...	...	...
2019	...	...	...	...	...

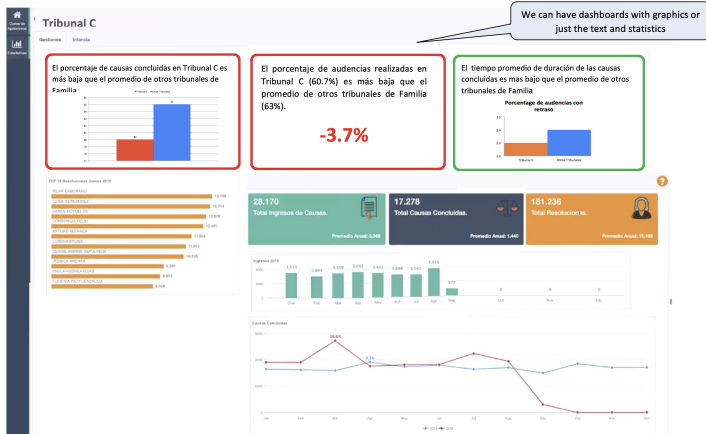
CROATIA

- 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

Personalized Interventions

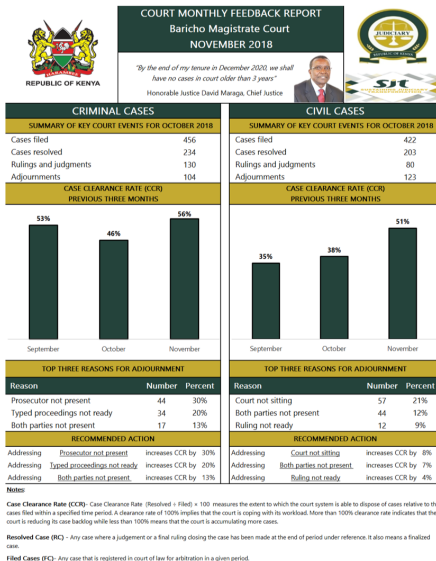
This kind of data can be used to personalize interfaces for judges.

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



Recommending Actions

Lending Agreement with Kenya: Judicial Performance Improvement (P105269)



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

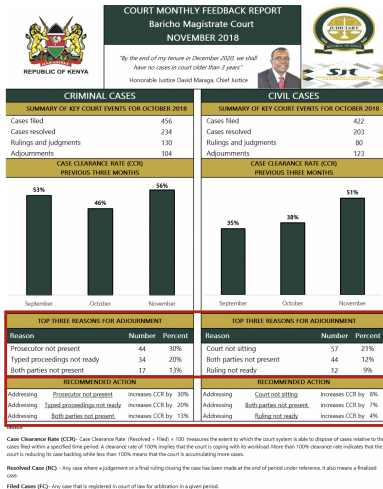
- Nation-wide experiment using the first digitized daily court records
 - ▶ Developed an algorithm to identify the greatest source of court delays
 - ▶ T1: provide actionable information
 - ▶ T2: + accountability (one-pager also sent to Court User Committees)
 - ▶ Control: status quo (no information),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

Data-Driven Recommendations

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

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



Analyze and present correlates of delay

Accountability reduced adjournments

.. especially initiated by the judge.

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

Starting Oct 2020, 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

Social-Emotional Learning Exercises - Advice Giving & Grading

localhost:8000/p/c7hms2sh/- x +

localhost:8000/p/c7hms2sh/self/Review1of2/12/ Incognito

Como recordará, usted respondió a la siguiente pregunta en el ejercicio de autoreflexión: "Dedique entre 15 y 30 minutos a reflexionar y escribir sobre un momento en que no cumplió las expectativas como juez o fiscal.". Abajo encontrará las respuestas a la misma pregunta de otros discentes. Cuando termine de leer dichas respuestas, por favor elija la que prefiera pulsando "PREFIERO ESTA" y luego pulse "Siguiente".

Las veces en que no cumplí como magistrado fueron las oportunidades en las que, por ejemplo, no cumplí con resolver un caso a tiempo, dentro del plazo previsto. Precisamente, la mora era y es un problema que, también, me alcanza. En ese sentido, muchas veces, los magistrados "justificamos" la demora en resolver los casos pendientes, basados en el exceso de carga laboral, sin considerar que al otro lado hay personas pendientes de respuesta y que la demora les causa no solo un perjuicio económico sino también emocional, lo que constituye un mero pretexto que busca justificar nuestra falta de capacidad de gestión y de acción en la resolución de los casos; o, de justificar que perdemos muchas veces nuestro valioso tiempo en cosas secundarias (dentro del despacho) en lugar de enfrascarnos en resolver cada uno de los casos puestos a nuestro conocimiento; o, el tiempo que perdemos "dándole vueltas" a un caso, buscando escribir "bonito" sobre abundando en citas cuando lo realmente importante es resolverlos de una buena vez; y, sobretodo, haciéndolo de manera clara y sencilla, con una redacción comprensible. Así pues, creemos ciegamente de que cuanto más complicada sea una resolución, ésta se encontrará mejor hecha; sin embargo, en ese tonto afán hemos terminado olvidándonos de los justiciables y de lo que es importante para ellos.

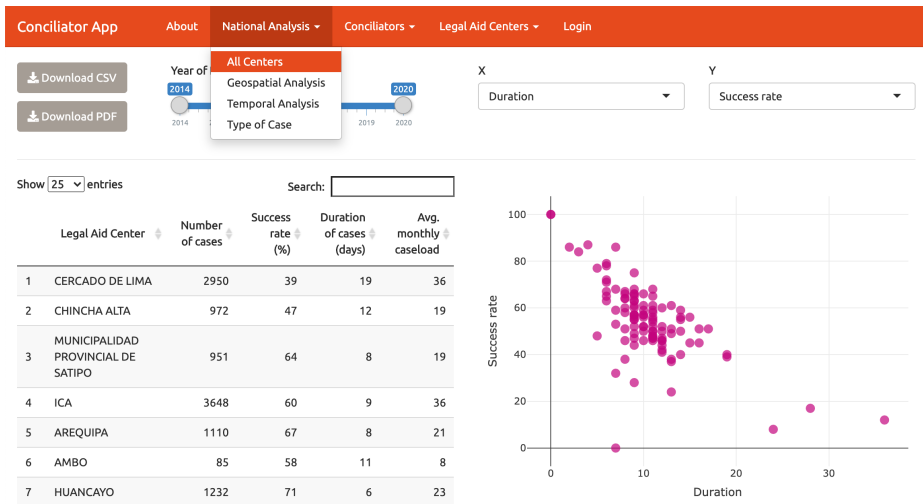
PREFIERO ESTA

Al sentenciar, emitimos pronunciamientos dirigidos a las partes procesales, las cuales muchas veces son ciudadanos comunes sin conocimientos de leyes; por ello deberíamos buscar que nuestras resoluciones no solo sean emitidas de manera celeré, sino que además contengan una redacción simple que sea comprendida por estas; sin embargo, considerando que los magistrados nos encontramos bajo el ojo vigilante y formalista de la Junta Nacional de Justicia (antes CNM); muchas veces he sentido que nos vemos obligados a dejar de lado esa simplicidad y practicidad como fin principal en nuestros pronunciamientos, para pasar elaborar resoluciones llenas de considerandos con citas bibliográficas que satisfagan las exigencias del ente calificador de nuestras decisiones (CNM, hoy JN.J). La experiencia que tenemos los magistrados, es que son mejor valorados estos pronunciamientos muchas veces saturados de citas y referencias bibliográficas, que aquellos que de manera concreta desarrollan el aspecto jurídico y buscan que las partes entiendan el fundamento de nuestra decisión. Considero que esto, es una de las causales por las que la sociedad cuestiona y no encuentra conformidad en muchas de las decisiones emitidas por nosotros los magistrados, pues encuentran en nuestras decisiones muchas veces términos que son ajenos a su entender. Y esta es una práctica que, ha sido fomentada en la escrituralidad y por nuestra propia responsabilidad, no es erradicada.

PREFIERO ESTA

Siguiente

Recommending Actions to Each Other



OR, AS MANAGEMENT TOOL, OBSERVING REGRESSIONS THAT THEY RUN

Recommending Mediators

Mediation App

National ▾

Find a Mediator

Courts

Court:

MILIMANI ▾

Case Type:

CIVIL MATTER ▲

Case Type

CIVIL MATTER

CONSTITUTIONAL MATTERS / HUMAN RIGHTS

CUSTODY & MAINTENANCE (CHILDREN)

DIVORCE & SEPARATION

EMPLOYMENT AND LABOR CASE

ENVIRONMENT & LAND MATTER

Mediator	Agreements (%)	Number of Cases Handled	Avg. Case Duration (days)	Current Caseload (all types)	email
Peter Mbugua Kiliru	50	4	69	1	pinkiru@gmail.com
Powell Maimba	0	3	0	3	powell.maimba@gmail.com
Hon. Morris Ozo	0	3	50	3	godepewa@gmail.com
Aasi 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	onditi@gmail.com
Samuel Muthi Mwera	100	2	14	2	unclesam714@yahoo.com
Charity Kaari Kanampio	100	2	32	2	charitykanampio@gmail.com
Everlyne Akinyi Owoso	100	2	96	2	evawoipo@gmail.com
Raphael Mwari	100	2	38	10	raphaelmwari@gmail.com
Tabitha Wangari Wairagu	50	2	34	0	twamwari@yahoo.com
Geoffrey K Njenga	50	2	80	0	grijenga2013@gmail.com
Jedida N. Muriyiri	50	2	164	0	jedidamuriyiri@gmail.com
Dr. Samson Muchelule	50	2	183	0	smuchelule@gmail.com
Geoffrey Njenga	50	2	82	1	grijenga2013@gmail.com
Ambrose Jebiwott Ngeny Bolt	0	2	50	0	boltrorse123@gmail.com
Jane Njeri Omyango	0	2	79	0	info@njerionyangoadvocates.com
Majna Mpagi	0	2	190	0	sufummediation@gmail.com
Fackson Wainaina Kapwe	0	2	51	1	facksonkapwe@gmail.com
Lucy Wangari Muhu	0	2	55	1	muhulucy4@gmail.com
Nemwel Mogere Atemba	0	2	57	1	nemwel@yahoo.com
Sabina Kavutha Mutiso	0	2	74	1	smutiso@yahoo.com
Jemima Wanza Kari	0	2	75	1	jemimah.kari@gmail.com
Tabitha K. Rutere	0	2	120	1	mapourlife2015@gmail.com
Njoki Kahiga	0	2	128	1	kinjokahiga@yahoo.com
Arthur Konye Igeria	0	2	135	1	arthurigeria@battorneyafrica.com
Christine Mwakali Kipsang	0	2	0	2	cmkadvocates@econet.co.ke
Rosemin Bhanji	0	2	0	2	ronemish26@gmail.com
Wilfred A. Mutubwa	0	2	0	2	willy@iduliah.co.ke
Edwin Ayanga Apacha	0	2	52	2	apachaedwin@gmail.com
Stephen Biko Adera	0	2	0	3	info@aderalaw.co.ke
Andrew Waruhu	100	1	0	0	waruhua@outlook.com
Chacha Lucas Matiko	100	1	20	0	chachaciri@gmail.com
Agnes Mueni Kioiko	100	1	43	0	amuenikioiko@gmail.com
Dr. Margaret Nthony Ngandu	100	1	43	0	margaretingandu@gmail.com
Eunice Njeri	100	1	48	0	njeri@njeriagachenuadvocates.com
Jackson Mocharia Githu	100	1	46	0	jmgadvocates@gmail.com
Raphael Shitaka Mwari	100	1	46	0	raphaelmwari@gmail.com
Kennedy Kitonga	100	1	49	0	kenkitonga@gmail.com

API to create own dashboards



Victim's defense, public defense, psychological support

Incentivize Case Logs

id=2.1107761.1047168567.1599579496-286649690.1592335228

Log Login

0 5 10

0 1 2 3 4 5 6 7 8 9 10

Enter the third case type

TODAS ▼

Describe the strategy you most used or found most useful (50 words or fewer).

