Superstitious Belief Versus Nudge as Contract-Enforcing Mechanisms: Evidence from a Field Experiment

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Motivation

▶ An influential body of literature arguing that contract enforcement is important for economic growth (MacLeod, 2007; Greif, 2005; North, 1981)

▶ When formal contract-enforcing mechanisms are lacking or weak, can informal mechanisms help enforce contracts? (evidence from the lab/lab-in-the-field exists)

▶ We use a *field* experiment to examine the performance of the following two mechanisms as a contract-enforcing device in a real marketplace

  ▶ Superstitious belief
  ▶ Nudge

▶ Emerging literature on the cost of superstitious beliefs

  ▶ E.g., 13th floor labeled as the 14th hampers emergency response (Perkins, 2002); disproportionate number of births in dragon years causes demand spikes for limited public services (Wong and Yung, 2005)

▶ Large literature showing that nudge (Thaler & Sunstein, 2008) can promote desirable behavior in various domains

  ▶ health, energy, savings, law compliance, charitable giving, etc. (see Egan (2013)'s database on nudge for an overview)

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Key features of this paper

- A natural field experiment in a marketplace fraught with contractual breaches

  - Sellers violate the provisions of a contract (cheat on the *weight*) reached via bilateral bargaining and it is hard to detect the breach and costly to enforce the contract

  - Contractual breach can more than offset the material gain from bargaining (Dugar & Bhattacharya, 2019)

- We examine the impacts of our interventions on the incidence of contractual breaches using the following treatments:

  - Superstition: Sellers' superstitious belief that the *first transaction of the day* (*aka 'bohni'*) is auspicious is rendered salient

  - Nudge: Buyer says to the seller *'Give everything all right'* after bargaining but before the weighing of the good

  - Baseline: Neither the first transaction of the day nor includes the nudge

The marketplace and the purchased good

- An established decentralized marketplace - large retail fish markets in Kolkata, the capital city of West Bengal (India)

  - Fish is a vital part of Bengali cuisine; a marker of Bengali identity (Walker, 1998)

  - Kolkata, with approximately 4.5 million population (2011 Census of India), has 81 large retail fish markets

  - Interventions in 16 large retail fish markets of Kolkata

- We purchased Rohu, a common Indian carp ▶ Rohu image

  - High demand and supply across all seasons, affordable

  - Purchasing a desired quantity by cutting Rohu into pieces is common

  - Seller can provide desired quantity by cutting small enough pieces ($\sim$ divisible good)

  - Average purchase quantity per transaction is about 1Kg (sellers' survey and literature)

Important features of the markets

▶ Based on pre-experiment survey of 200 buyers and 200 sellers:

  ▶ Prices are set by face-to-face negotiations i.e. buyers and sellers engage in alternating, sequential offer bargaining (83% buyers said they bargain)

  ▶ Sellers cheat on the *weight* of the fish purchased and cheating is subtle and difficult to detect even for experienced buyers

    ▶ 91% of buyers and 94.5% of sellers perceive the probability of getting caught from cheating close to zero if cheating $\leq$ 100 grams | 1Kg purchase

  ▶ Formal (e.g., regulations) and informal (e.g., monitoring) contract-enforcing mechanisms missing - almost no consequences for sellers for cheating up to a point

    ▶ Inspection of weights and scales by government officials is rare (82% sellers said rarely)

  ▶ High proportion of non-repeat buyers (67% non-repeat); reduced concern of reputation loss

  ▶ Each market is populated with over 50 sellers and hundreds of customers during the peak business hours (8am to 10am)

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The modus operandi of cheating

▶ Sellers typically use hand-held weighing scales ▸ Weighing scale image

▶ Cheating techniques are subtle and include:

    ▶ Rigged measurement weights (usual weight denominations 25grams, 50grams, 100grams, 500grams, 1Kg and so on)

    ▶ Rigged scale

    ▶ Skillful maneuver of the scale

▶ Nearly impossible even for an experienced buyer to detect by visual scrutiny unless the weight discrepancy is remarkably large

▶ None of the 200 buyers surveyed said they caught a cheating seller and 98% of them have never reweighed the purchased fish

▶ Costly to verify whether cheating occurred even after the purchase

Experimental design and procedure

▶ Three treatments: Baseline, Nudge, Superstition

▶ Within-seller design: Three observations (one for each treatment) per seller

▶ Procedure: Each transaction involved requesting for a discount of 10 Rupees and purchasing 1Kg of Rohu cut into pieces ▶ Bargain protocol diagram

  ▶ Four (or three) experimenter-buyers visited a market very early in the day and made a purchase after confirming that he is the first buyer for the seller

  ▶ Two more experimenter-buyers visited the same market and the same sellers during peak business hours and sequentially made purchases

