

Misunderestimating Corruption

Aart Kraay (World Bank)
Peter Murrell (U Maryland)

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What Do These Two Famous People Have in Common?



Two things Celine Dion and Steven Isserlis have in common:

1. Big hair

Two things Celine Dion and Steven Isserlis have in common

1. Big hair
2. People lie on surveys about how much they listen to them
 - Do you listen to easy listening/soft rock?
 - Do you listen to classical music?

How do we know they lie?

Easy, use a Portable People Meter



Arbitron Advances Electronic Audience Measurement



PPM 360™
PPM 360™

Mobile Data Retrieval

Cellular platform with PPM™ technology simplifies data transmission. Arbitron can retrieve consumers' data without the meter being docked at home.

Future Focused

Cellular platform provides greater flexibility to integrate electronic audience measurement onto emerging personal devices.

Greater Appeal

The smaller, sleeker meter fits in better with the mobile lifestyle and tastes of today's younger consumers.

Improved Usability

New meter is plug and play, more comfortable to wear and its text screen provides positive reinforcement to panelists. It even tells the time.

People lie on surveys about lots of other things too...

- Do you have a library card?
- Do you attend church regularly?
- How often do you have sex?
- Do you use illegal drugs?
- Have you bribed a government official?

This Paper

- New estimates of prevalence and consequences of reticence in responses to survey questions about corruption
 - World Bank Enterprise Survey in Peru
 - 10 Asian countries in Gallup World Poll
- Builds on “inversion” of random response methodology developed by Azfar and Murrell (2009) in Romania, and applied in Nigeria by Clausen, Kraay and Murrell (2011)
- Key methodological novelty is the use of a formal statistical model to estimate the prevalence of reticent behaviour and “guilt”
- Key finding is that reticence-adjusted estimates of corruption are at least twice as high as simple questions might suggest
 - conventional questions *misunderestimate* corruption

Definitions

- A *reticent* respondent is one who gives a knowingly false answer with nonzero probability when an honest answer could generate an inference that the respondent might have committed a sensitive act (r)
- *Reticent behaviour* occurs when a reticent respondent gives a false answer on a specific question (q)
- A *guilty* respondent is one who has in fact committed a sensitive act (g)

Goal of paper is to estimate r , q , and g

Context

- Peru Enterprise Survey
 - 1000 business owners/managers interviewed during 2010/11
 - key “conventional” survey question of interest: *“It is said that establishments are sometimes required to make gifts or informal payments to public officials to “get things done” with regard to customs, taxes, licenses, regulations, services etc. On average, what percentage of total annual sales, or estimated total annual value, do establishments like this one pay in informal payments or gifts to public officials for this purpose?”*
 - Code >0 and refused as 1, =0 as 0, with DK as missing
 - Mean response=18%
 - Interpretation of “guilt”
 - Knowing about other firms that paid bribes?
 - Paying bribes yourself?

Context

- Gallup World Poll in 10 Asian countries
 - ~1000 respondents per country, more in India
 - Key “conventional question” of interest: *Sometimes people have to give a bribe or a present in order to solve their problems. In the last 12 months, were you, personally, faced with this kind of situation, or not (regardless of whether you gave a bribe/present or not)?*
 - Code Yes/Refused as 1, No as 0, DK as missing
 - Mean responses range from 7 percent (Indonesia) to 23 percent (India)
 - Interpretation of “guilt”: being faced with a bribe situation

Random Response Question

- Both surveys also contain a series of Random Response Questions (RRQ) that we placed
 - Interviewer asks series of 10 sensitive questions
 - Before answering each one, respondent is instructed to toss a coin without showing interviewer the outcome
 - If Heads, say “Yes” regardless of whether you have done sensitive act
 - If Tails, answer truthfully

