Courts, Firms, and Informality

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" *The justice system can have a direct impact on formality, making formality not only attractive but also feasible*"
(Loayza 2018, WB)

Link judiciary via firms to informality

Q: Impact of speed of courts on share of formal firms and share of formal workers (overall + within formal firms)

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Contribution:

1. **Propose model to study impact of court efficiency on informality**
   À la Melitz, adds productivity shock and cost on formal workers to Ulyssea (2018)
2. Use **original dataset from India** to link court efficiency to informality
   Combine case-level data from Indian courts with survey data on firms and workers
3. Quantify **signs and magnitudes of effects**
   Potential problem of reverse causality $\Rightarrow$ 2SLS estimates
   IV: Quasi random variation in judge vacancies
4. Use estimates to learn about **model parameters** and the implied **mechanism**

This Paper in a Nutshell

Faster Courts

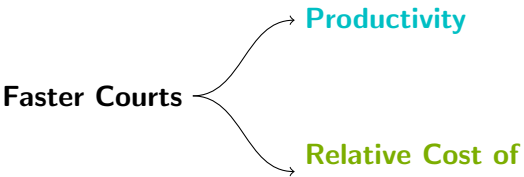
▸ Correlation ▸ Margins

This Paper in a Nutshell

Underinvestment, Inefficient investments, Reduction in credit, Access to credit, Economic growth, ...

▸ Correlation ▸ Margins

This Paper in a Nutshell



Workers can enforce contract ?
Employers can enforce contract ?
Cost on formal workers has GE effects ?

▸ Correlation ▸ Margins

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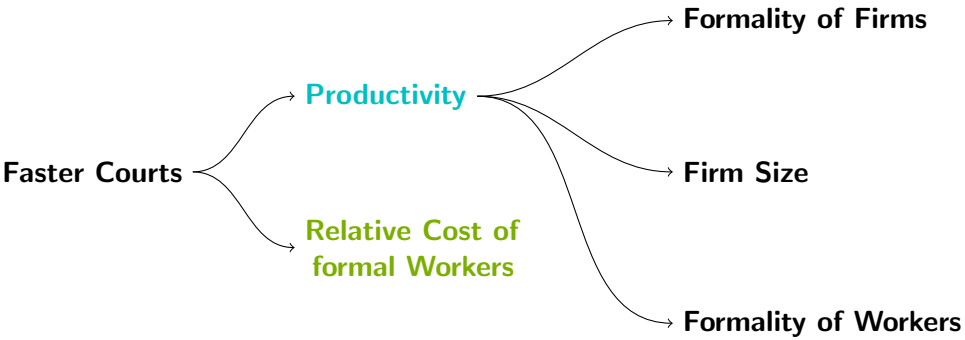

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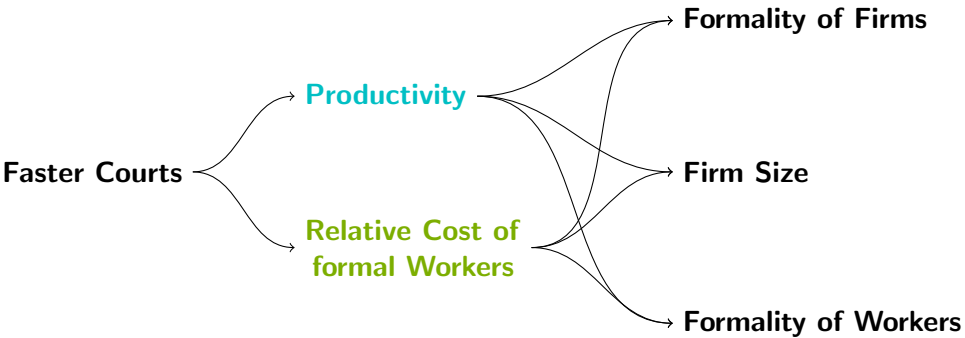

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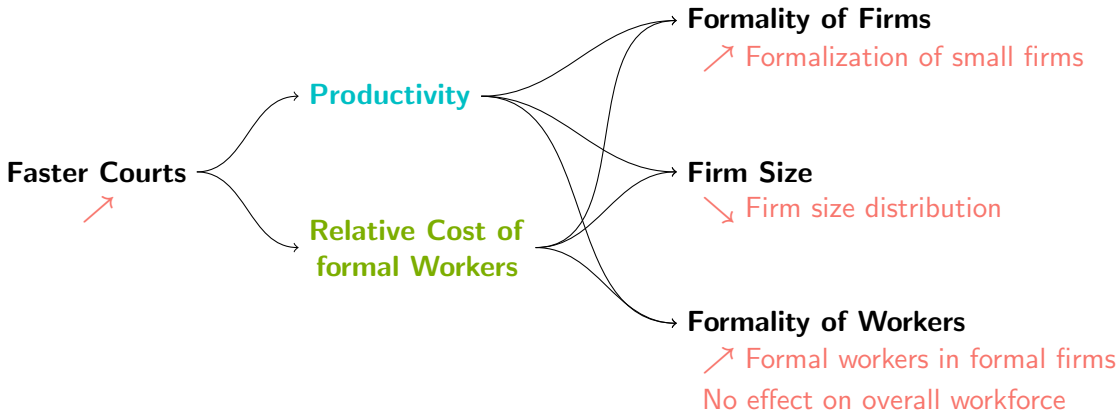