    ▶ One purchased with the nudge and the other purchased without the nudge

  ▶ The buyers recorded the quoted and final prices, and we measured weight discrepancies using a calibrated digital scale ▶ Digital scale image

  ▶ The Nudge and Baseline treatment orders and experimenter roles were randomized

▶ Total 61 observations (triplets) from 16 markets

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The experimenter-buyers

- All male

- Belonged to age group 20-25 years

- Well versed in the local language, Bengali

- Experienced in purchasing fish

- Dressed in casual clothing so that they blend well among the buyers in the markets

Summary statistics of prices by treatment

	Baseline		Nudge		Superstition	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Price Quote (p)	**287.87**	7.61	**287.87**	7.61	**287.87**	7.61
Final Price ($p - d$)	**282.29**	7.56	**282.29**	7.56	**287.46**	7.34
Bargain Success [#]	**0.59**	0.50	**0.59**	0.50	**0.07**	0.25

Note: [#] denotes a binary variable; p, d in Rupees per Kg; sample size 61 for each treatment.

- ▶ Price quotes identical across treatments

- ▶ Bargain success ($d > 0$) incidence significantly lower in *Superstition*

▶ Weight discrepancy: $x =$ quantity purchased - quantity received (measured in grams)
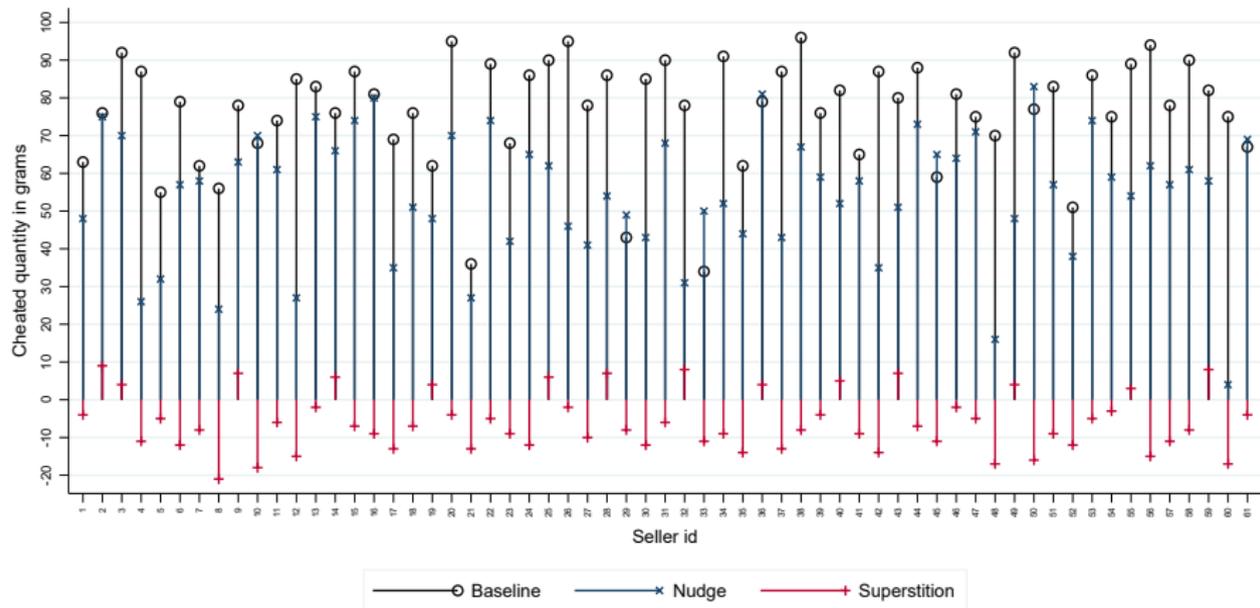
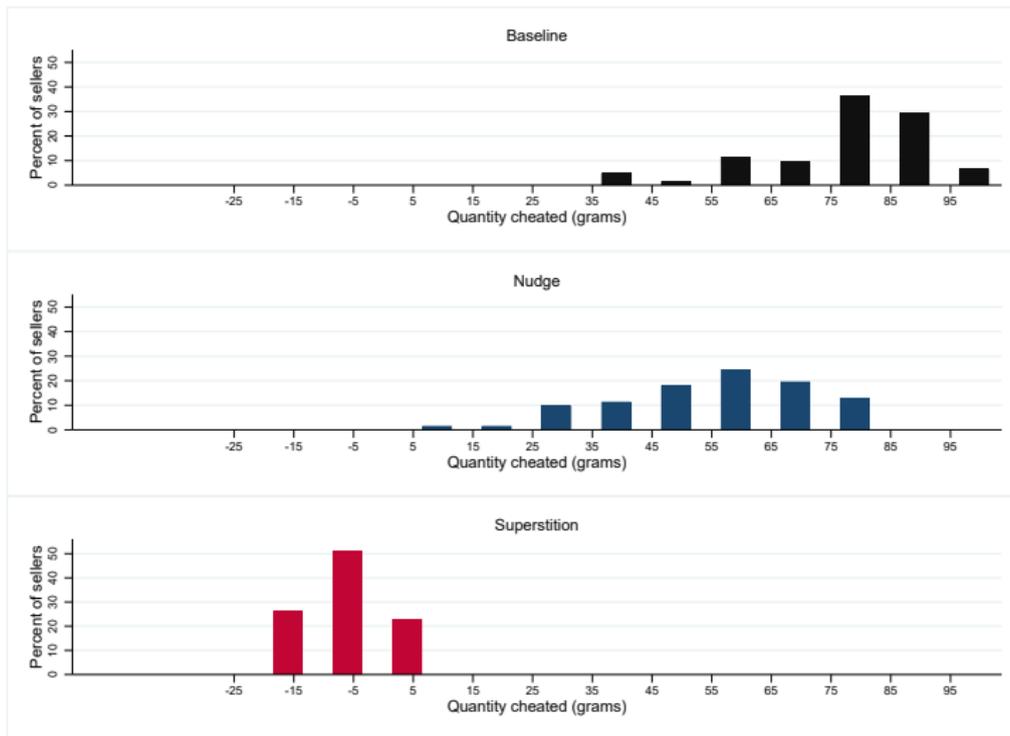|	Baseline		Nudge		Superstition	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
$x > 0^{\#}$	**1**	0	**1**	0	**0.23**	0.42
$x \geq 25^{\#}$	**1**	0	**0.95**	0.22	**0**	0
$x \geq 50^{\#}$	**0.95**	0.22	**0.66**	0.48	**0**	0