How effective was this strategy toward reaching an agreement? (10 is the most effective)

0 5 10

0 1 2 3 4 5 6 7 8 9 10

Submit

Record and present correlates of improvement

TRANSFER LEARNING WITHIN AND ACROSS DECISION-MAKERS

Wiki-survey Structured Questions

.. IEs among lending agreement with Peru

Peru & Chile Improving the Performance of Justice Services (P162833, P173860)

Question: Can adaptive learning (advice giving & receiving) improve the performance of court actors and litigant wellbeing?



Intervention:

- Formalize advice-giving to dynamically generate an automated policy causal inference machine
 - Social-emotional learning exercises have been documented to improve intrinsic motivations, increase empathy and social identity with occupation
- Ask top performers to give advice to others
- Elicit structured questions for advice givers
- Log advice given to self to enhance record keeping
- Analyze impacts on decisions and disparities

IE design and timeline:

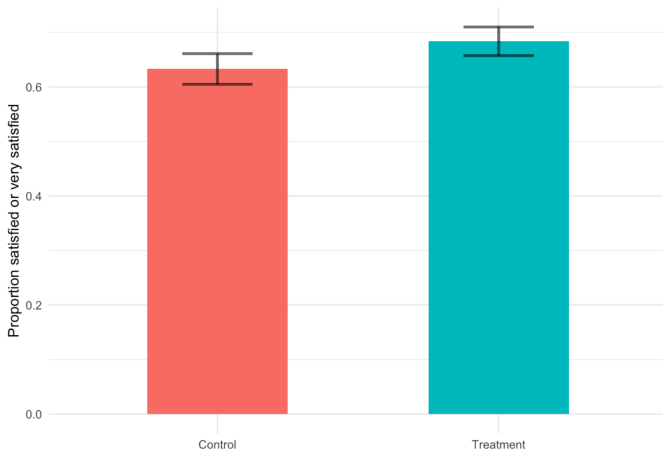
- Multi-arm Bandit Impact Evaluation
- 2020-

Key Feature : Lending agreement with Peru includes 3 impact evaluations (legal aid, judicial training, and electronic processing)

E-JUSTICE CAN IMPROVE EFFICIENCY AND ACCESS

Online Class Monitoring Improves Student Satisfaction

IE first requested by Peru: what is the effect of monitoring & feedback?



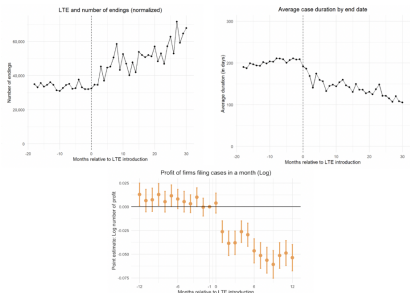
Monitoring + Debrief = "Community of practice" (*Etienne Wenger*)

What is the Impact of E-Justice?

IE first requested by Chile: what is the effect of electronic filing?

Peru & Chile Improving the Performance of Justice Services (P162833, P173860)

Question: Can technological innovations improve the performance of courts and the overall wellbeing of litigants?



Intervention:

- Electronic filing of cases (LTE) began in 2016
- Interrupted time-series analysis of LTE courts
- Total number of cases filed and resolved increased
 - Duration of cases significantly decreased
 - Even for non-spurious cases
- Smaller firms have greater access
- Next: What are the impacts on firms?

IE design and timeline:

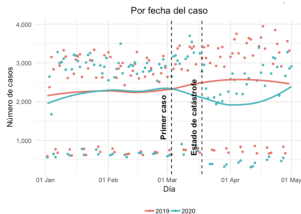
- Geospatial Impact Evaluation (GIE)
- 2020-

Key Feature : Electronic processing is a common policy intervention; covid accelerates development of e-justice solutions

E-JUSTICE MEETS SOCIAL DISTANCING NEEDS

.. like many other countries, Chile experienced

Decline in reported criminal cases amid COVID



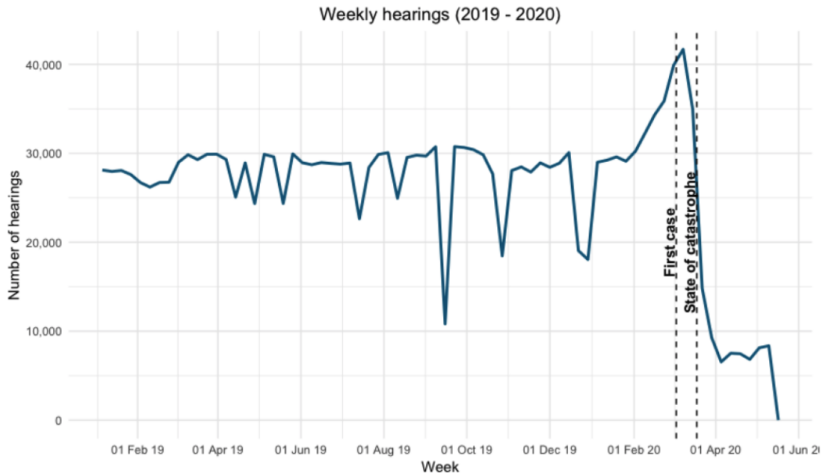
- Most common crimes fell during March and April relative to 2019.
- Theft experienced the largest decline.
- Rebound appears

- There was a significant reduction in crimes reported after the state of catastrophe took place.

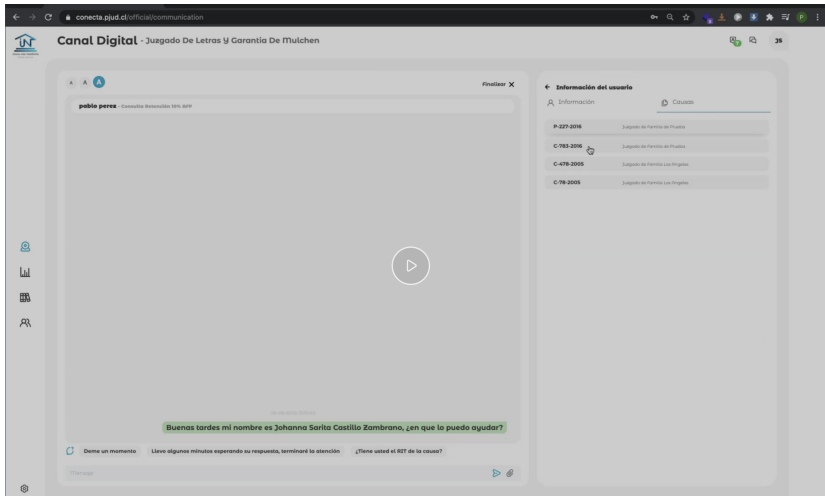
Cambio porcentual en el número de casos (2020 vs. 2019) - Delitos más comunes

Grupo de delito	Marzo	Abril
HURTOS.	-36.90	-50.37
DELITOS CONTRA LA FE PÚBLICA.	-21.80	-23.33
FALTAS	-19.91	-32.75
DELITOS CONTRA LA LIBERTAD E INTIMIDAD DE LAS PERSONAS.	-13.45	-20.48
DELITOS LEY DE TRÁNSITO	-12.02	-31.02
ROBOS NO VIOLENTOS.	-10.99	-21.60
OTROS DELITOS CONTRA LA PROPIEDAD.	-9.95	-31.21
LESIONES.	-5.39	-16.93
DELITOS ECONÓMICOS.	-1.88	-12.90
DELITOS DE DROGAS.	4.69	-14.11

.. and decrease in court activity



E-Justice during covid: Whatsapp



for Q&A with courts
video and audio also enabled

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

Canal Digital - Juzgado De Letras Y Garantía De Mulchen

Finalizar X

pablo peres • Consulta Resolvida 10% RFP

Buenas tardes mi nombre es Johanna Sarita Castillo Zambrano, ¿en que lo puedo ayudar?

Hola

Cómo están

Deme un momento Llevo algunos minutos esperando su respuesta, terminaré la atención

Documento (.docx)

Causa C-478-2005

Doc.	Núm.	Etapas	Trámite	Referencia	Fecha Trámite
	0	Terminada	Resolución	Archivar	03-12-2007
	0	Terminada	Resolución	Como se pide	27-10-2007
		Terminada	Escrito	Sin referencia	24-10-2007
	0	Sentencia	Resolución	Oficio Registro Civil	06-09-2007
	0	Sentencia	Actuación	Ejecutaria	06-09-2007
		Sentencia	Escrito	Sin referencia	31-07-2007
	0	Sentencia	Resolución	Reprobación Sentencia Corte	31-07-2007
	0	Sentencia	Resolución	Oficio Consulta Corte	14-05-2007
	0	Sentencia	Actuación	Resumen	12-05-2007
	0	Sentencia	Actuación	Notificación 04/05/07	07-05-2007
	0	Sentencia	Actuación	cumplase 04/05/07	07-05-2007
	0	Sentencia	Actuación	Resumen	01-03-2007
	0	Sentencia	Resolución	Consulta Corte	22-02-2007
	0	Sentencia	Resolución	Oficio Resumen	22-02-2007
	0	Audiencia de Juicio	Sentencia	Dictación de sentencia	01-02-2007
	0	Audiencia de Juicio	Resolución	Como se pide	31-01-2007

P-227-2016 C-763-2016 **C-478-2005** C-79-2005

documents are linked

Cases are linked across calls

.. and into the courts (DIGITAL INTEROPERABILITY)

Canal Digital - Juzgado De Letras Y Garantía De Mulchen

← Volver al listado

Historia

- pablo perez** 13:34:50
pablo perez contacto al tribunal
+ 2 segundos
- Johanna Sarita Castillo Zambrano** 13:34:52
Atención **aceptada** por Johanna Sarita Castillo Zambrano
+ 13 segundos
- Johanna Sarita Castillo Zambrano** 13:35:05
Buenas tardes mi nombre es Johanna Sarita Castillo Zambrano, ¿en que lo puedo ayudar?
+ 39 segundos
- pablo perez** 13:35:05
Hola
+ 2 segundos
- pablo perez** 13:35:07
Cómo están
+ 10 segundos
- Johanna Sarita Castillo Zambrano** 13:35:19
Llevo algunos minutos esperando su respuesta, terminare la atención
+ 1 segundo
- Johanna Sarita Castillo Zambrano** 13:35:20
Adios
+ 2 segundos

Participantes

- pablo perez**
Usuario
- Johanna Sarita Castillo Zambrano**
Funcionaria

Duración

Espera: 00:00:02

Atención: 00:01:30

Información del Usuario

RUT	Fecha Atención
6.187.814-9	28-08-2020 13:34:50
Nombre	Tipo
pablo perez	Whatsapp
Teléfono	
964.395678	

No se realizaron observaciones

FACILITATING DOWNSTREAM ANALYSIS ON CONSEQUENCES

40% of inquiries have been related to alimony

Pilot being rolled out nationally (and advertised on Facebook)

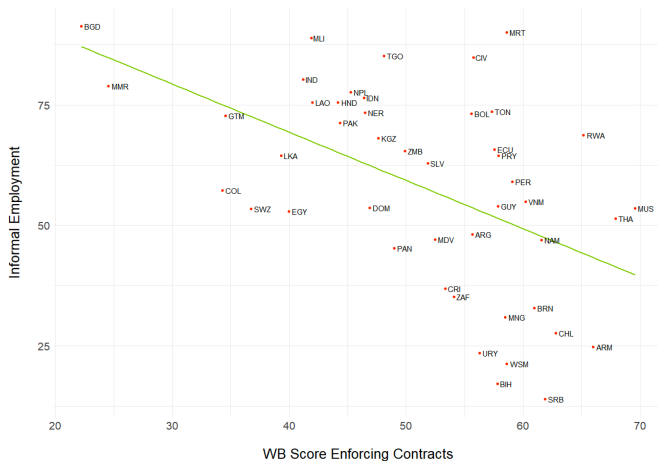


to improve speed of justice

WHAT DO WE KNOW ABOUT THE IMPACT OF SPEED OF JUSTICE?