Peru RRQ Results

	Percentage of Respondents Answering "Yes"
Have you ever paid less in personal taxes than you should have under the law?	37.8
Have you ever paid less in business taxes than you should have under the law?	36.8
Have you ever made a misstatement on a job application?	31.7
Have you ever used the office telephone for personal businesses?	74.8
Have you ever inappropriately promoted an employee for personal reasons?	36.1
Have you ever deliberately not given your suppliers or clients what was due to them?	31.5
Have you ever lied in your self-interest?	50.3
Have you ever inappropriately hired a staff member for personal reasons?	33.8
Have you ever been purposely late for work?	48.4
Have you ever unfairly dismissed an employee for personal reasons?	28.4

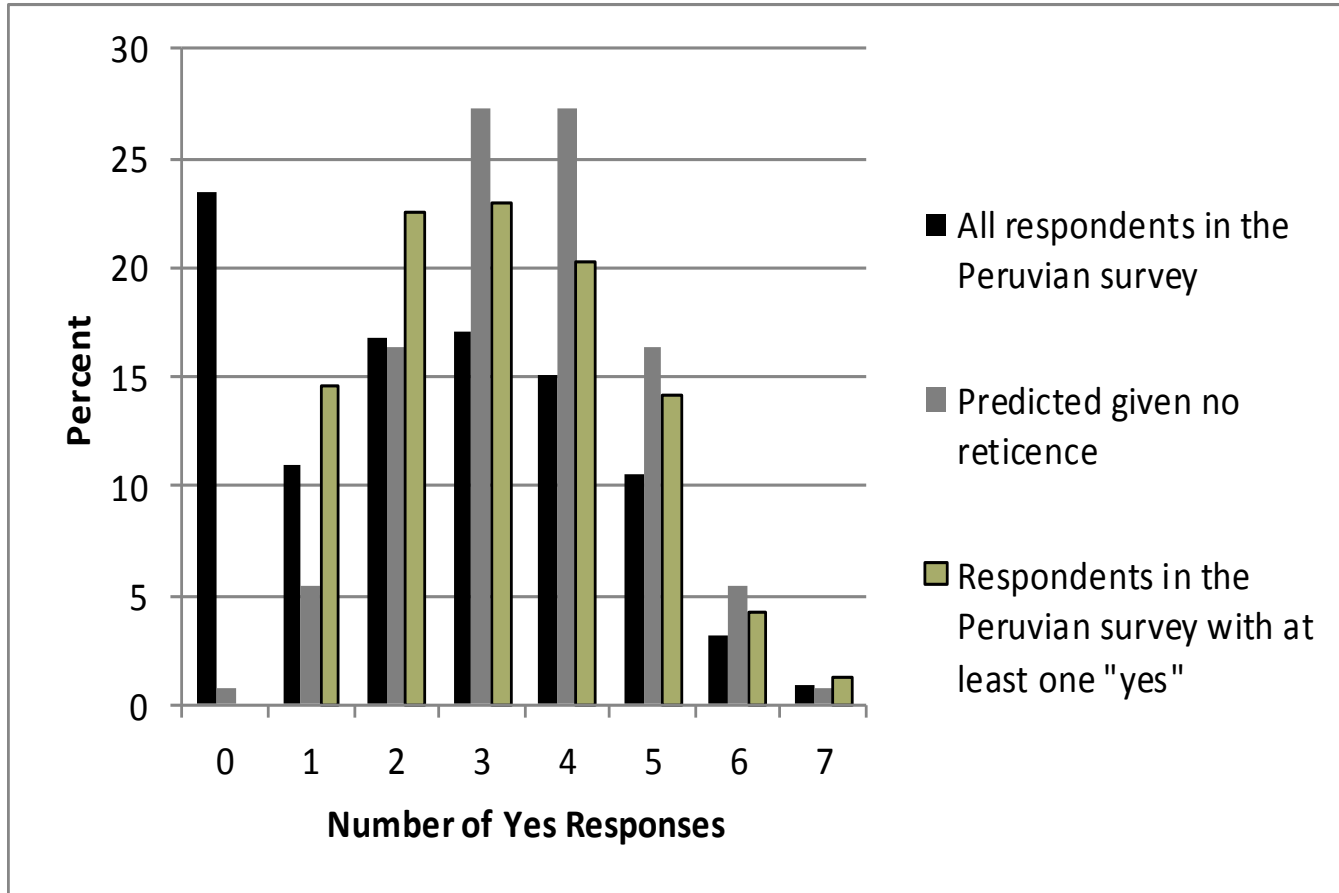
Gallup World Poll RRQ Results

	<u>Afghanistan</u>	<u>Bangladesh</u>	<u>Cambodia</u>	<u>China</u>	<u>India</u>	<u>Indonesia</u>
<i>Proportion of Respondents Answering "Yes" to:</i>						
1. Have you ever lied to protect yourself?	63.9	61.2	68.3	59.1	64.3	66.7
2. Have you ever deliberately spoken ill of a member of your family or a friend?	56.1	40.1	51.7	45.5	45.2	51.5
3. Have you ever deliberately tried to cheat another person?	54.9	39.2	38.0	42.9	34.1	43.0
4. Have you ever broken a promise?	31.4	47.9	57.6	51.2	48.7	55.9