Note: $^{\#}$ denotes a binary variable; sample size 61 for each treatment.

▶ Sellers carry 25 gram and 50 gram weights $\Rightarrow$ significant for market transactions

▶ Evident that weight discrepancies are not random measurement errors

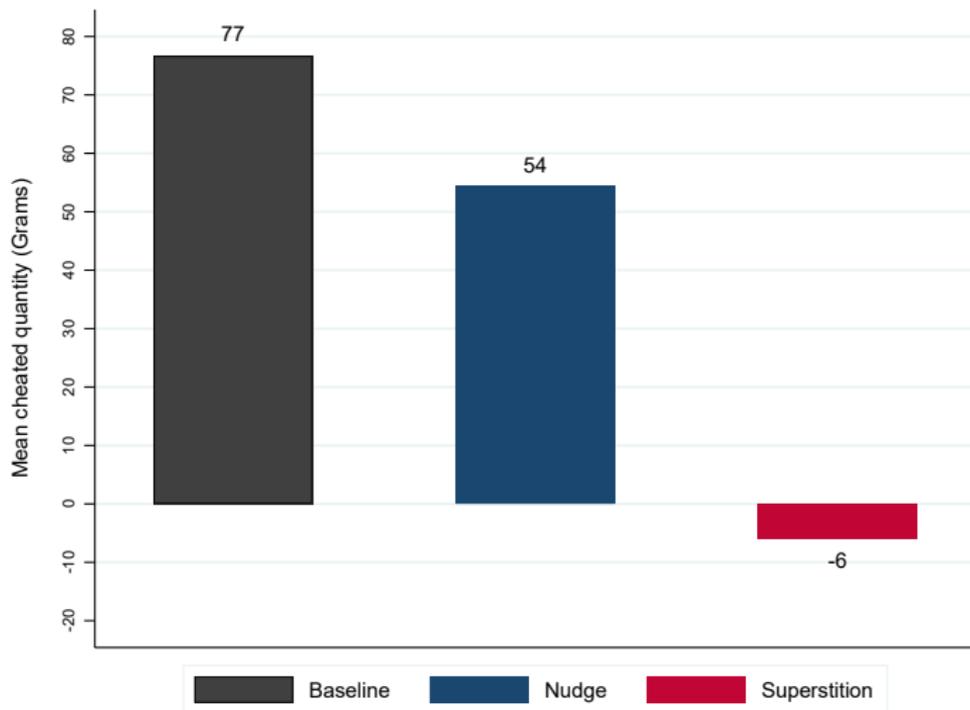   ▶ $\therefore$ we refer to x as cheated quantity

x by seller id

Histogram of x by treatment

Results

▶ Statistics of paired differences, comparative tests and regression results for cheated quantity $[x]$ and cheated value $[v = x(p - d)/1000]$ show that

  ▶ $\bar{x}_{Baseline} > \bar{x}_{Nudge} > \bar{x}_{Superstition}$

  ▶ $\bar{v}_{Baseline} > \bar{v}_{Nudge} > \bar{v}_{Superstition}$

  ▶ Paired differences ▶ Comparative tests ▶ Regressions

▶ The resulting buyer surplus $[S = V - (p - d) - v$, where V is common buyer valuation of the product] therefore follows the following pattern:

  ▶ $\bar{S}_{Baseline} < \bar{S}_{Nudge} < \bar{S}_{Superstition}$

Conclusion

- The nudge significantly reduces cheated quantity relative to *Baseline*
  - however it does not eliminate cheating

- By contrast, when a buyer happens to be the first buyer, the sellers do not cheat altogether

- The intrinsic superstitious belief of the sellers about first transaction of the day has a much stronger effect on their cheating beahvior than the extrinsic nudge by a buyer that implicitly conveys an expectation of a fair transaction

- Therefore, informal mechanisms do help in contract enforcement

Thank You!
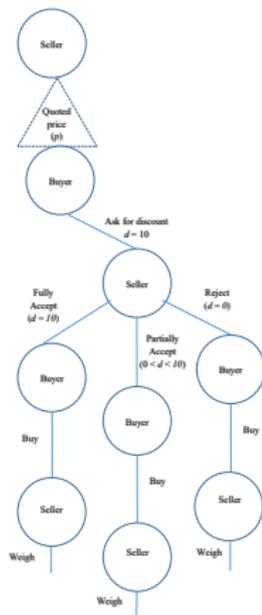
Summary statistics of paired differences

	Baseline - Nudge	Nudge - Superstition	Baseline - Superstition
Price quote (p)	0	0	0
	(0)	(0)	(0)
Final price ($p - d$)	0	-5.16	-5.16
	(0)	(4.74)	(4.74)
Cheated quantity (x)	22.33	60.29	82.62
	(18.16)	(16.03)	(14.13)
Cheated value (v)	6.33	17.04	23.36
	(5.21)	(4.54)	(4.12)
Buyer surplus (S)	-6.33	-11.87	-18.2
	(5.21)	(6.22)	(6.83)

Notes: Mean of differences (left hand side treatment - right hand side treatment) and the corresponding standard deviation of differences are reported in parentheses. p and d are in Rupees per Kg; x is in grams; $v = x(p - d)/1000$, in Rupees; & $S = $ valuation $-(p - d) - v$, in Rupees.

◂ Return

Comparative tests based on matched pairs of observations

	Baseline - Nudge	Nudge - Superstition	Baseline - Superstition
Cheated quantity (x)			
Paired Student's t-test	9.60**	29.38**	45.68**
	(0.000)	(0.000)	(0.000)
Wilcoxon signed-rank test	6.34**	6.79**	6.79**
	(0.000)	(0.000)	(0.000)
Cheated value (v)			
Paired Student's t-test	9.48**	29.33**	44.25**
	(0.000)	(0.000)	(0.000)
Wilcoxon signed-rank test	6.34**	6.79**	6.79**
	(0.000)	(0.000)	(0.000)
Buyer surplus (S)			
Paired Student's t-test	-9.48**	-14.90**	-20.82**
	(0.000)	(0.000)	(0.000)
Wilcoxon signed-rank test	-6.34**	-6.79**	-6.79**
	(0.000)	(0.000)	(0.000)

Notes: p-values in parentheses, ** p-value < 0.01 and * p-value < 0.05.

◂ Return

Regressions for x and v

	(1) x	(2) v	(3) x	(4) v
Nudge	-22.33**	-6.327**	-22.17**	-6.28**
	(0.000)	(0.000)	(0.000)	(0.000)
Superstition	-82.84**	-23.68**		
	(0.000)	(0.000)		
Price quote	0.193	0.0936	0.240	0.130
	(0.372)	(0.134)	(0.357)	(0.084)
Bargain success	-0.421	-0.603	0.829	-0.357
	(0.902)	(0.537)	(0.844)	(0.765)
Tuesday	0.527	0.160	2.177	0.624
	(0.895)	(0.885)	(0.674)	(0.667)
Wednesday	-3.061	-0.852	-3.115	-0.869
	(0.482)	(0.489)	(0.575)	(0.577)
Thursday	-0.671	-0.154	0.920	0.322
	(0.876)	(0.900)	(0.872)	(0.841)
Friday	0.132	0.0547	2.228	0.667
	(0.971)	(0.958)	(0.644)	(0.623)
Baseline first			2.889	0.865
			(0.414)	(0.383)
Buyer id 6			3.205	0.951
			(0.182)	(0.166)
Constant	21.95	-4.783	3.535	-16.46
	(0.721)	(0.785)	(0.962)	(0.431)
Test for coefficient of *Nudge* = coefficient of *Superstition*:				
F-test statistic	405.76**	402.02**		
	(0.000)	(0.000)		

Notes: p-values in parentheses based on s.e. for seller level clustering, ** p-value < 0.01 and * p-value < 0.05.