Economic development & legal institutions are associated

MACRO EVIDENCE, E.G.:

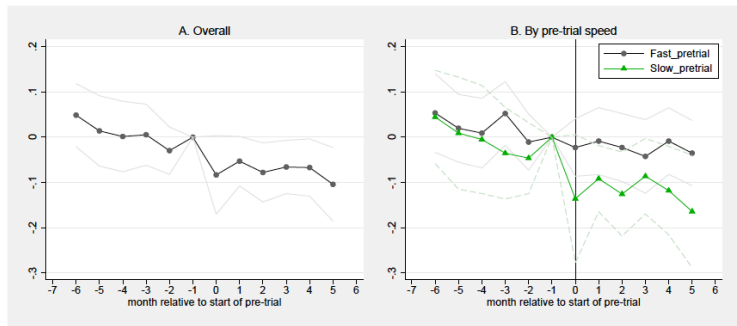


WHAT ABOUT THE MICRO EVIDENCE?

Senegal: Impact of Procedural Reform (P122225)

Revenue is 8% lower for cases with pre-trial duration ≥ 4 months

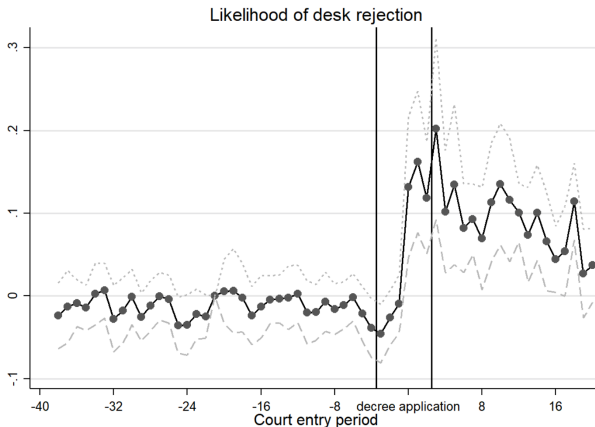
Figure 1: Case parties' log revenues around the start of the pre-trial



Note: For all x-axes, month is indexed in relation to the case-level pre-trial start month (zero-centered)

=> Staggered roll-out of judicial reform giving judges the duty and powers to conclude pre-trial proceedings in 4 months

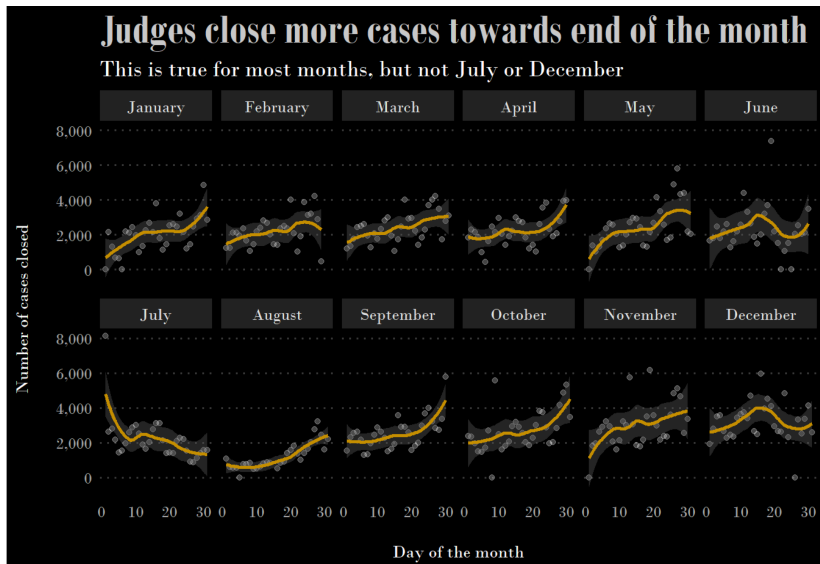
Senegal: Impact of Procedural Reform (Kondylis and Stein Restat R&R)



Reform halved the negative impact on revenues & increased firm satisfaction

DEADLINES AND POINT SYSTEMS ARE UBIQUITOUS

Scoring Rules: End-of-Month Quotas



Firm Assets Associated with Judicial Speed

.. and more associated, in slower jurisdictions

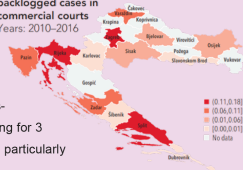
The Impact of Judicial Speed on Firm Outcomes in Croatia

In 2010, the Ministry of Justice in Croatia launched an Integrated Case Management System (ICMS) to electronically record and track the progress of all court cases in Croatia. The DE JURE program is leveraging the power of this rich, case-level database to evaluate the impact that the speed of justice can have on the financial outcomes of firms, using random allocation of cases to judges to produce a randomized controlled trial of our interventions.

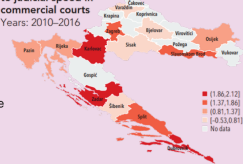
The first map illustrates that despite the introduction of a more efficient case management system, in half of Croatia's commercial courts, backlogged cases (i.e. cases that have been pending for 3 years or longer) continue to constitute up to 18% of the overall stock of cases. The problem is particularly worse in the counties with the highest caseloads – Zagreb, Rijeka and Split.

If firm resources remain tied up in prolonged court proceedings, it can begin to impede the operations of a firm, and the extent of this effect can be regionally heterogeneous. The following map shows the impact of judge speed – measured by the proportion of cases the assigned judge resolved within 1 year – on total firm assets. It suggests that gains are to be had even in areas with lower backlogs because firm assets are highly responsive to increases in judge speed in counties like Karlovac and Dubrovnik that lie in the bottom quartile in terms of backlog.

Proportion of backlogged cases in commercial courts
Years: 2010–2016



Elasticity of firm assets to judicial speed in commercial courts
Years: 2010–2016



Justice Sector Support Project (P104749)

IS IT CAUSAL?

Empirical Challenges

Medicine, prior to clinical trials

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

Randomizing judicial decisions

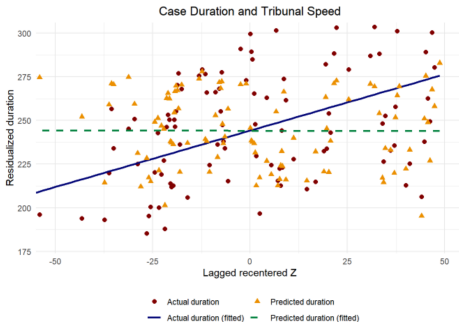
Violates our notion of justice (equal treatment before the law)

Randomizing judicial assignment

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

What is the Impact of Speed of Justice?

Chile cases are randomly assigned to tribunals



Testing empirically the identification assumptions:

- **Tribunal assignment matters for case duration:** there is a steep positive correlation between tribunal speed and case duration (blue line)
- **Tribunal assignment is random:** there is no correlation between duration predicted by baseline case characteristics and tribunal speed (green dotted line)

Impact of Speed of Justice

Preliminary evidence on Summary cases (smaller firms)

	<u>Log Sales</u>		
	t-1	t0	t+1
	(1)	(2)	(3)
Tribunal Speed	-0.008 (0.025)	0.049 (0.034)	0.099*** (0.034)
1st Stage F-stat	41	41	41
Y mean (level)	9.401	9.053	8.735

We are exploring similar research design in Croatia (& anytime infrastructure permits)

knowledge of one's effectiveness as public defender

INSTEAD OF LEVERAGING VARIABILITY

CAN WE REDUCE IT?

Uber-ization of Case Backlog

Interventions

- Chilean courts are affected by high imbalance of workload and little incentives to perform better.
- Telework aims to **improve performance** in congested courts by **balancing the workload** across courts, without incurring the costs of hiring new staff.
- Participants volunteer into an **incentives scheme**--receive benefits conditional on doing **the extra work** and on meeting **performance targets**.

Research Design

- We use **Randomized Controlled Trials (RCT)** with treatments:
 1. **Providing Telework**: administrative staffs and judges opt-in the program.
 2. **Receiving Telework**: receive help from another tribunal at no extra cost.
- There are 41 blocks between composed of at least three tribunals of similar competence & jurisdiction.

Stage 1: mechanism to smooth variability across jurisdictions (daily, court-specific incentive)

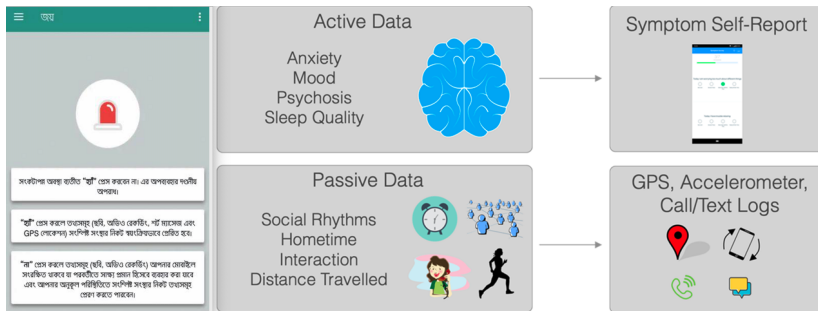
Stage 2: mechanism to smooth variability across time within jurisdictions ('uber')

UBERIZATION ADDRESS CASES ACTUALLY FILED

WHAT ABOUT CASES THAT NEVER FILE?

