

“The Simple Economics of Extortion:
Evidence from Trucking in Aceh”

Comments on Olken & Barron by
Justin Wolfers, Wharton & NBER

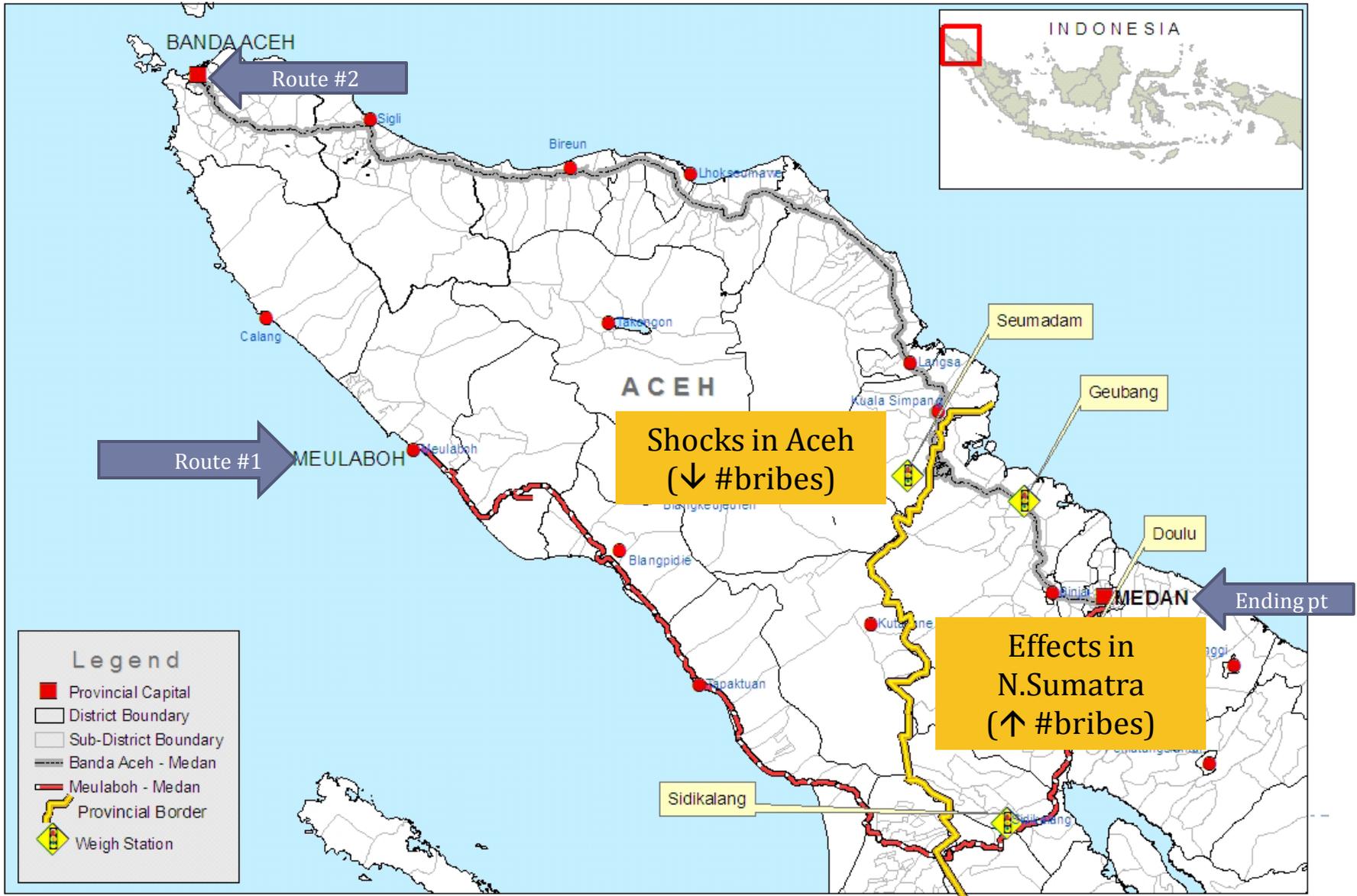
NBER Economics of Crime Working Group
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The Research Innovation