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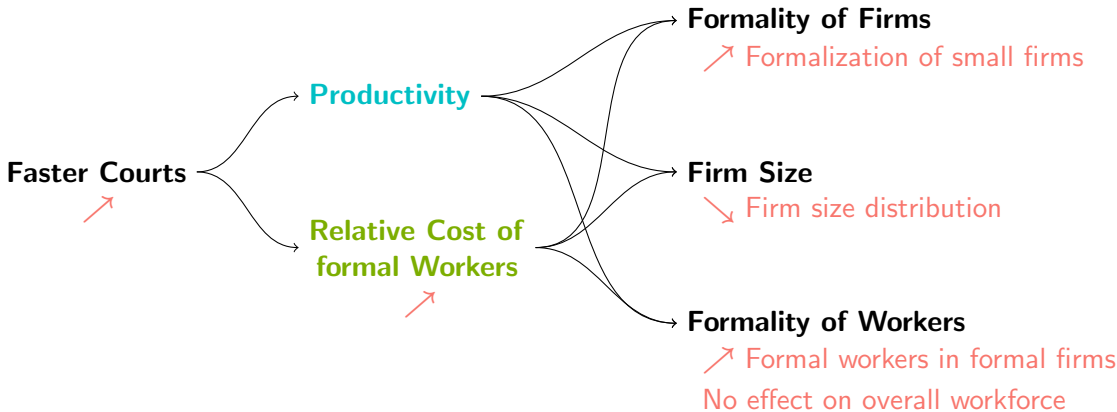


▸ Correlation ▸ Margins

Related Literature

Judiciary and workers: de la Parra & Bujanda (2020), Naidu & Yuchtman (2013), Kaplan & Sadka (2011), and many more...

⇒ **Allow for relative cost on formal workers**

Judiciary and firms: Boehm & Oberfield (2020), Amirapu (2017), Lilienfeld-Toal & al (2012), Visaria (2009), Klein, Crawford, and Alchian (1978), and many more...

⇒ **Allow for productivity shock**

Judiciary and Informality: Assenova & Sorenson (2017), Shapiro (2015), Dabla-Norris et al. (2008), Friedman et al. (2000), Johnson et al. (2000), and many more...

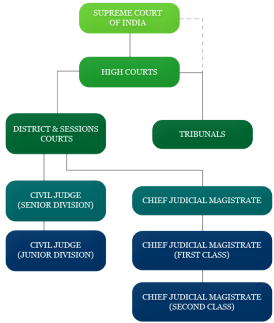
⇒ **Focus on causal link between courts and two margins of formality.**

⇒ **Propose model to study mechanism.**

Courts and Informality in India

1. **Informal workers**: Workers with no formal labor contract and no social security benefits
2. **Informal firms**: Self-employed + non registered firms which hire casual labor outside the own household
3. **D&S courts**: First instance for relevant cases
   $\Rightarrow$ Judges in these courts have to handle civil and criminal cases.

▸ Firm Size Descriptives ▸ Worker Descriptives



Judicial efficiency and firms

- Model à la Melitz (2003), extended by Ulyssea (2018)
- Introduce judicial efficiency in model

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- Firms decide to be formal or informal
- Heterogeneous firms produce one homogeneous good
- Endogenous Entry of firms
- Exogenous Exit

▸ Firms' Decisions ▸ Firms ▸ Informal Incumbents ▸ Fixed Costs ▸ Exit ▸ Entry ▸ After Entry ▸ Households

Formal incumbents

- Hire formal (l_f) and / or informal (l_i) workers

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$$\Pi_f(\theta, w, b) = \max_l \{(1 - \tau_y)\eta(b)\theta q(l) - C(l)\}$$

$$C(l) = \begin{cases} \tau_f(l)w & \text{for } l \leq \tilde{l} \\ \left[\tau_f(\tilde{l}) + (1 + \tau_w)(l - \tilde{l})\lambda(b)\right] w & \text{for } l > \tilde{l}. \end{cases}$$

Impact of court speed on informality?

1. $\eta'(b) = 0$, $\lambda'(b) = 0$:
   $\Rightarrow$ Variation in judicial efficiency has no impact on cost and revenues of firms
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   $\Rightarrow$ Extensive and intensive margin of informality decreases

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3. ...

▸ Prediction Table

Data on Court Speed: eCourt

Case level data from district and sessions courts, **aggregated at district level**

$$\textbf{Clearance Rate} = \frac{\#\text{ resolved cases}}{\#\text{ incoming cases}}$$

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	N	Mean	SD	Min	Max
Clearance Rate	189	0.32	0.43	0.001	1.59

Robustness in paper: Backlog, Average age of pending cases, Disposition time

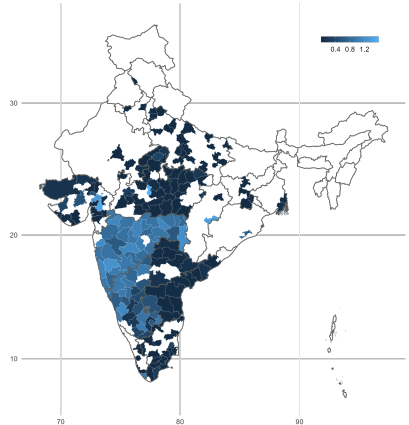
▸ Map of Indian Courts ▸ Hierarchy of Judicary ▸ Sample Selection ▸ Map of Districts