5. Have you ever taken something that is not yours without permission and kept it?	32.1	39.8	40.6	37.7	34.6	38.9
6. Have you ever bought, sold, bartered or been given something that you knew was stolen?	31.0	37.9	35.0	37.8	31.4	39.4
7. Have you ever mistreated someone because they did not share your opinions or values?	47.8	54.7	40.1	37.2	42.6	42.2
8. Have you ever been nice to a person only because you thought it would bring you some benefit?	78.6	62.8	66.5	46.0	49.6	48.4
9. If you received some extra money that your family did not know about, would you ever hide it from them and spend it on your own enjoyment?	38.5	42.6	42.5	40.3	39.0	44.0
10. Have you ever insulted your parents, relatives or other elders ?	28.3	40.0	36.8	34.6	35.3	41.0

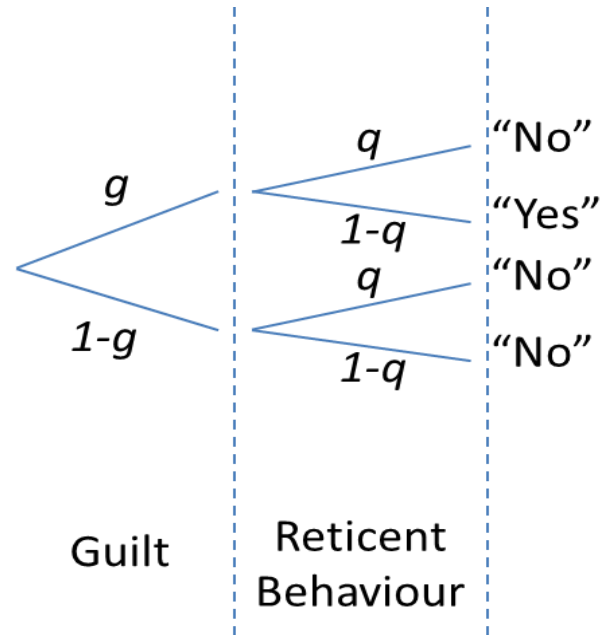
Key Features of RRQ Responses

- RRQs originally developed to encourage candour
 - Not very successful, note “Yes” rate should be > 50 percent
- 24 percent of respondents answer “No” to all seven questions
 - If no guilt and no reticence, probability of 7 “No’s” is very small ($0.5^7=0.8$ percent)
 - There are reticent respondents
 - Even more reticent respondents if some are in fact guilty
- 11 percent of respondents answer “No” six times
 - If no guilt and no reticence, probability is just 2 percent
 - Reticent respondents may not behave reticently on all questions