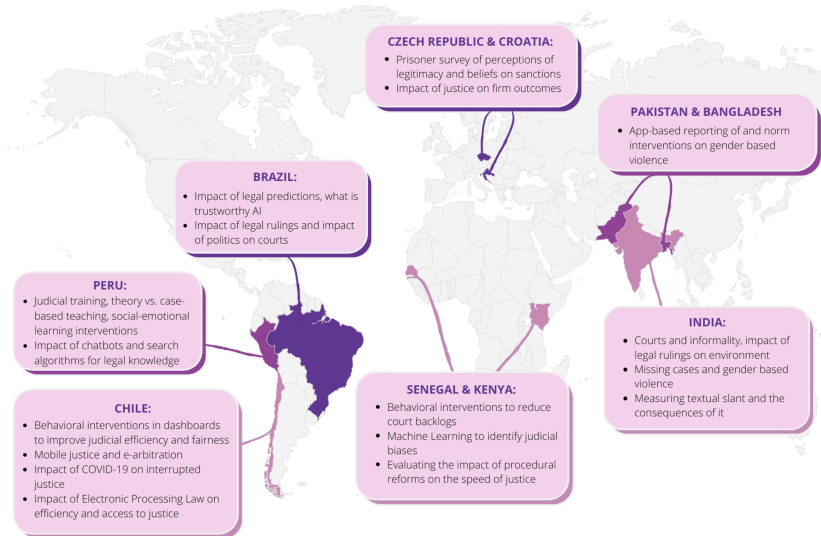
Apps for Missing Cases Bangladesh app (nationally advertised on July 2018)

smartphone app aiming to address violence against women and children



- Emergency button sends the victim's GPS, picture, and audio recording
- Potentially add passive features for additional revealed preference data

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.

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

India

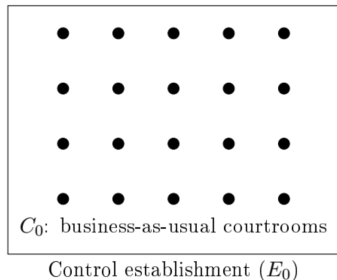
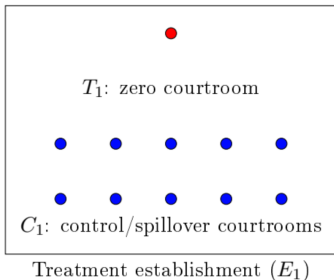
- Impacts of law
 - ▶ linkages to litigant (firm or individual)
 - ▶ economic data, pollution, land disputes
- Impacts on law
 - ▶ inconsistencies, elections, rotations, networks
- Improving rule of law
 - ▶ court reforms, decision-support, transparency
- <https://explore-ecourts.herokuapp.com/>

HIGHLIGHT THREE STUDIES

(1) Impact of “Zero” Courts

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

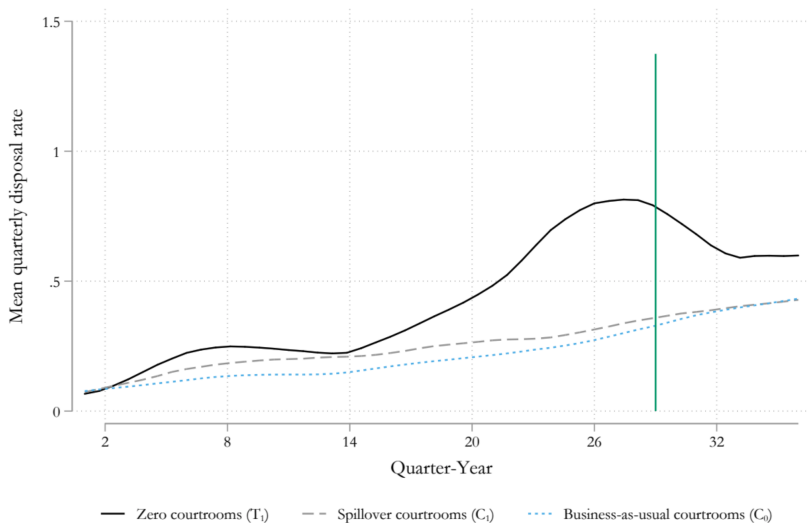
An illustration of two model court establishments:



and their functioning was compared with 11 courts with regular workload

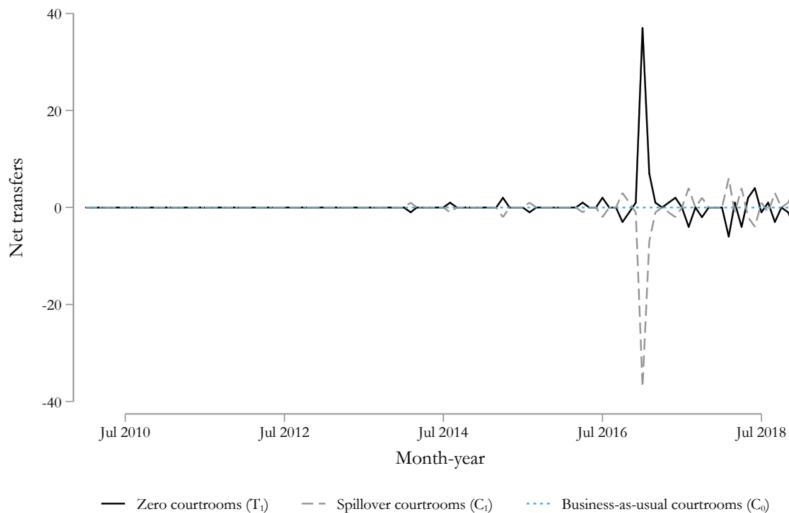
(1) Selection of “Zero” Courts

Figure 10: Mean quarterly disposal rate



(1) Impact of “Zero” Courts

Figure 12: Density of transfers by month



(1) Impact of Transfers

	Days in court	Disposed within 1 year	Number of Hearings	Duration of Hearings
Judge changed	169* (93)	-0.24** (.11)	3.1* (1.8)	83*** (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

(2) Impact of Legal Search Engines



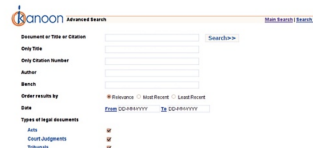
INNOVATORS
UNDER 35
INDIA

2011

Sushant Sinha, 30

A search engine for Indian laws and court judgments

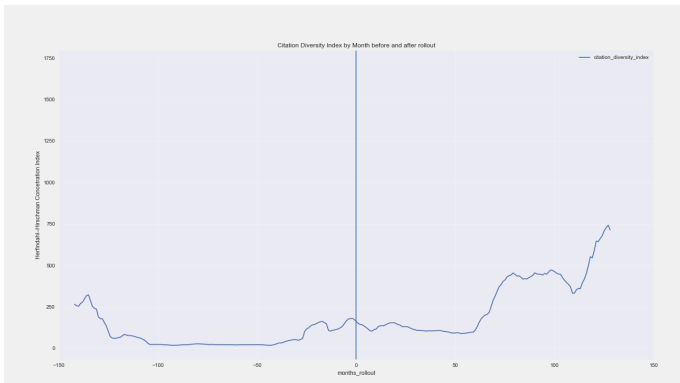
Indian Kanoon



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

(2) 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

(3) Judicial bias by gender and religion

Motivation

- ▶ While the proportion of Muslims convicted is close to their share in India's population (14%), only 4% of judges across India's high courts are Muslim. (*The Quint*, 2016)
- ▶ Women account for 28% of the lower judiciary, and 12% of the High Courts, while they account for 48% of the population. (*India Justice Report*, 2019)
- ▶ The importance of substantive representation in the judiciary has been researched extensively in the US (Dobbie et al. 2018, Abrams et al. 2012, Alesina et al. 2014, etc.), but the **relevant literature is non-existent in the Indian context**.
- ▶ This paper is **the first to quantitatively study the consequences of a lack of diversity in India's lower judiciary**, at scale.

(3) Judicial bias by gender and religion

Summary of findings

► **Descriptive:**

- Muslim defendants are more likely to be charged with theft, crimes against women, property crimes, trespassing, and marriage offenses in the analysis sample.
- Muslim defendants are more likely to be convicted with crimes that endanger public safety and health.

► **Substantive:**

- Random assignment of judges to cases holds in the study sample.
- Female judges are less lenient on male defendants.
- Muslim and Non-muslim judges are indistinguishable.
- On bail cases, marginal evidence that female judges grant bail to female defendants more often than male judges.
- No major difference for crimes against women or property crimes.

(3) Judicial bias by gender and religion

Data

- ▶ **Raw sample:** Approximately 8 million cases scraped from e-courts.
- ▶ **Scope:** All metropolitan, district and sessions courts across all states in India.
- ▶ **Timeline:** 2015-2018
- ▶ **Variables:**
 - (a) For each case, the primary variables are defendant and plaintiff name, dates of various hearings, and final outcome if available.
 - (b) We also scraped judge information data for all the districts in India.
- ▶ **Construction:**
 - (a) Judge-case data were matched based on state code, district code, court code, and judge designations, provided the date of the case in the case data lies within the start and end date of the judge's tenure provided in the judge dataset.
 - (b) Before the match, we ensured the final judge dataset had no overlaps in tenure at a specific position in a particular court.
- ▶ **Final sample:** The final analysis dataset has approximately 4 million observations.

(3) Judicial bias by gender and religion

Classification of names

- ▶ The judge and defendant details available on e-court do not include gender and religion details.
- ▶ We classified cleaned names as Muslim or not Muslim, and female or male, using a bidirectional Long Short-Term Memory (LSTM) model.
- ▶ An LSTM is a specific type of Recurrent Neural Network (RNN) that retains the memory of previous inputs as it handles each new piece of input data.
- ▶ Our LSTM model was trained on a database of 1.4 million names of individuals whose religion was recorded when they sat for the National Railway Exam, and on 2,287,973 Delhi voter names for gender classification.

(3) Judicial bias by gender and religion

Empirical strategy

We exploit random assignment of judges to cases to estimate judicial bias using the following difference-in-difference specification:

$$Y = \alpha + \beta_1 \text{judge_female} + \beta_2 \text{def_female} + \beta_3 \text{judge_female} * \text{def_female} + \gamma [\text{loc_month} / \text{loc_year}] + \phi \text{acts} + \epsilon \quad (1)$$

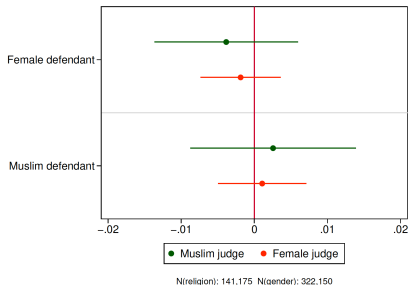
$$Y = \alpha + \beta_1 \text{judge_muslim} + \beta_2 \text{def_muslim} + \beta_3 \text{judge_muslim} * \text{def_muslim} + \gamma [\text{loc_month} / \text{loc_year}] + \phi \text{acts} + \epsilon \quad (2)$$

- ▶ **loc_month:** group(state_code dist_code court_no filing_year filing_month)
- ▶ **loc_year:** group(state_code dist_code court_no filing_year)
- ▶ **acts:** group(act section)
- ▶ **judge:** group(state_code dist_code court_no position tenure_start tenure_end)
- ▶ We implement equations (1) & (2) **separately for bail and non-bail related cases.**

(3) Judicial bias by gender and religion

Test using court-month fixed effects: Are defendants more likely to get assigned to a judge with the same identity? No.

$$judge_ [muslim/female] = \alpha + \beta_1 def_ [muslim/female] + \gamma loc_ month + \phi acts + \epsilon$$