- ▶ Observe actual bribes in the field



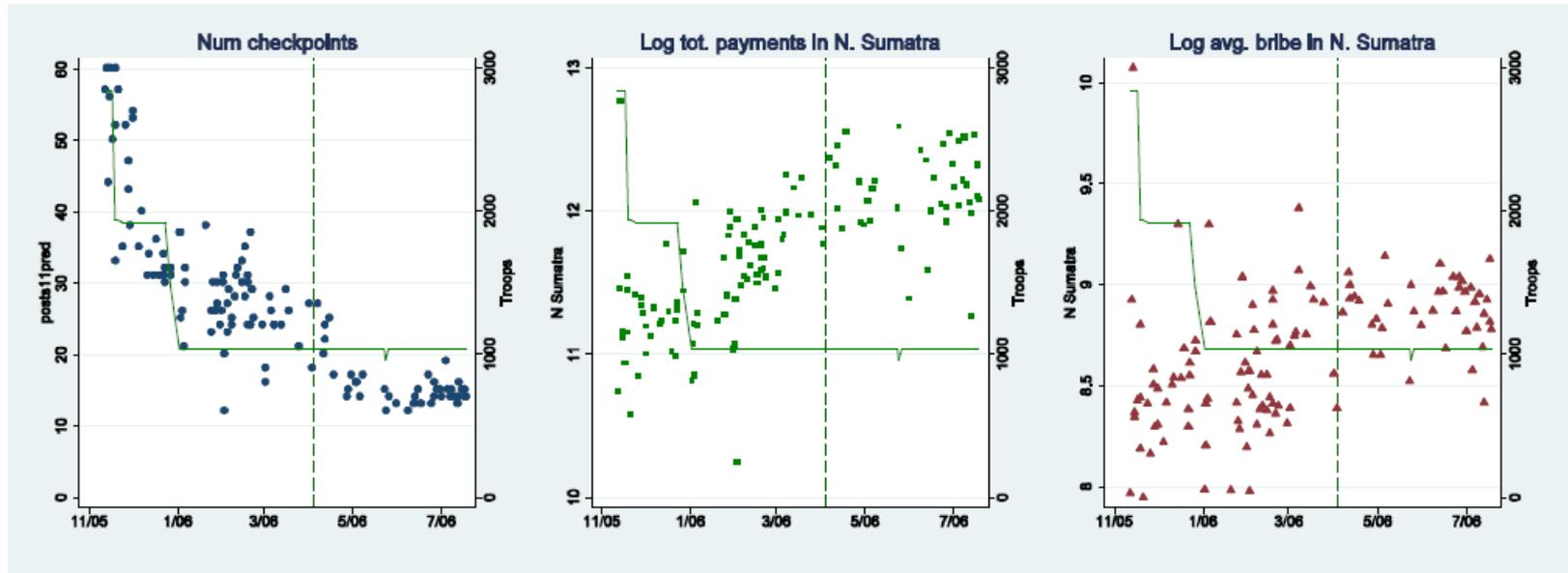
Understanding the context



Primer on Indonesian Trucking

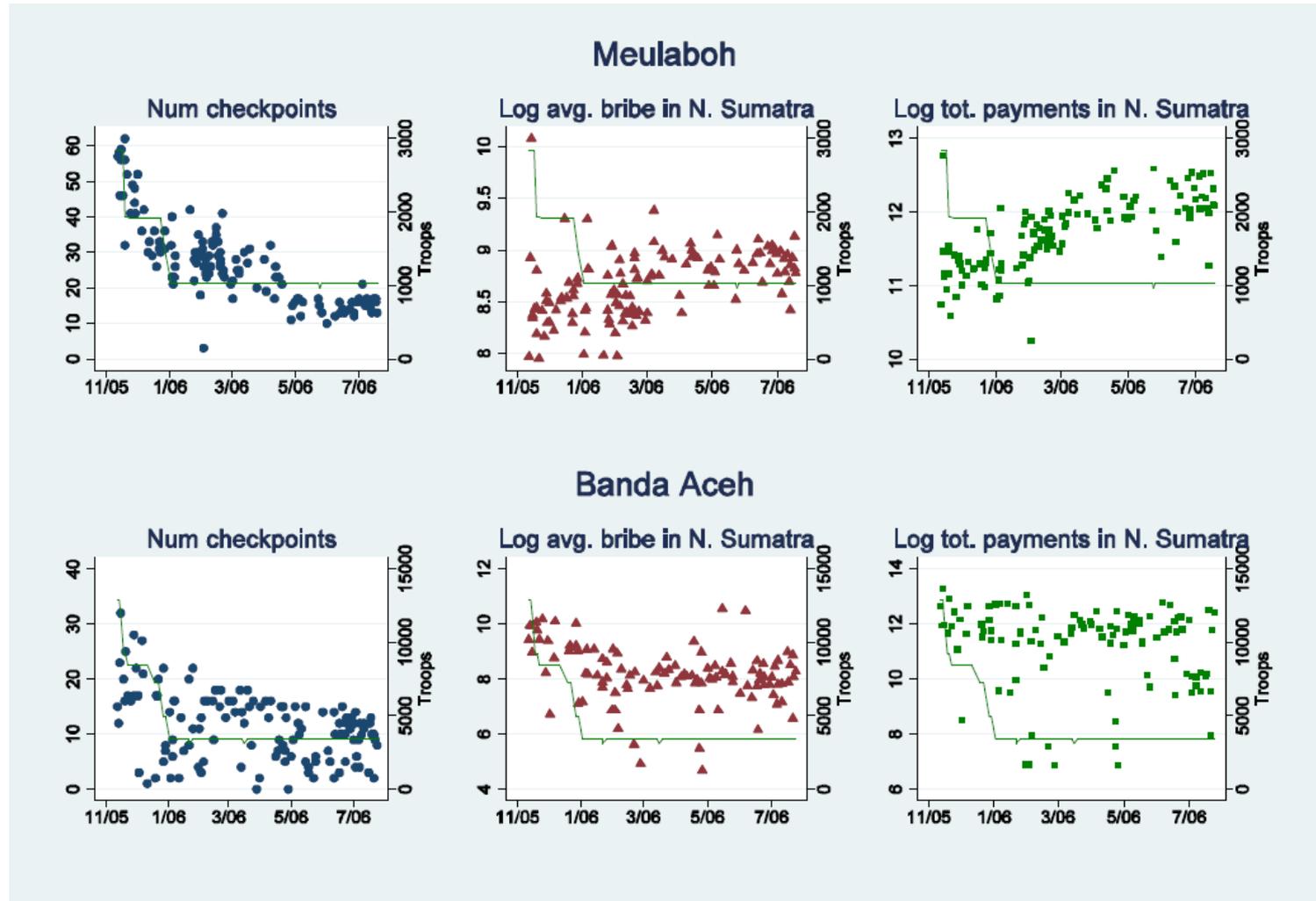
- ▶ **Corrupt institutions**
 - ▶ Military checkpoints
 - ▶ Officially for safety / security
 - ▶ Actually for collecting “tolls”
 - ▶ Weighing stations (2 on each road)
 - ▶ Protection payments
 - ▶ Sometimes to travel as part of a protected (military) convoy
 - ▶ **Shocks**
 - ▶ Peace agreement in Aceh \Rightarrow 60% of military withdrawn
 - ▶ Reducing #military checkpoints (had already occurred in Banda Aceh)
 - ▶ Olken & Barron study “goes public”
 - ▶ **Data collection**
 - ▶ Achenese surveyors accompanied drivers on 282 trips
 - ▶ Truck data: Expenditures; weight; cargo
 - ▶ Checkpoint data: Police / army; #officers; presence of guns
 - ▶ Bribe data: Time; location; \$ paid
 - ▶ Yields different results than driver interviews
 - ▶ Hawthorne effects unlikely
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Impact of Military Withdrawal in Aceh on Bribes in North Sumatra