Data on Firms + Employment

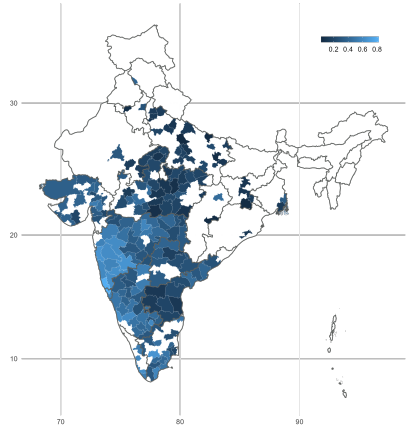
- **SUNAE 2010/11**: Survey on Unincorporated Non Agricultural Enterprises (Excluding Construction)
- **IEU 2009/10**: Indian Employment and Unemployment Survey
- **ASI 2009/10**: Annual Survey of Industries

Moment	Data Source
Firms being informal	ASI + SUNAE
Informal workers	IEU
Informal workers in formal firms	IEU
Revenue / worker of form. firms	ASI
Value of manuf. goods / worker of form. firms	ASI

Clearance Rate correlates with Informality



(a) Clearance Rate



(b) Share of Formal Firms

Estimation

- Impact of court efficiency on extensive and intensive margin?
- Signs of first derivatives of $\eta(b)$ and $\lambda(b)$?

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Estimate impact of court efficiency in district d on firm f's outcomes:

$$y_{fdr} = \alpha_r + \theta b_d + \gamma X_d + \epsilon_{fdr} \tag{1}$$

where:

- y_d: the outcome of interest in district d in years 2009/10.
- b_d: court efficiency in district d in 2008
- X_d: are district level controls
- α_r: region fixed effects

All regressions are clustered at the State x NIC4 level.

Endogenous Regressor

OLS biased and inconsistent if $\mathbb{E}[\epsilon_{fdr}|b_d] \neq 0$

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Instrument:

- Every court has a given number of judge positions
- Number of judges is important for court speed
- Many judge positions are vacant
- Judges rotate often
- Judge assignment quasi random
- Vacancies are changing quasi randomly

$\rightarrow$ **Mean share of occupied court rooms in district 2004-2008**

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$\rightarrow$ **Mean share of occupied court rooms in district 2004-2008**

Exogeneity violated IF

- judges always get preferred position and
- preferences of judges for district d are correlated with y_d.

▸ Instrument Distribution ▸ Maps ▸ Exogeneity

Impact on Firms' Formality Status

	Share of inf. Firms of all Firms of Size				
	(1)	(2)	(3)	(4)	(5)
	All	$\leq$ 2 Workers	$>$ 2 Workers	$\leq$ 10 Workers	$>$ 10 Workers
Clearance Rate	-0.163				
	[-0.268; -0.0573]				
First Stage F	325.37				
Region FE	Yes				
Controls	Yes				
N	142,528				

▸ First Stage ▸ Alternative Specification of IV

Impact on Firms' Formality Status

- Court Speed decreases share of firms being informal:
  If Clearance Rate ↗ by 1 p.p., informality ↘ by 0.16 p.p.

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	[-0.268; -0.0573]	[-0.294; -0.0727]	[-0.259; -0.00706]	[-0.273; -0.0629]	[-0.282; 0.123]
First Stage F	325.37	291.58	290.09	321.04	112.86
Region FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
N	142,528	91,590	50,938	122,920	19,608

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Impact on Firms' Formality Status

- Court Speed decreases share of firms being informal:
  If Clearance Rate ↗ by 1 p.p., informality ↘ by 0.16 p.p.
- Effect mainly driven by small firms (< 10 workers)

	Share of inf. Firms of all Firms of Size				
	(1) All	(2) ≤ 2 Workers	(3) > 2 Workers	(4) ≤ 10 Workers	(5) > 10 Workers
Clearance Rate	-0.163	-0.183	-0.133	-0.168	-0.0793
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Other Results

1. Faster courts lead to smaller firm size distribution ▸ Results Firm Size
2. Zero effect on overall formality of workers ▸ Results Worker Formality
3. Small positive or zero effect on share of formal workers in formal firms ▸ Results Worker Formality

▸ 2SLS int. Margin by Size ▸ 2SLS Revenue / worker ▸ 2SLS Values / worker

Implications

Back to the model: Link estimates to model.

$\Rightarrow$ Evidence for **case 2** from the comparative statics section.