Female judges are less lenient

<i>Panel A: Court-month fixed effect</i>				
	(1) Female judge on Male def	(2) Female judge on Female def	(3) Interaction effect	(4) Control mean
Acquitted	-0.020** (0.01)	-0.012 (0.011)	0.008 (0.008)	.184
Not convicted	-0.016* (0.01)	-0.010 (0.008)	0.006 (0.006)	.903
Positive_0	-0.025** (0.01)	-0.008 (0.013)	0.017* (0.009)	.336
Positive_1	-0.002 (0.01)	0.007 (0.011)	0.009 (0.008)	.714
Observations	157337	157337	157337	157337

Standard errors in parentheses

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

marginal in-group effect

Muslim and Non-muslim judges indistinguishable

<i>Panel A: Court-month fixed effect</i>				
	(1) Muslim judge on non-Muslim def	(2) Muslim judge on Muslim def	(3) Interaction effect	(4) Control mean
Acquitted	0.002 (0.011)	0.004 (0.016)	0.002 (0.012)	.169
Not convicted	-0.008 (0.011)	-0.011 (0.015)	-0.003 (0.007)	.892
Positive_0	0.002 (0.015)	0.008 (0.019)	0.006 (0.013)	.309
Positive_1	0.020 (0.021)	0.043 (0.033)	0.023 (0.016)	.693
Observations	74317	74317	74317	74317

Standard errors in parentheses

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

Female judges are more lenient in bail

<i>Panel A: Court-month fixed effect</i>				
	(1) Female judge on Male def	(2) Female judge on Female def	(3) Interaction effect	(4) Control mean
Positive_0	0.056** (0.03)	0.090*** (0.035)	0.034 (0.027)	.39
Positive_1	0.020 (0.04)	0.070 (0.049)	0.051** (0.025)	.739
Observations	14602	14602	14602	14602

Standard errors in parentheses

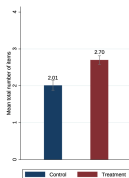
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

marginal in-group effect

EMPATHY IS PROPOSED ANTIDOTE TO IN-GROUP BIAS

Training Empathy

- 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)



- Pending analysis of twitter/social media posts and impacts on followers
- Additional rounds administered over zoom
 - ▶ With 1 hour battery of social preference games (other-regarding behavior)
 - ▶ Used for IE of mandatory economics in French high schools (w/ oTree)

LET ME TURN TO MEASUREMENT

INDICATORS OF JUDICIAL QUALITY & TRUST IN THE LAW

Three uses of judicial analytics

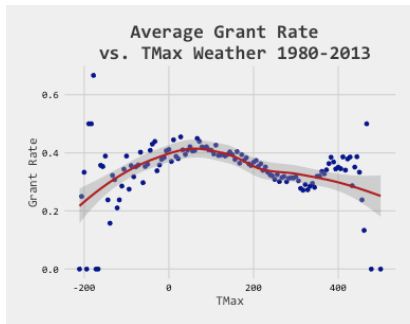
- Predictive analytics of judges
 - ▶ MEASURING PRODUCTIVITY INNOVATIVELY
- Predictive analytics for causal inference
 - ▶ AUTOMATED PROSPECTIVE IMPACT ANALYSIS OF THEIR DECISIONS
- Predictive analytics to increase recognition, dignity
 - ▶ DEVELOP INSTITUTIONS TO HELP INDIVIDUALS BE THEIR BEST SELF

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)

The weather

Judges deny refugees asylum when the weather is too hot or too cold

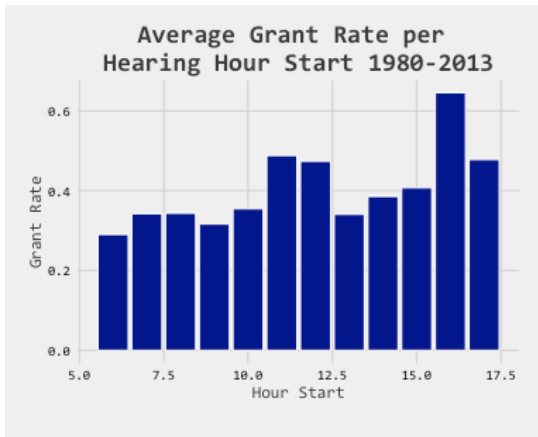


ICAIL 2017

See also Hayes and Saberian, AEJ 2018

Time of Day

They grant asylum more before lunch and less after.

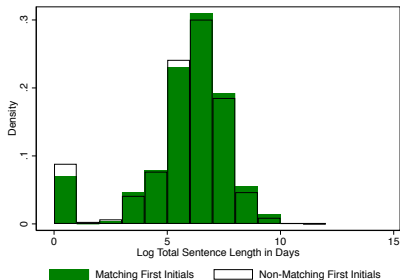


1M decisions

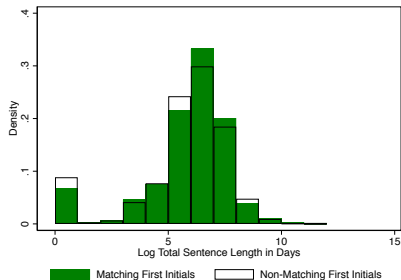
See also Norris 2020, Danziger, Levav, Avnaim-Pesso, PNAS 2011

The defendant's name

They assign longer sentence lengths to defendants whose first initial matches their own.



First Letter of First Name



First Letter of Last Name

See also *Belenzon, Chatterji, and Daley, AER 2017, Jena, Sunstein, and Hicks 2018*

The defendant's birthday

When they do the opposite and give the gift of leniency

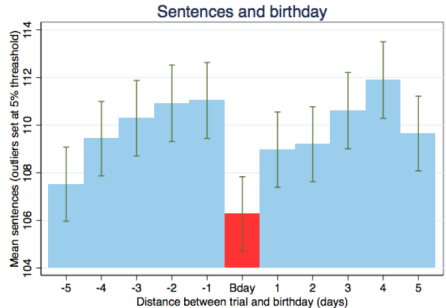
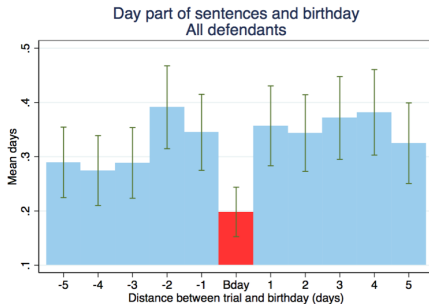
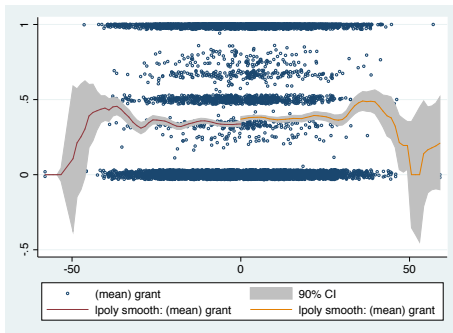


Figure: US and French judicial leniency on defendant birthdays

NFL Football

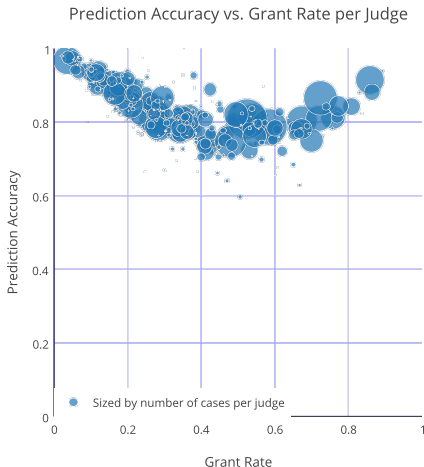
Judges are more lenient the day after their team wins, rather than loses.



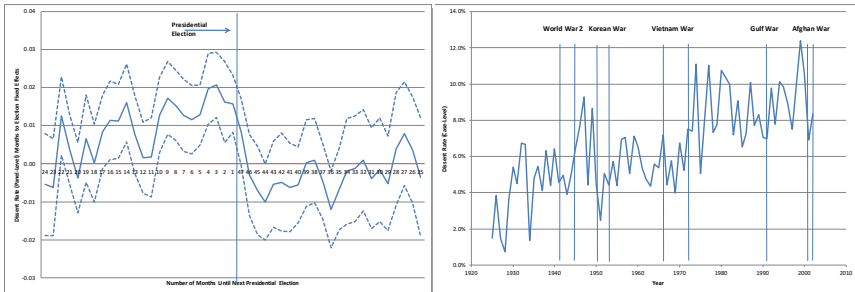
See also *Eren and Mocan, AEJ 2017*

Snap judgments

We can use machine learning to predict asylum decisions with 80% accuracy the date the case opens.. and when it closes.



Elections and wartime also affect decisions



JLE 2017

Gambler's Fallacy

How people often imagine a sequence of coin flips:

0101001011001010100110100

A real sequence of coin flips:

0101011111011000001001101

Up to 5% of decisions reversed due to the gambler's fallacy

UMPIRE CALLS AND THE GAMBLER'S FALLACY

MLB umpires call fewer strikes if previous call was a strike

Percentage point decline in probability of a called strike if:

- Previous call was a strike ● Previous two calls were strikes*

Obvious pitches: Within 3 inches of center of strike zone

-0.2

-0.5

Ambiguous pitches: Within 1.5 inches of edge of strike zone

-3.5

-4.8

*Compared to two previous calls that were balls
Source: Authors' calculations using PITCHf/x data

QJE 2016

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

Recording 1 of 66



1. Please provide your impression of the voice recording in the matrix below:

Very Attractive	☐	☐	☐	☐	☐	☐	☐	Very Unattractive
Very Masculine	☐	☐	☐	☐	☐	☐	☐	Not At All Masculine
Not Intelligent	☐	☐	☐	☐	☐	☐	☐	Intelligent
Very Unaggressive	☐	☐	☐	☐	☐	☐	☐	Very Aggressive
Not Trustworthy	☐	☐	☐	☐	☐	☐	☐	Trustworthy
Very Confident	☐	☐	☐	☐	☐	☐	☐	Very Timid

2. Assuming that this is a lawyer arguing a case in front of a panel of judges, how likely do you think this lawyer will win the case?

Will Definitely Lose ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Will Definitely Win

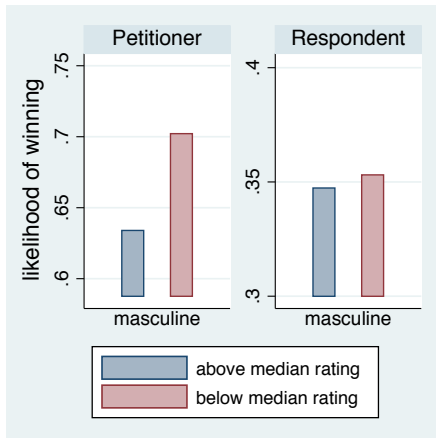
3. How good is the quality of the recording?