Green line = #troops in Aceh
Dashed line = Olken press conference

Impact of Military Withdrawal in Aceh: Both Routes



Econometrics: Impact of Checkpoints in Aceh on Bribes in North Sumatra

- ▶ Exploit time series variation due to troop movements out of Aceh
 - ▶ Checkpoint-trip observations \Rightarrow Average price regression:
$$\text{Log}(\text{Price in North Sumatra}_{c,t}) = \beta \text{Log}(\text{Expected posts}_{c,t})$$
 - ▶ Controls: Include checkpoint fixed effects
 - ▶ Cluster standard errors in two dimensions: trip; checkpoint
 - ▶ Trip observations \Rightarrow Total payments regression:
$$\text{Log}(\text{Total bribes in North Sumatra}_t) = \beta \text{Log}(\text{Expected posts}_t)$$
 - ▶ Newey-West standard errors
 - ▶ $\text{Log}(\text{Expected posts})$ isolates variation from Aceh only
 - ▶ Mean #checkpoints in Aceh in two-week period (exc. this trip)
 - ▶ Mean #checkpoints in North Sumatra over whole sample (no variation)
 - Can IV Expected posts using $\text{Log}(\text{Troops}_i)$
 - Possible control group: Banda Aceh route (\Rightarrow Diff-in-diff ID's common trends)
 - ▶ Both specifications live off time-series variation only
 - ▶ Theory
 - ▶ Centralized price fixing: $\beta = -1$
 - ▶ Independent (naïve / non-rational) pricing: $\beta = 0$
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Impact of Military Withdrawal on Bribes

Table 2: Impact of number of checkpoints in Aceh on bribes in North Sumatra

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	IV	OLS
<i>Panel A: Log average payment at checkpoint</i>					
Log expected checkpoints on route	-0.545*** (0.157)	-0.580*** (0.167)	-0.684*** (0.257)	-0.788*** (0.217)	-0.808*** (0.196)
Sample	Meulaboh	Meulaboh	Meulaboh Pre-Press Conf.	Meulaboh	Both Routes
Truck controls	No	Yes	Yes	Yes	Yes
Common time effects	None	None	None	None	Cubic
Observations	1941	1720	1069	1720	2715
Test elas = 0	0.00	0.00	0.01	0.00	0.00
Test elas = -1	0.00	0.01	0.22	0.33	0.33
<i>Panel B: Log total payments</i>					
Log expected checkpoints on route	-0.736*** (0.064)	-0.695*** (0.069)	-0.643*** (0.237)	-0.782*** (0.131)	-1.107** (0.444)
Sample	Meulaboh	Meulaboh	Meulaboh Pre-Press Conf.	Meulaboh	Both Routes
Truck controls	No	Yes	Yes	Yes	Yes
Common time effects	None	None	None	None	Cubic
Observations	161	144	90	144	249
Test elas = 0	0.00	0.00	0.01	0.00	0.01
Test elas = -1	0.00	0.00	0.14	0.10	0.81

Reject both straw men: Pricing neither centralized nor naïve.

Serious Econometric Concern

- ▶ Interested in isolating variation in *Expected Posts* from Aceh only
 - ▶ $E[\text{Expected Posts}] = E[\text{Posts}_{\text{Aceh}}] + E[\text{Posts}_{\text{North Sumatra}}]$
 - ▶ $E[\text{Posts}_{\text{North Sumatra}}] = \gamma_{\text{NS}} * \text{Full sample mean}$
 - ▶ $E[\text{Posts}_{\text{Aceh}}] = \gamma_{\text{Aceh}} * \text{Average posts in Aceh over two week period}$
 - ▶ Imposes $\gamma_{\text{NS}} = \gamma_{\text{Aceh}} = 1$
 - ▶ But by shrinkage principle: $\gamma_{\text{Aceh}} < 1$
 - ▶ If any noise or measurement in two-week average
⇒ BLUE estimator attenuates by signal-to-noise ratio
 - ▶ Easy fix: IV
 - ▶ First stage regression: $\text{Posts}_{\text{Aceh}} = \gamma_{\text{Aceh}} * \text{Average posts in Aceh}$
 - ▶ Existing IV regression don't deal with this re-scaling issue
 - ▶ Current first stage: $\text{Log}(1 * \text{Posts}_{\text{N.Sumatra}} + 1 * \text{Posts}_{\text{Aceh}}) = \delta \text{Log}(\text{Troops}_{\text{Aceh}})$
 - ▶ Implications:
 - ▶ Olken-Barron estimate is the reduced-form
 - ▶ Wald estimator = Olken estimates / γ_{Aceh}
 - ▶ Results likely to support (or fail to reject) centralized model
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Exploiting Variation in Timing of Withdrawals

- ▶ Each trip passes through ten police/military districts
 - ▶ Exploit variation across space in timing of withdrawal in Aceh
- ▶ Trip*district observations \Rightarrow Total payments regression:

$$\text{Log}(\text{Payments}_{d,i}) = \beta \text{Log}(\text{Expected posts}_{d,t})$$
 - ▶ Allows: Trip fixed effects \Rightarrow No longer living off agg. time series variation
 - ▶ District fixed effects (and district*direction)