$\eta'(b) = 0$: No direct effect of court speed on productivity / revenue

$\lambda'(b) > 0$: Court efficiency impacts firms via a cost on formal workers

▸ Predictions

Conclusion

- Investigate the **link between court efficiency and informality**
- Focus on both, **extensive and intensive margin**
- Propose **model** with productivity shifter and cost on formal workers
- Estimation via 2SLS, using **original dataset from India**

1. Court efficiency decreases share of informal firms
   Effect driven by small firms
2. Negative/zero impact of court efficiency on:
   - share of informal workers
   - share of informal workers in formal firms
3. **A Cost on formal workers can explain all observed effects**

Comments & Suggestions?
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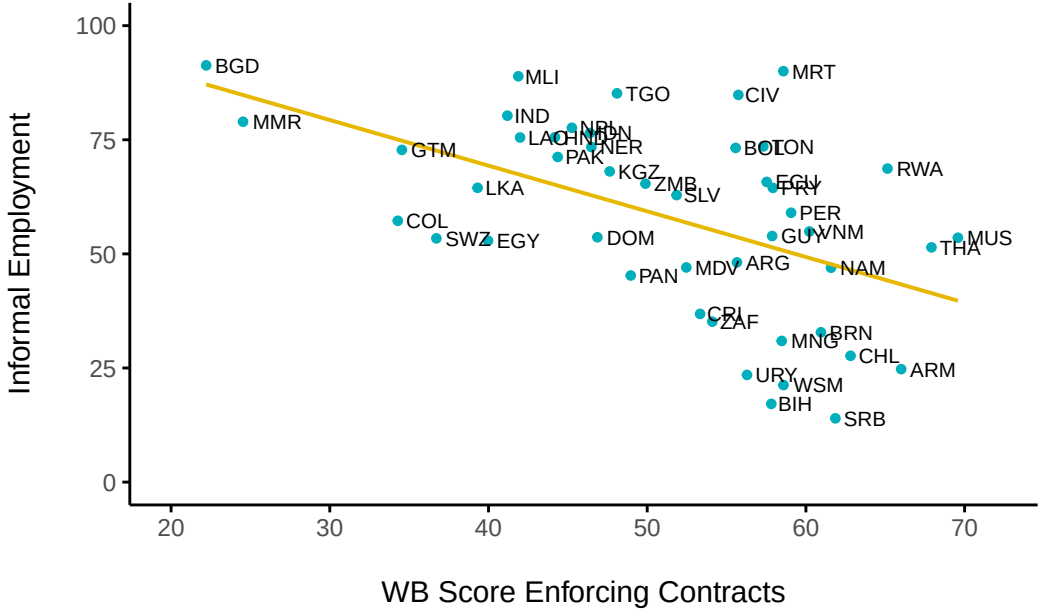
APPENDIX


Informal Employment
WB Score Enforcing Contracts
100
75
50
25
0
20
30
40
50
60
70
BGD
MMR
MLI
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LAO
NPL
HND
NER
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PAK
LKA
COL
SWZ
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TGO
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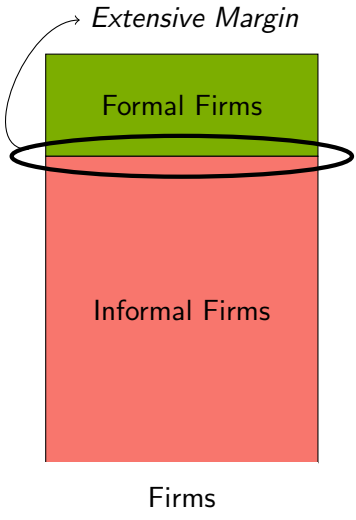
The (Indian) Economy



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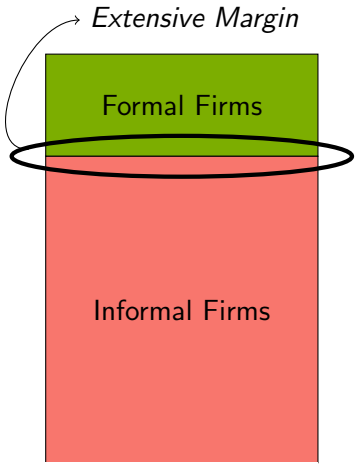
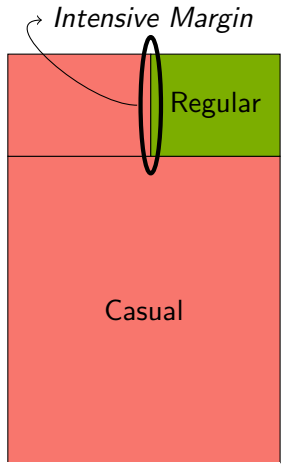
The (Indian) Economy





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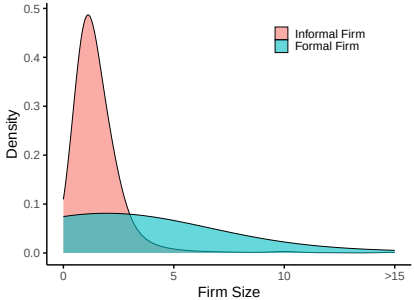
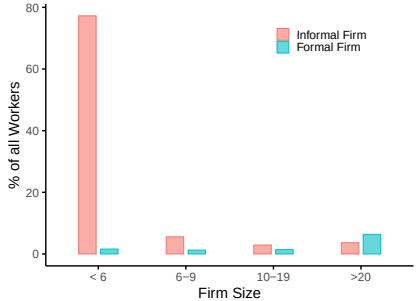
Informal and Formal Firm Size