Very Bad ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very Good

Next

“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

Besides voice, there is text

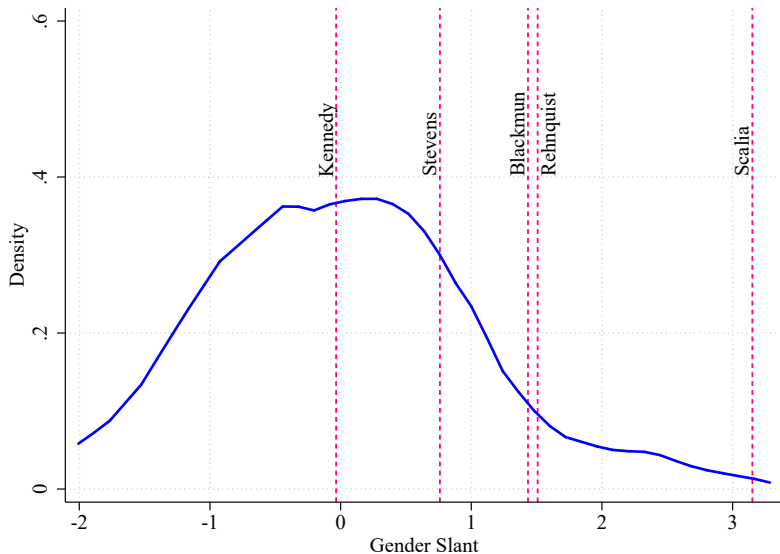


- Females: Migraine, hysterical, morbid, obese, terrified, unemancipated, battered
- Males: Reserve, industrial, honorable, commanding, conscientious, duty

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

We can do this judge by judge

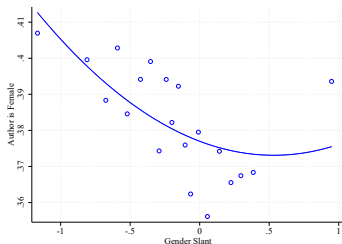
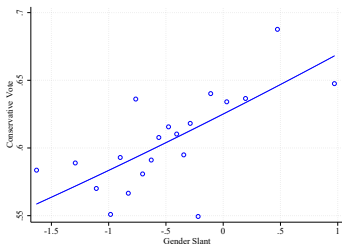
Justice Scalia is an outlier in gender slant



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

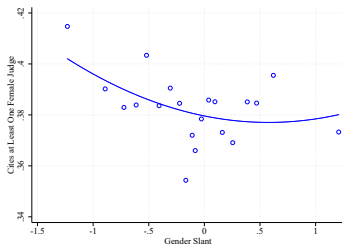
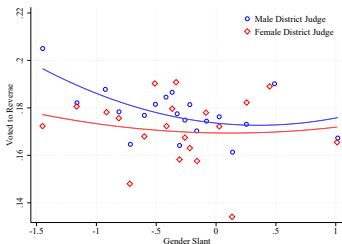
Vote against women's rights issues

Assign fewer opinions for females to author



Reverse male judges less often

Cite female judges less often



By 1990, 40% of federal judges had attended an economics-training program.

The New York Times

19 U.S. Judges Study Economics To Help Them in Work on Bench

Special to The New York Times

KEY LARGO, Fla., Dec. 18—For three weeks, 19 Federal judges from around the country took a grueling, six-day-a-week course in economics that ended here yesterday.

With classes starting at 9 A.M. and sometimes ending at 10 P.M. or later, the judges received the equivalent of a full semester at the college level.

Their teachers were, among others, two Nobel laureates in economics, Paul Samuelson and Milton Friedman. The courses, sponsored by the Law and Economics Center of the University of Miami School of Law, made up what is believed to have been the first such institute for Federal judges.

"It was a very enriching experience," said Chief Judge John W. Reynolds of the Federal District Court in the Eastern District of Wisconsin. "We were here not to become economists, but to understand the language of economics. Courts are only as good as judges and the lawyers who appear before us. By and large, our training in economics is not really satisfactory, and yet we are being increasingly called upon to decide economic issues."

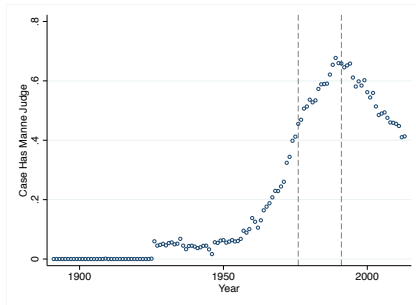
The program dealt basically with economic theory, and an effort was made

not to relate the theoretical studies to cases now pending in Federal court. "One has to be very cautious in dealing with Federal judges," said Henry Mann, director of the center. "Our goal has been to give them the most recent thinking in economic theory and enable them to better understand the testimony of expert witnesses and lawyers."

Chief Judge David N. Edelstein of the Federal District Court in the Southern District of New York, who is the judge in the International Business Machines Corporation antitrust case—regarded as many lawyers as the most important antitrust litigation of the century—informally attended the institute to clear any legal questions about a possible conflict of interest.

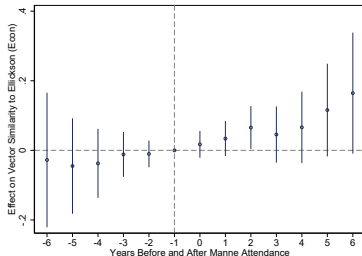
"All the lawyers were very cordial and replied that they saw no grounds for a conflict of interest in my coming here," Judge Edelstein said.

From the beginning, the judges, some of them 60 years old or over, behaved like students, deferring to their teachers and reminiscing about undergraduate days decades ago.



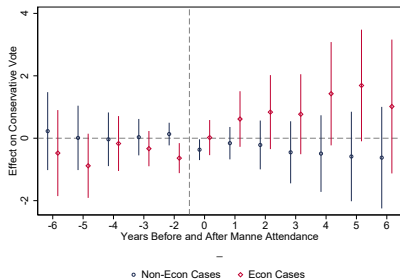
The results of these seminars were dramatic

We can see economics language used in academic articles became prevalent in opinions.

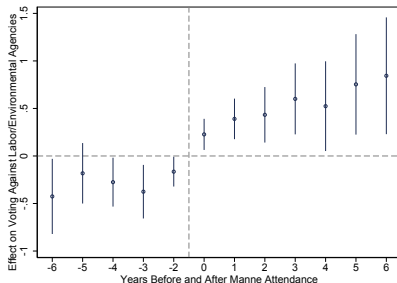


The results of these seminars were dramatic

We can see economics trained judges changing how they decided



Econ vs Non-Economics Cases

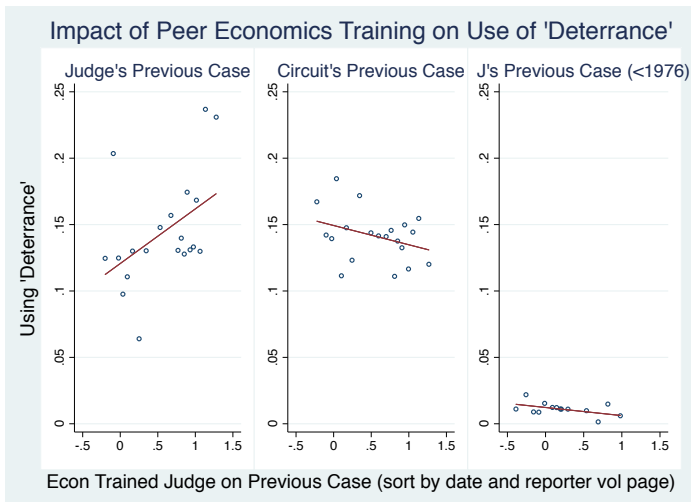


on Labor/Environmental Cases

See also *Hjort, Moreira, Rao, and Santini, AER R&R*

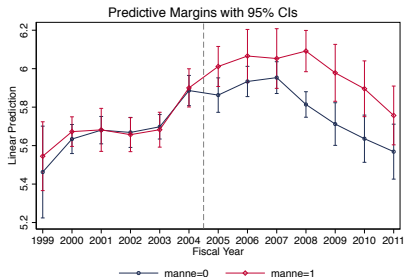
Impacting their peers

We can see economic language traveling from one judge to another and across legal areas.



When judges were given discretion in sentencing

economics trained judges immediately rendered 20% longer sentences relative to the non-economics counterparts.



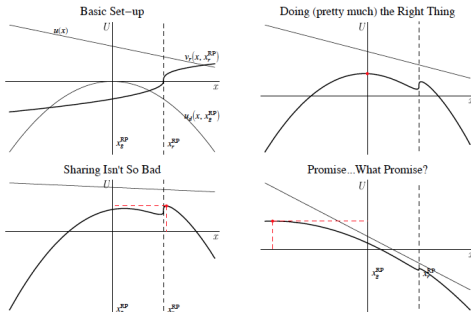
See also *Cohen and Yang, AEJ 2019*

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

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 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)



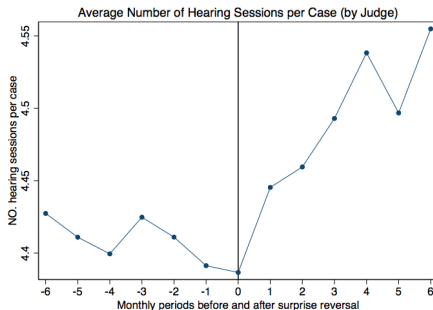
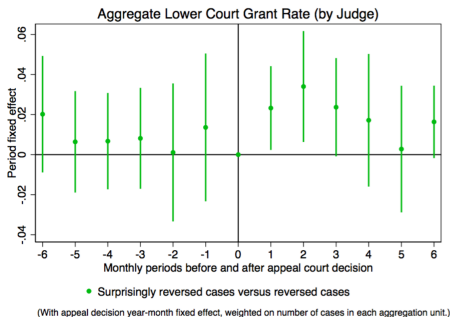
A model of recognition-respect and
revealed preference indifference

Five Ways for ML to Diagnose Judicial Inattention

NEW INDICATORS FOR OBJECTIVENESS IN ENFORCING REGULATIONS?

- ① Early predictability
- ② Behavioral anomalies
- ③ Inattentiveness to appellate reversals
- ④ Implicit risk rankings of litigants (asylees) closer to random
- ⑤ Is indifference greater for some refugees (e.g., from Global South)?

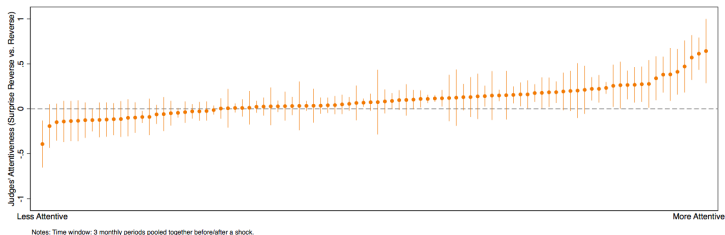
After “Surprise” Reversals, Judges Grant More Asylum and Hold More Hearing Sessions



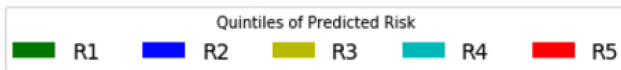
Surprise Reversal is a reversal of a decision that was predicted to be “Affirm”

See also *Posner, HUP 2010*

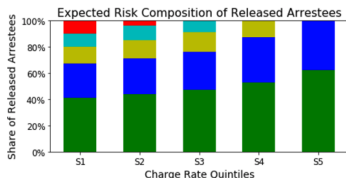
Judges Vary in Responsiveness to Reversal



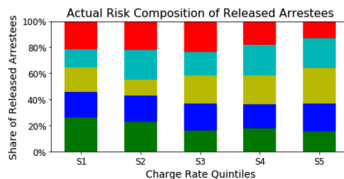
Do less attentive judges have implicit risk rankings closer to random?