Table 3: Impact of number of checkpoints on total payments in district

	(1)	(2)	(3)	(4)
	OLS	IV (troops)	OLS	IV (troops)
Log expected checkpoints in District	0.663*** (0.081)	1.522*** (0.390)	0.586*** (0.082)	0.786** (0.359)
Sample	Meulaboh	Meulaboh	Both Routes	Both Routes
Observations	1090	1026	1435	1363
Test elas = 0	0.00	0.00	0.00	0.03
Test elas = 1	0.00	0.18	0.00	0.55

- ▶ Dependent variable now: *Payments in a district / Trip_i*
 - ▶ Measures allocation of bribes within a trip, not overall level of bribes
 - ▶ Centralized corruption within districts: $\beta=0$
 - ▶ Non-rational pricing: $\beta \geq 1$

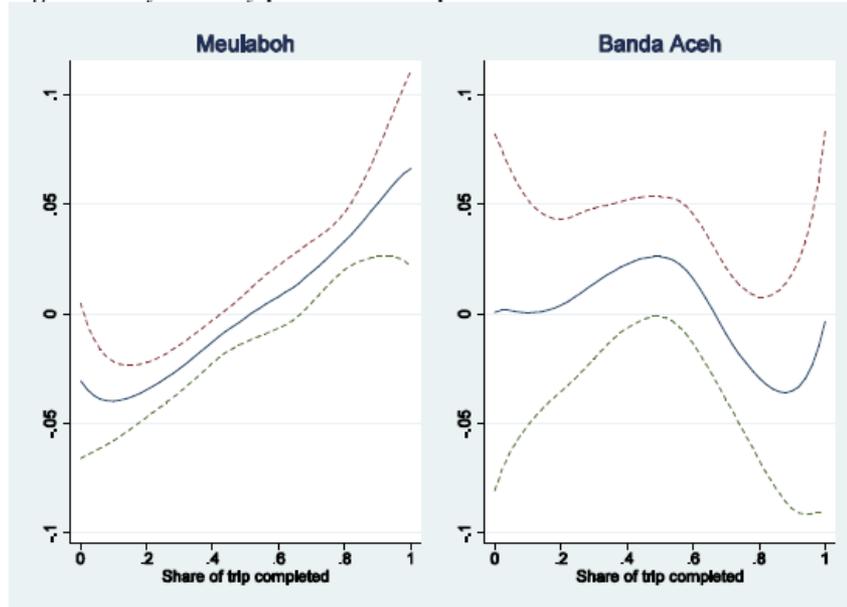
Some Theory and a Question:
What has been falsified?

Welfare Implications

- ▶ “Policy shock”
 - ▶ Before sample: 90 checkpoints per trip
 - ▶ After withdrawal: 18 checkpoints per trip ($\Delta n = \downarrow 80\%$)
- ▶ Pricing implications
 - ▶ Elasticity of average price per checkpoint to #checkpoints ≈ -0.55
 - ▶ Elasticity of total bribes to #checkpoints = $1 - 0.55 = 0.45$
 $\Rightarrow \Delta \text{bribes} \downarrow 51\%$
- ▶ Quantity implications
 - ▶ Price elasticity of demand for fuel ≈ -0.1
 - ▶ Convert Δbribes to equivalent fuel surcharge
 - ▶ Trucking increases 1.2% (from about 6,000 trips per month)
- ▶ Welfare implications
 - ▶ Deadweight loss fell by \$28,000
 - ▶ Redistribution of \$1.6m
- ▶ Are these welfare implications dependent on market structure?
 - ▶ Key parameter is on the demand side (trucking is inelastic)
 - ▶ If prices centralized $\Rightarrow \Delta \text{bribes} = 0$
 - ▶ If prices naively exogenous $\Rightarrow \Delta \text{bribes} \downarrow 80\%$
 - ▶ If policy changes industrial organization of sector (destroys centralization)...