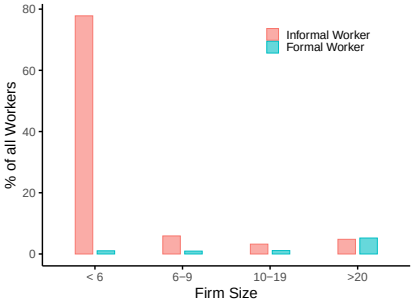


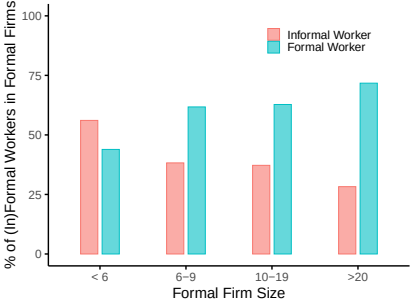


- Most firms are small, especially informal firms
- Overlap between formal and informal firm size distribution
- Almost all workers in small informal firms

Back

Informal and Formal Workers





- Large majority of workers is in very small firms
- Most of them are informal workers
- In small formal firms, around 1/2 of workers informal

Back

Firms' decisions

Firms observe noisy productivity signal

- can enter market or not
- if entering, decide to be formal or informal

Informal firms

- can stay informal, become formal or exit
- only hire informal workers

Formal Firms

- can stay formal or exit
- hire formal and informal workers

Back

Firms

- Firms produce homogeneous good
- Only input: labor l
- Same wage w for workers in formal or informal sector
- Heterogeneous in productivity θ (constant over time)

Production:

$$y(\theta, l) = \theta q(l).$$

with $q(\cdot)$ increasing, concave, twice continuously differentiable.

Back

Informal Incumbents

- Only hire informal workers
- Do not pay (labor and production) taxes
- Might be caught by the government with some probability + Can not enforce labor contracts
  $\Rightarrow$ Labor distortion $\tau_i(l)$ with $\tau_i', \tau_i'' > 0$

$$\Pi_i(\theta, w) = \max_l \{\theta q(l) - \tau_i(l) w\}$$

Back

Formal incumbents

- Hire formal (l_f) and / or informal (l_i) workers
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Fixed costs of operation

Firms have to pay a fix cost of operation: $\bar{c}_s$ for $s = f, i$
Profit for a firm in sector s net of fixed costs are given by:

$$\pi_s = \Pi_s(\theta, w, b) - \bar{c}_s.$$

Back

Exit

- If $\theta < \bar{\theta}$, where $\pi_s(\bar{\theta}, w) = 0$ firm exits immediately without producing
- Exogenous probability of death shock: δ_s

In steady state: Aggregate prices and θ remain constant
$\Rightarrow$ Firm's value function:

$$V_s(\theta, w, b) = \max\left\{0, \frac{\pi_s(\theta, w, b)}{\delta_s}\right\}$$

Back

Entry

- M potential entrants
- Potential entrants observe noisy signal $v \sim G$
- v and θ pos. correlated
- Fixed cost for entry: $E_f > E_i$
- After entry: draw $\theta \sim F(\theta|v)$

The expected value of entry for a firm with signal v is:

$$V_s^e(\theta, w, b) = \int V_s(\theta, w, b) dF(\theta|v)$$

Entry into sector s occurs if:

$$V_s^e(\theta, w, b) - E_s \geq \max\{V_{s'}^e(\theta, w, b) - E_{s'}, 0\}$$

Back

After entry

Informal Firms:

- stay informal
- become formal $\Rightarrow$ pay $E_f - E_i$
- exit
- death shock

Formal Firms:

- stay formal
- exit
- death shock

Back

Households

- Representative household supplies $\bar{L}$ units of labor
- Consumes the final good x:

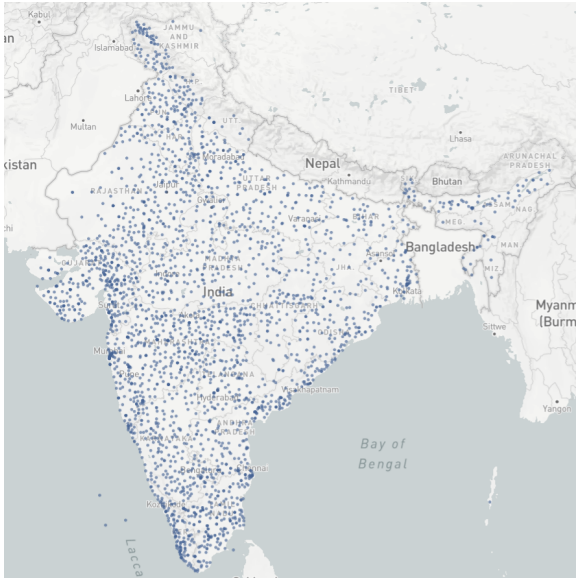
$$U(x) = \sum_{t=0}^{\infty} \beta^t u(x_t)$$

Back

How do outcomes react to an increase in b?