Robot Prosecutors



Human Prosecutors



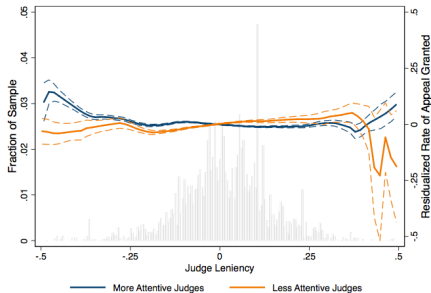
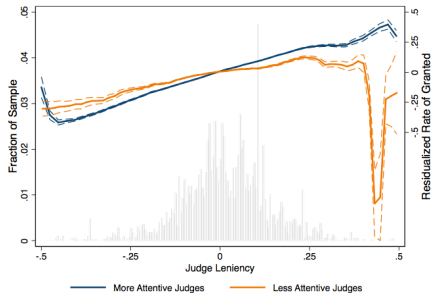
- If defendants released based only on risk score, the harshest prosecutors would only be releasing low-risk defendants.
- Distribution of risk scores for released defendants is similar for most lenient and least lenient prosecutors.
- Are the lenient asylum judges, only denying the 'riskiest' applicants
 - ▶ 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

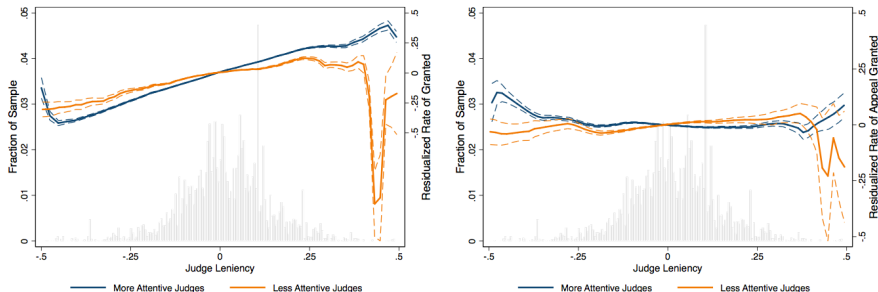
Inattentiveness of Judge: Surprisingly Reversed vs. Reversed



(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

Inattentiveness of Judge: Surprisingly Reversed vs. Reversed



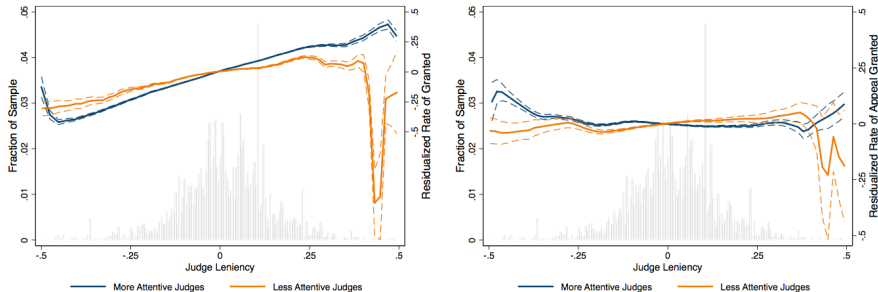
(Time window: 3 monthly periods pooled together before/after shock. More attentiveness: the coefficient of interaction of surprisingly reversed dummy and time-period dummy is bigger)

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

Inattentiveness of Judge: Surprisingly Reversed vs. Reversed

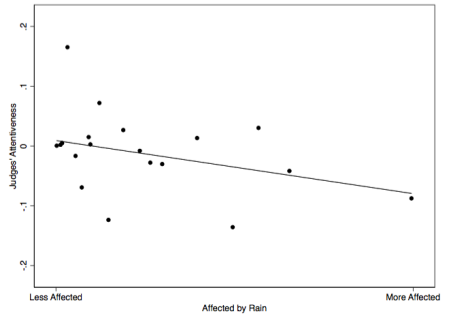
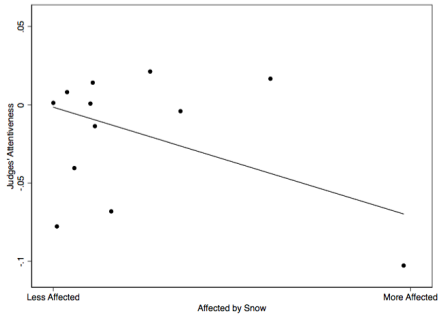


(Time window: 3 monthly periods pooled together before/after shock. More attentiveness: the coefficient of interaction of surprisingly reversed dummy and time-period dummy is bigger)

.. who may be more prone to other extraneous factors

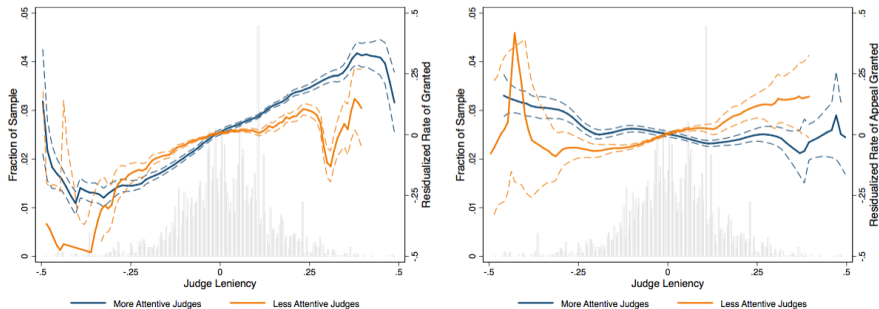
.. such as weather

Judges' Attentiveness and Vulnerability to Weather



Difference in Indifference for asylees from the Global South

African Applicants



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

Proof of Concept

Schedule Type	Detained Master Reset
Judge	John Milo Bryant
Hearing City	ADELANTO
Asylum type	Affirmative
Hearing Language	ABRON
Attorney present?	Yes
Case Type	ASYLUM ONLY CASE
Hearing Location	DHS-LITIGATION UNIT(OAKDALE (ADC)
Nationality	ANTIGUA AND BARBUDA
Adjudication Medium	N
Base City	ADELANTO
View Prediction	

- Assess effects on trust and perceived indifference of lawmakers
- and applications, decisions, reversals, speed, disparities, etc.

DATA INTEROPERABILITY = NEW WAYS OF MEASURING JUDICIAL PRODUCTIVITY

Personalized Assessments

This kind of data can measure inconsistency in judicial decisions.

Table: Name Letter Effect in Judicial Sentencing in Chile

	<u>Log of Total Sentence in Days</u>			
First Letter Match	0.0169*** (0.00584)	0.0212*** (0.00480)		
First Name Match			0.0314* (0.0189)	0.0401*** (0.0153)
N	2763242	2762799	2763242	2762799
Judge FE	X	X	X	X
Case Type x Month x Year FE		X		X
Letter FE, Week FE, Day of Week FE		X		X

NAME LETTER EFFECT RELATED TO WHAT PSYCHOLOGISTS CALL “IMPLICIT EGOISM”

- Can we use this data to incentivize judges to increase efficiency and consistency?
- Can we use written judgments to evaluate judicial biases or use the text of laws and regulations to indicate best practices across countries?

Empirical Challenges

Medicine, prior to clinical trials

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

Randomizing judicial decisions

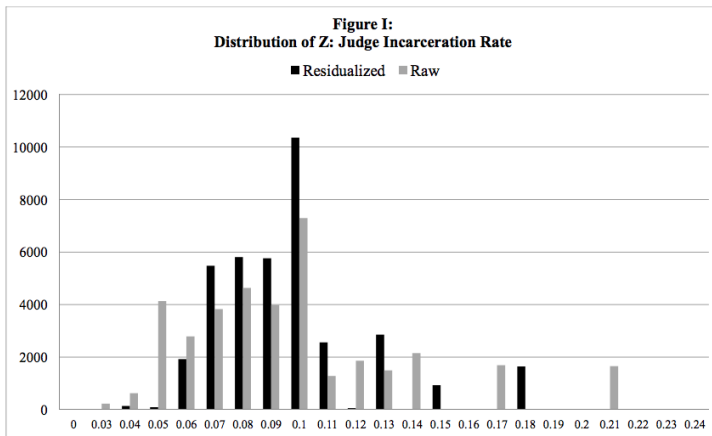
Violates our notion of justice (equal treatment before the law)

Randomizing judicial assignment

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

Juvenile Incarceration (QJE 2015)

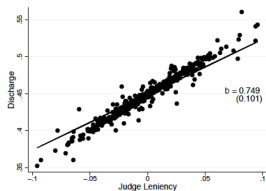
Reduced human capital formation and increased future imprisonment



Notes: These histograms display the distribution of the leave-one-out mean incarceration rate for the first judge in the first case in the linked Chicago Public School - Juvenile Court of Cook County data including cases from 1990-2000 as described in the text. The residualized measure was calculated from a regression model with full controls listed in Table 1, including indicators for each year of age at the time of the offense and community x weapons offense x year indicators.

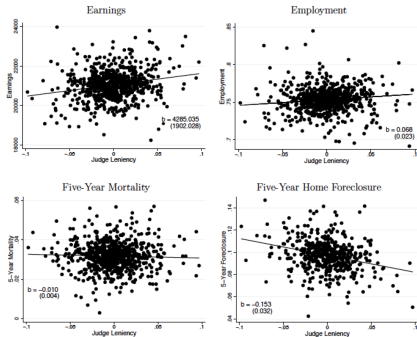
Debt Relief and Debtor Outcomes (AER 2014)

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.

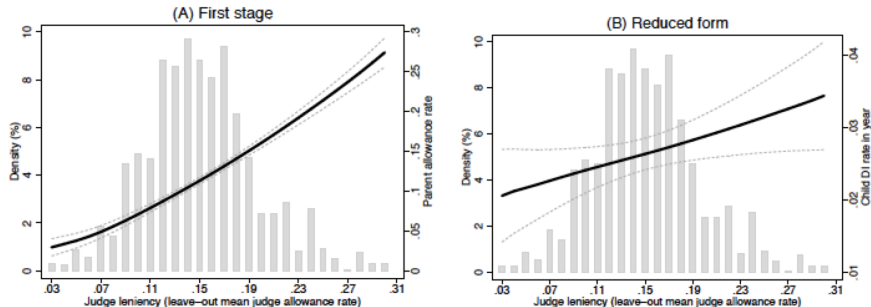
↑Earnings, ↑Employment, ↓Mortality, ↓Foreclosure

Family Welfare Cultures (QJE 2014)

Is the intergenerational correlation of welfare receipt causal?

Determinants of poverty or health correlated across generations -or- culture of welfare?

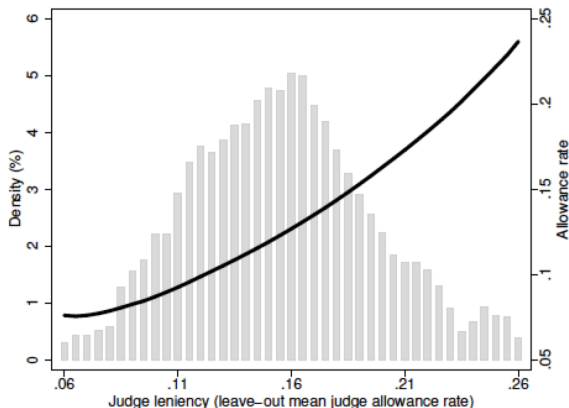
Figure 3: Effect of Judge Leniency on Parents (First Stage) and Children (Reduced Form).