Evidence of hold-up

Figure 4: Payments by percentile of trip



Exploit trips in both directions

$\text{Log}(\text{Price}_{c,i}) = \beta \text{ Checkpoints passed}$

+ trip fixed effects

+ checkpoint*month fixed effects

Table 5: Sequential bargaining and increasing prices

	(1)	(2)
Mean percentile	0.145*** (0.045)	-0.178 (0.225)
Sample	Meulaboh	Banda Aceh
Observations	4190	1089

Bargaining versus Fixed Prices

- ▶ Factors may increase bargaining power:
 - ▶ Is the officer carrying a gun?
 - ▶ How many officers are visible?
- ▶ Does this affect:
 - ▶ Amount paid
 - ▶ Probability of negotiation over payment

Table 4: Bargaining vs. fixed prices

	(1)	(2)
	Log Payment	Negotiate dummy
Gun visible	0.166*** (0.056)	0.042*** (0.015)
Number of people at Checkpoint	0.047*** (0.009)	0.017*** (0.004)
Observations	5260	5281
Mean dep. Var	8.49	0.13

Controlling for:

- Trip fixed effects
- Checkpoint*month*direction

- ▶ What is the (implicit) labor supply model here?
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Evidence of Third Degree Price Discrimination

Checkpoints:

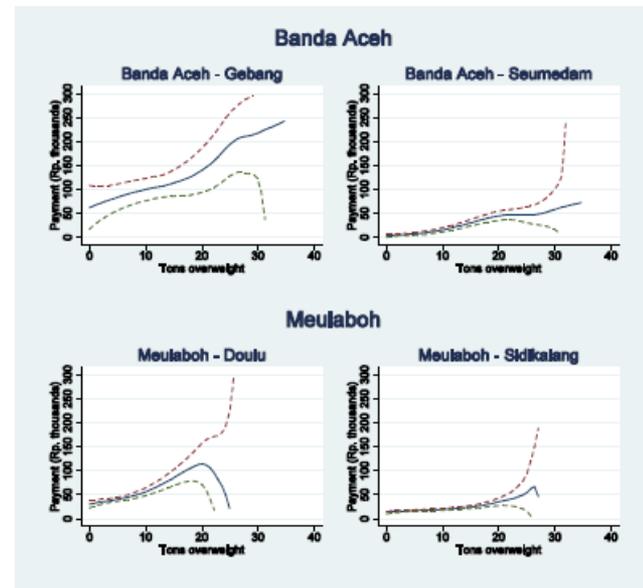
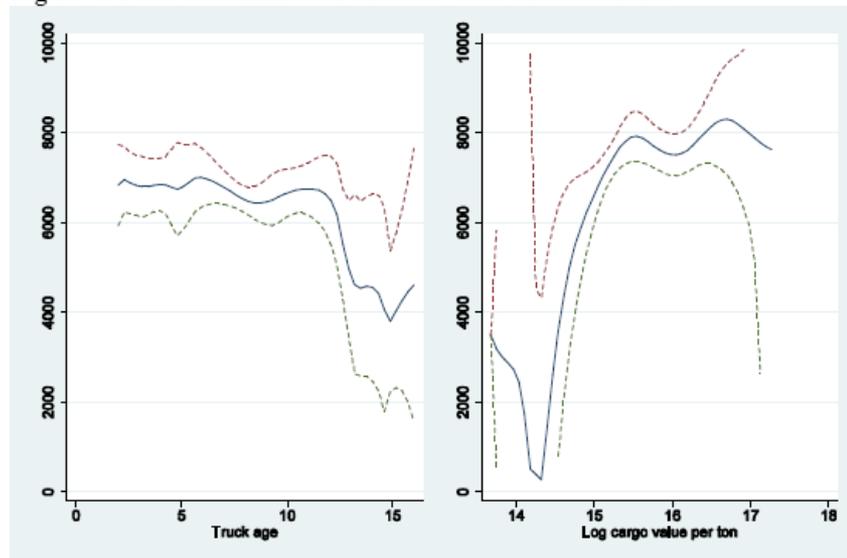
Price varies with truck and cargo characteristics

Weighing Stations:

Price varies with potential fine

- Not socially efficient

Figure 4: Price discrimination on observable characteristics



Evidence of 2nd degree price discrimination

Menu of two-part tariffs

A. Arrive at weigh station

$$Price = 18.50 + 1.20 * \max(w - 10, 0)$$

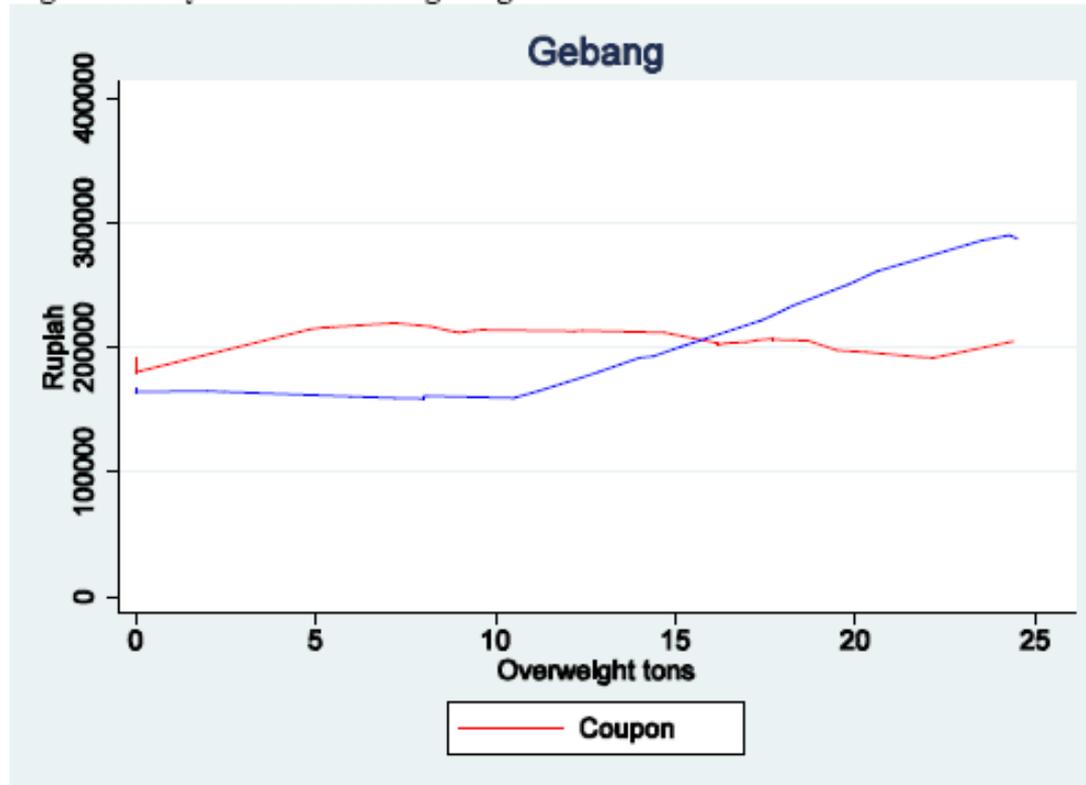
B. Pre-purchase date-stamped coupon

$$Coupon = \$16.30$$

$$Fixed\ bribe = \$5.50$$

Crossing point at 16 tons

Figure 5: Payments at Gebang weigh station



What's Missing?

- ▶ Where is the supply side?
 - ▶ Prices and profitability change => Why don't we see entry?
 - ▶ Where is the criminal justice system?
 - ▶ Investments in bargaining power
 - ▶ What is being falsified?
 - ▶ Centralization of price setting
 - ▶ Monopolist sets prices where elasticity of demand = -1
 - ▶ Only collect tolls in one location
 - ▶ Decentralized price-setting
 - ▶ $-1 \leq$ Price elasticity of demand ≤ 0
 - ▶ "Exogenous" prices is a straw man
 - ▶ What model generates pricing where elasticity = 0?
 - ▶ What is generalizable?
 - ▶ Jakarta-Bandung road: Payments are monthly
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Conclusions (Broad and overstated)

- ▶ Shleifer and Vishny were right
 - ▶ The industrial organization of corruption shapes its impacts
 - ▶ First-order implications for welfare analysis
 - ▶ Important policy impacts
 - ▶ “New empirical IO” versus “New new empirical IO”
 - ▶ Alternatively: “Beckerian IO”
 - ▶ This paper: Industrial organization of corruption
 - ▶ Big question
 - ▶ Policy implications
 - ▶ Interesting(!)
 - ▶ Written within a year of the experiment
 - ▶ Emerging theme in economics: Industrial organization of important things:
 - ▶ Political economy
 - ▶ Media
 - ▶ Crime
 - ▶ Marriage market
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Some fun themes

- ▶ **Primary data collection can be tough**
 - ▶ “Due to the clandestine nature of the survey, and the military occupation underway when the survey began...”
 - ▶ **But it is important**
 - ▶ “on average the bribes drivers reported in interviews were more than double the amount of the bribes we recorded by direct observation”
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