$\eta'(b)$	$= 0$	$= 0$	$= 0$	< 0	< 0	< 0
$\lambda'(b)$	$= 0$	> 0	< 0	$= 0$	> 0	< 0
Sh. form. I	.	+	-	-	+	?
Sh. form. I in form. firms	.	?	?	?	?	?
Sh. form. I in large form. firms	.	+	-	+	+	?
Sh. firms being formal	.	+	-	-	+	?
$\tilde{I}$	.	+	-	.	+	-
Revenue / I	.	+	.	-	-	-
Ex Factory Value of goods / I	.	+	.	-	-	-

▸ Model Cases ▸ Implications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Islamabad
JAMMU AND KASHMIR
Lahore
Multan
TIBET
Lhasa
Nepal
Kathmandu
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Yangon
Bay of Bengal

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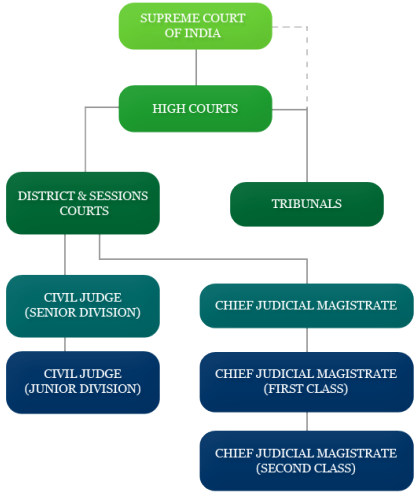
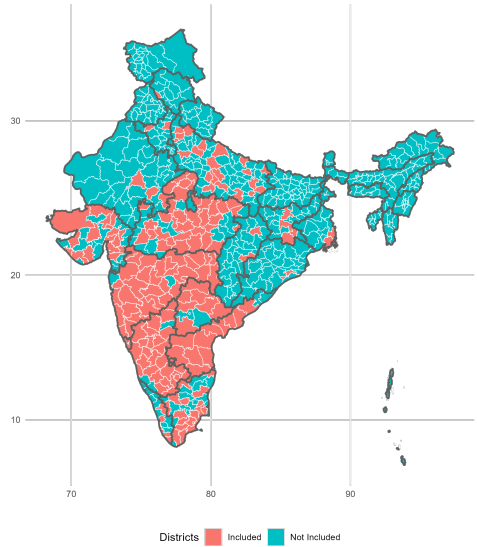

SUPREME COURT OF INDIA
HIGH COURTS
DISTRICT & SESSIONS COURTS
TRIBUNALS
CIVIL JUDGE (SENIOR DIVISION)
CHIEF JUDICIAL MAGISTRATE
CIVIL JUDGE (JUNIOR DIVISION)
CHIEF JUDICIAL MAGISTRATE (FIRST CLASS)
CHIEF JUDICIAL MAGISTRATE (SECOND CLASS)



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Sample Selection per Data Set in 2008 and 2013

Panel A: 2008

	Backlog	Avg Age	Clear. Rate	Disp. Time	IV	SUNAE	IEU	ASI
Initial	506	506	208	211	294	617	611	547
Remove NE + UT	454	454	193	196	266	511	507	483
Not in Dictionary	420	420	189	192	258	500	497	479

Panel B: 2013

	Backlog	Avg Age	Clear. Rate	Disp. Time	IV
Initial	523	523	493	495	505
Remove NE + UT	467	467	445	447	457
Not in Dictionary	428	428	415	417	

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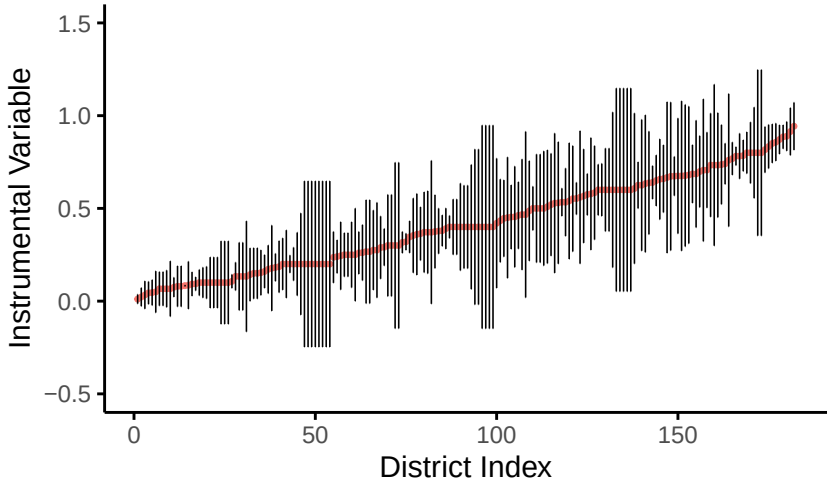
Instrumental Variable
1.5
1.0
0.5
0.0
−0.5
0
50
100
150
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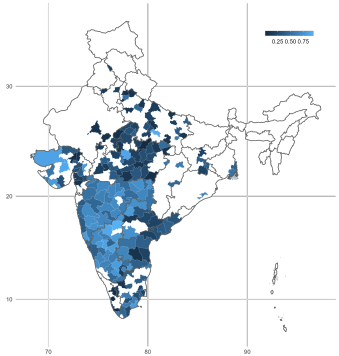
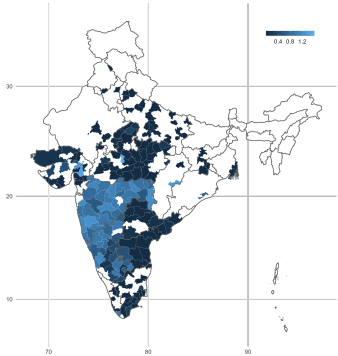
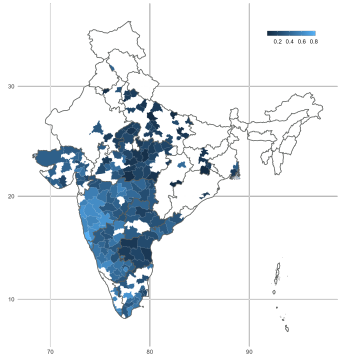


(a) Mean Occupied Courtrooms



(b) Clearance Rate



(c) Share of Formal Firms

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Why is this exogenous?