Notes: Baseline sample, consisting of parents who appeal an initially denied DI claim during the period 1989-2005 (see Section 3 for further details). There are 14,722 individual observations and 79 different judges. Panel (A): Solid line is a local linear regression of parental DI allowance on judge leniency. Panel (B): Solid line is a local linear regression of child DI receipt on their parent's judge leniency measure. All regressions include fully interacted year and department dummies. The histogram of judge leniency is shown in the background of both figures (top and bottom 1% excluded from the graph). Dashed lines represent 90 percent confidence intervals.

Do disability benefits insure? (AER 2019)

Figure 4: Effect of Judge Leniency on DI Allowance

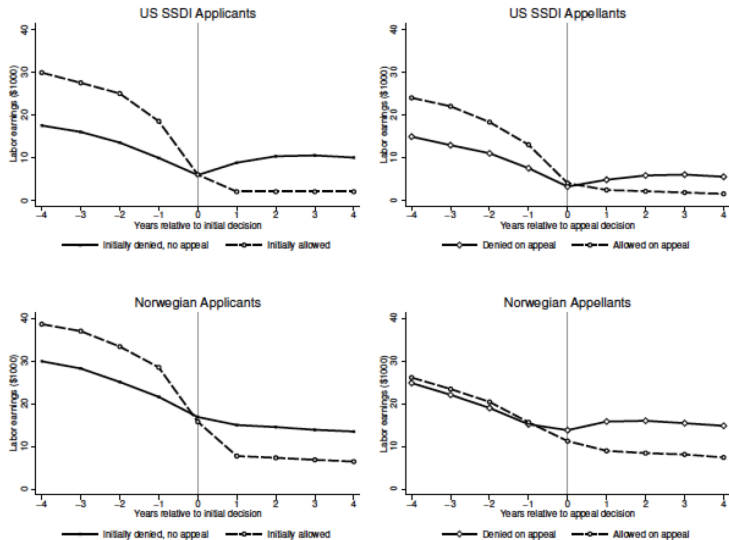


Notes: This figure displays the effect of judge leniency on DI allowance, conditional on fully interacted year and department dummies. Baseline estimation sample consists of individuals who appeal an initially denied DI claim during the period 1994-2005 (see Section 3 for further details). There are 75 unique judges. The solid line plots a local linear regression of allowances on judge leniency. The histogram of judge leniency is shown in the background of both figures (top and bottom 1 percent excluded from the graph).

DI Applicants' adverse outcomes ameliorated by grant

measured in employment, earnings, and assets

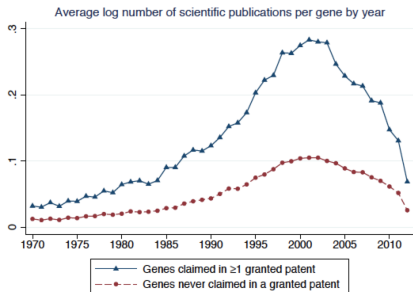
Figure 3: Earnings Trajectories of Allowed and Denied DI Applicants and Appellants



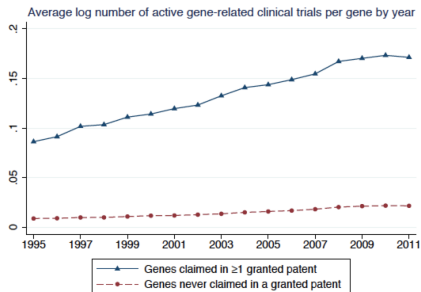
Patents and Innovation (AER 2019)

Patented genes are more valuable, but does patenting make them valuable?

Figure 1: Follow-on Innovation on Patented and Non-Patented Human Genes



(a) Gene-Level Scientific Publications

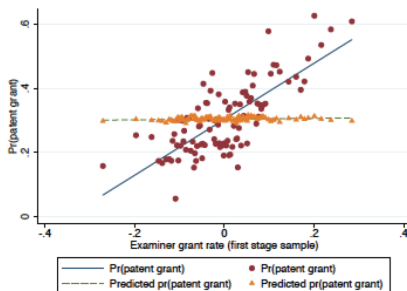


(b) Gene-Level Clinical Trials

Notes: This figure plots trends in follow-on innovation by year separately for genes that ever receive a patent and for genes that never receive a patent. The figure is constructed from gene-level data. Panel (a) 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 (b) 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.

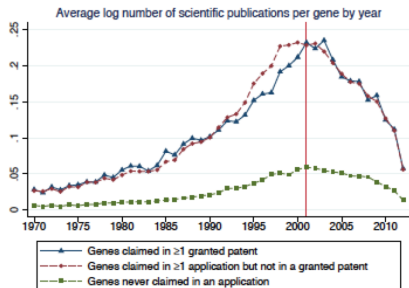
Patents examiners have strong habits

Figure 3: Probability of Patent Grant by Examiner Leniency

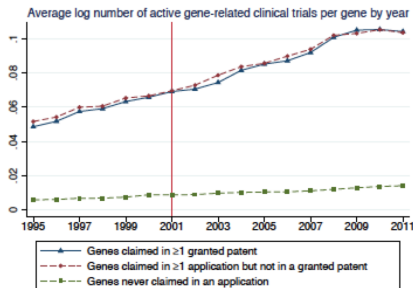


Notes: The figure relates our examiner leniency measure, residualized by Art Unit-by-application year fixed effects, to two variables: (1) the patent grant rate and (2) the predicted patent grant rate, where we predict patent grant as a function of our two measures of patent value fixed at the time of 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



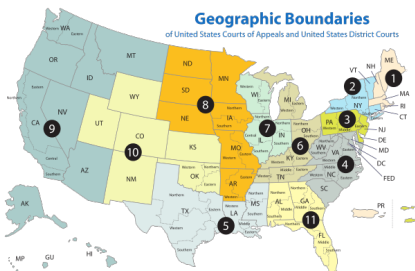
(b) Gene-Level Scientific Publications



(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).

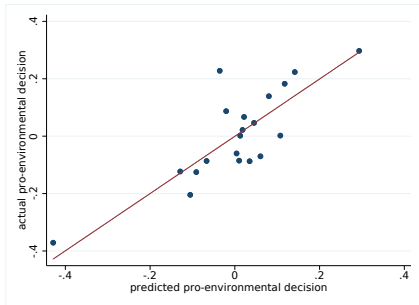
Random Variation in Precedent



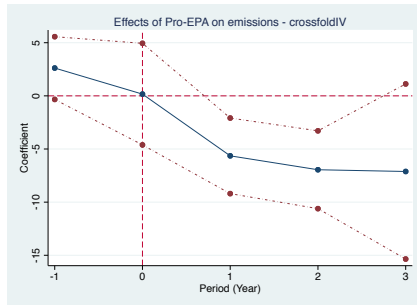
- **Random** assignment of judges
 - ▶ Judge characteristics **predict** decisions
- Binding precedent **within** circuit
 - ▶ 98% of decisions are final

$$\begin{cases} Law_{ct} = \alpha_{ict} + \phi Z_{ct} + \gamma_1 X_{ict} + \gamma_2 W_{ct} + \eta_{ict} \text{ (machine learning step)} \\ Y_{ict} = \alpha_{ict} + \rho Law_{ct} + \beta_1 X_{ict} + \beta_2 W_{ct} + \varepsilon_{ict} \text{ (causal inference step)} \end{cases}$$

Impact of Environmental Decisions



Calibration plot



Rulings in favor of EPA regulations reduce air pollution

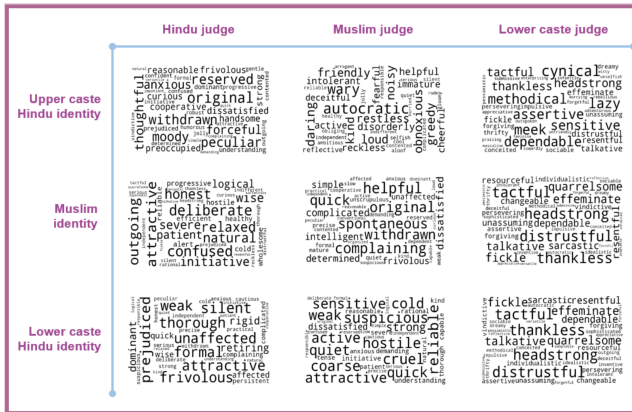
Data

U.S. Circuit Courts

- All 380K cases, 1,150K judge votes, from 1891-
- 2B 8-grams, 5M citation edges across cases
- 677 judges since 1800 (250 biographical features)
- 5% sample, 400 hand-coded features

Can be used to facilitate large scale data collection in other countries

- e.g., coding of case categories or direction of verdicts



Preliminary evidence that Hindu judges describe the Hindu identity more positively

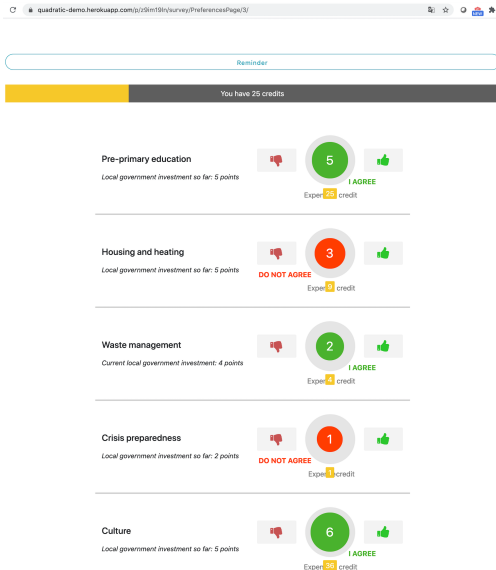
SC/ST judges describe Muslims more negatively

- 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

quadratic-vote.web.app/create-survey

QVSR DANIEL CHEN

Config Survey Preview

#1 Initial Setup

Topic *

0/75 characters

Launching Date * 08/09/2020

Finish Date * 15/09/2020

Preferred Function *

Quadratic Vote

Linear

How many credits/respondent *

#2 Language Designation

Preferred language Agree/Disagree

Preferred language Coins

BACK NEXT

Self-service Quadratic Voting

QVSR

DANIEL CHEN

Config

Survey

Preview

#3 Welcome message

0/ 1000 characters

#4 Questions

Question

0/ 250 characters

Question

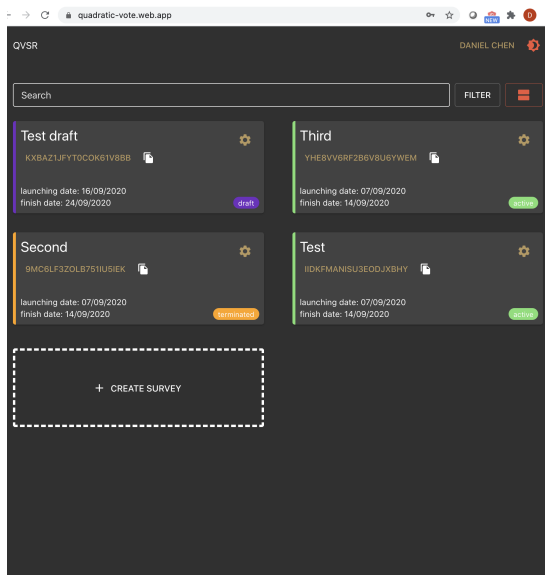
0/ 250 characters

Question

0/ 250 characters

ADD QUESTION

Self-service Quadratic Voting



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

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

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)

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