- Vacancies calculated based on population census (from 2001)
- High courts can not open up new vacancies in ST
- Judges at district courts rotate every 1 or 2 years
- Rotate only in same HC judiciary (until promotion / retirement)
- Can not be assigned to same district twice
- Assignment based on rank ordered list and seniority

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Relevance

	Clearance Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Courtrooms	1.011***	1.014***	0.992***	1.013***	0.998***	0.926***	0.809***
	(0.098)	(0.098)	(0.105)	(0.100)	(0.100)	(0.102)	(0.138)
Rural FE		×	×	×	×	×	×
Bank Credits			×				
Population				×			
Share SC					×	×	×
Share Literate						×	×
Region FE							×
F	106.33	35.45	22.38	26.81	29.77	38.97	27.34
Observations	189	187	170	187	187	187	187
Adjusted R^2	0.328	0.322	0.329	0.318	0.380	0.434	0.495

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Alternative Specifications of IV

	Clearance Rate				
	(1)	(2)	(3)	(4)	(5)
Courtrooms Mean 2004 - 08	0.809***				
	(0.138)				
Courtrooms Mean 2005 - 08		0.789***			
		(0.126)			
Courtrooms Mean 2003 - 08			0.842***		
			(0.152)		
Courtrooms Mean 2004 - 09				0.868***	
				(0.138)	
Courtrooms Median 2004 - 08					0.549***
					(0.111)
Region FE	×	×	×	×	×
Covariates	×	×	×	×	×
F	27.34	29.02	25.94	30.97	27.72
Observations	187	187	187	187	187
Adjusted R^2	0.495	0.511	0.493	0.511	0.463

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Impact on Firm Size

	All Firms			Formal Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
	Firm Size	$>$ 2 Workers	$>$ 10 Workers	Firm Size	$>$ 2 Workers	$>$ 10 Workers
Panel A: OLS						
Clearance Rate	-0.0290	0.0156	0.00142	-0.559	-0.00839	-0.00995
	[-0.344,0.286]	[-0.0224,0.0536]	[-0.00788,0.0107]	[-1.182,0.0646]	[-0.0686,0.0518]	[-0.0267,0.00684]
Adj. R2	-0.0000587	0.00192	0.0000356	-0.000108	0.000407	0.000954
Panel B: IV						
Clearance Rate	-0.404	-0.0541	-0.00862	-1.050	-0.136	-0.0352
	[-1.038; 0.230]	[-0.129; 0.0205]	[-0.0207; 0.00342]	[-2.117; 0.0173]	[-0.238; -0.0337]	[-0.0617; -0.00870]
First Stage F	325.37	325.37	325.37	405.01	405.01	405.01
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	142,528	142,528	142,528	71,567	71,567	71,567

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Impact on Firm Size

	All Firms			Formal Firms		
	(1) Firm Size	(2) > 2 Workers	(3) > 10 Workers	(4) Firm Size	(5) > 2 Workers	(6) > 10 Workers
Panel A: OLS						
Clearance Rate	-0.0290	0.0156	0.00142	-0.559	-0.00839	-0.00995
	[-0.344,0.286]	[-0.0224,0.0536]	[-0.00788,0.0107]	[-1.182,0.0646]	[-0.0686,0.0518]	[-0.0267,0.00684]
Adj. R2	-0.0000587	0.00192	0.0000356	-0.000108	0.000407	0.000954
Panel B: IV						
Clearance Rate	-0.404	-0.0541	-0.00862	-1.050	-0.136	-0.0352
	[-1.038; 0.230]	[-0.129; 0.0205]	[-0.0207; 0.00342]	[-2.117; 0.0173]	[-0.238; -0.0337]	[-0.0617; -0.00870]
First Stage F	325.37	325.37	325.37	405.01	405.01	405.01
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	142,528	142,528	142,528	71,567	71,567	71,567

- Faster courts ⇒ smaller firms

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Impact on Firm Size

	All Firms			Formal Firms		
	(1) Firm Size	(2) > 2 Workers	(3) > 10 Workers	(4) Firm Size	(5) > 2 Workers	(6) > 10 Workers
Panel A: OLS						
Clearance Rate	-0.0290	0.0156	0.00142	-0.559	-0.00839	-0.00995
	[-0.344,0.286]	[-0.0224,0.0536]	[-0.00788,0.0107]	[-1.182,0.0646]	[-0.0686,0.0518]	[-0.0267,0.00684]
Adj. R2	-0.0000587	0.00192	0.0000356	-0.000108	0.000407	0.000954
Panel B: IV						
Clearance Rate	-0.404	-0.0541	-0.00862	-1.050	-0.136	-0.0352
	[-1.038; 0.230]	[-0.129; 0.0205]	[-0.0207; 0.00342]	[-2.117; 0.0173]	[-0.238; -0.0337]	[-0.0617; -0.00870]
First Stage F	325.37	325.37	325.37	405.01	405.01	405.01
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	142,528	142,528	142,528	71,567	71,567	71,567

- Faster courts $\Rightarrow$ smaller firms
- If Clearance Rate $\nearrow$ by 1 p.p. $\Rightarrow$ share of formal firms > 2 $\searrow$ by 0.14 p.p.

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Impact on Worker Formality

	(1) Share of Form Workers	(2) Share of Form Workers in Form Firms
Panel A: OLS		
Clearance Rate	0.0234	0.0724
	[-0.0229,0.0698]	[-0.00733,0.152]
Adj. R2	0.00397	0.00376
Panel B: IV		
Clearance Rate	-0.00268	0.0532
	[-0.0726; 0.0672]	[-0.0838; 0.190]
First Stage F	81.64	136.52
Region FE	Yes	Yes
Controls	Yes	Yes
N	47,148	6,459

Impact on Worker Formality

	(1) Share of Form Workers	(2) Share of Form Workers in Form Firms
Panel A: OLS		
Clearance Rate	0.0234	0.0724
	[-0.0229,0.0698]	[-0.00733,0.152]
Adj. R2	0.00397	0.00376
Panel B: IV		
Clearance Rate	-0.00268	0.0532
	[-0.0726; 0.0672]	[-0.0838; 0.190]
First Stage F	81.64	136.52
Region FE	Yes	Yes
Controls	Yes	Yes
N	47,148	6,459

- Zero effect on overall formality of workers

Impact on Worker Formality

	(1) Share of Form Workers	(2) Share of Form Workers in Form Firms
Panel A: OLS		
Clearance Rate	0.0234	0.0724
	[-0.0229,0.0698]	[-0.00733,0.152]
Adj. R2	0.00397	0.00376
Panel B: IV		
Clearance Rate	-0.00268	0.0532
	[-0.0726; 0.0672]	[-0.0838; 0.190]
First Stage F	81.64	136.52
Region FE	Yes	Yes
Controls	Yes	Yes
N	47,148	6,459

- Zero effect on overall formality of workers
- Small positive or zero effect on share of formal workers in formal firms

	Share of inf. Workers in form. Firms of Size			
	< 6 Workers	$6-9$ Workers	$10-19$ Workers	> 20 Workers
	(1)	(2)	(3)	(4)
Panel A: OLS				
Clearance Rate	-0.08	-0.03	0.028	$-0.12^{\cdot}$
	(0.0794)	(0.0746)	(0.0749)	(0.0604)
Adj. R2	0	-0.02	0.04	0.01
Panel B: 2SLS				
Clearance Rate	-0.32^{*}	0.00058	0.31	-0.1
	(0.155)	(0.156)	(0.191)	(0.121)
Adj. R2	-0.05	-0.02	-0.05	0.01
First Stage F	63.41	51.3	47.28	54.51
Region FE	$\times$	$\times$	$\times$	$\times$
Controls	$\times$	$\times$	$\times$	$\times$
Observations	179	167	160	174

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	Gross Sales Value per Worker in Formal Firms of Size					
	Total	< 5 Workers	$5 - 10$ Workers	$11 - 20$ Workers	$21 - 50$ Workers	> 50 Workers
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
Clearance Rate	−1.1	1.2	0.75·	−3.2	−0.34	−0.37
	(1.13)	(0.952)	(0.443)	(3.28)	(0.461)	(0.485)
Adj. R2	0.01	0.04	0.04	0.02	0.02	0.03
Panel B: 2SLS						
Clearance Rate	−3.2	3.6	0.7	−8.9	−0.49	−1.3
	(3.64)	(2.5)	(0.762)	(10)	(0.924)	(0.967)
Adj. R2	-0.01	-0.02	0.04	0	0.02	0.01
First Stage F	55.39	27.53	45.24	52.11	58.06	54.6
Region FE	×	×	×	×	×	×
Controls	×	×	×	×	×	×
Observations	184	111	160	154	161	179

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	Ex Factory Value of Manufactured Goods per Worker in Formal Firms of Size					
	Total	< 5 Workers	$5-10$ Workers	$11-20$ Workers	$21-50$ Workers	> 50 Workers
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS						
Clearance Rate	−1.1	1.4	0.54	−3.5	−0.31	−0.34
	(1.13)	(0.953)	(0.455)	(3.27)	(0.527)	(0.447)
Adj. R2	0.02	0.05	0.03	0.03	0.01	0.05
Panel B: 2SLS						
Clearance Rate	−3.1	4	0.39	−9.4	0.18	−1.2
	(3.63)	(2.49)	(0.835)	(9.94)	(1.15)	(0.877)
Adj. R2	0	-0.02	0.03	0.01	0	0.03
First Stage F	55.39	27.53	45.24	52.11	58.06	54.6
Region FE	×	×	×	×	×	×
Controls	×	×	×	×	×	×
Observations	184	111	160	154	161	179

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