Actual vs Expected Responses to RRQ in Peru

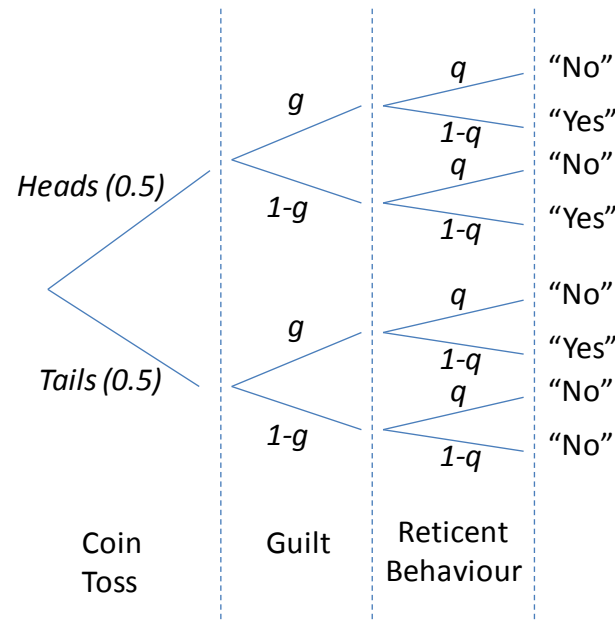


Modeling Interview Process for Reticent Respondents: CQ



- reticence is an unobserved individual-specific characteristic
- g : probability that respondent is guilty
 - assume for now guilt independent across questions
- q : probability that reticent respondent answers untruthfully
- candid respondents: $q=0$

Modeling Interview Process for Reticent Respondents: RRQ



- note three possible ways to observe a “Yes” response
 - Heads -> Guilty -> Candid
 - Heads -> Innocent -> Candid
 - Tails -> Guilty -> Candid
- tree for candid respondents same with $q=0$

Method of Moments Estimator

- Response model has three parameters (g, r, q)
- Make inferences about these parameters using method of moments estimator that equates three sample moments with their population counterparts
 - Expected rate of “Yes” responses on CQ
 - Expected rate of “Yes” responses on RRQ
 - Variance of “Yes” responses on RRQ

Method of Moments Estimator

- $S=1$ if “Yes” on CQ, so expected rate of “Yes” responses on CQ is

$$E[S] = g(1 - rq)$$

- Intuition: answer “Yes” only if
 - Guilty (with probability g), and
 - *Not* “effectively reticent” (with probability $1-rq$)
- If we knew rate of “effective reticence” rq , we could just adjust up observed rate of “Yes” responses to find guilt g

Method of Moments Estimator

- X = number of “Yes” responses over $n=7$ RRQs, so Expected rate of “Yes” responses on RRQ is:

$$E[X/n] = 0.5(1 + g)(1 - rq)$$

- Intuition:
 - If no reticent behaviour should answer “Yes” whenever coin comes up heads, and whenever respondent is guilty ($0.5(1+g)$)
 - This is scaled down by same rate of effective reticence as before ($1-rq$)

Method of Moments Estimator

- Ratio of rate of “Yes” responses to CQ and RRQ pins down prevalence of guilt:

$$\frac{g}{1 + g} = \frac{1}{2} \frac{E[S]}{E[X/n]}$$

- Intuition: *difference* between rate of yes responses on CQ and RRQ reflects prevalence of guilt
 - same rate of “Yes” responses on CQ and RRQ can only occur if $g=1$, since no “false” responses induced by coin toss
 - very different rate of “Yes” responses on CQ and RRQ only if true rate of guilt is low
- Implication: can estimate guilt (g) and “effective reticence” (rq) from only mean “Yes” rate on two types of questions, i.e. using only first two moment conditions

Method of Moments Estimator

- Variance of number of “Yes” responses in RRQ is informative about difference between reticence (r , a fixed individual-specific trait), and reticent behaviour (q , independent across questions)
- Intuition: for a given rate of “effective reticence” rq :
 - If r is large and q is small, should see many cases with zero “Yes” responses in RRQ (corresponding to the reticent guys) and many cases with 3 or 4 “Yes” responses (corresponding to the candid guys)
 - If r is small and q is large, should see more variation in responses induced by the event of acting reticently, which is independent across questions

Results for Peru

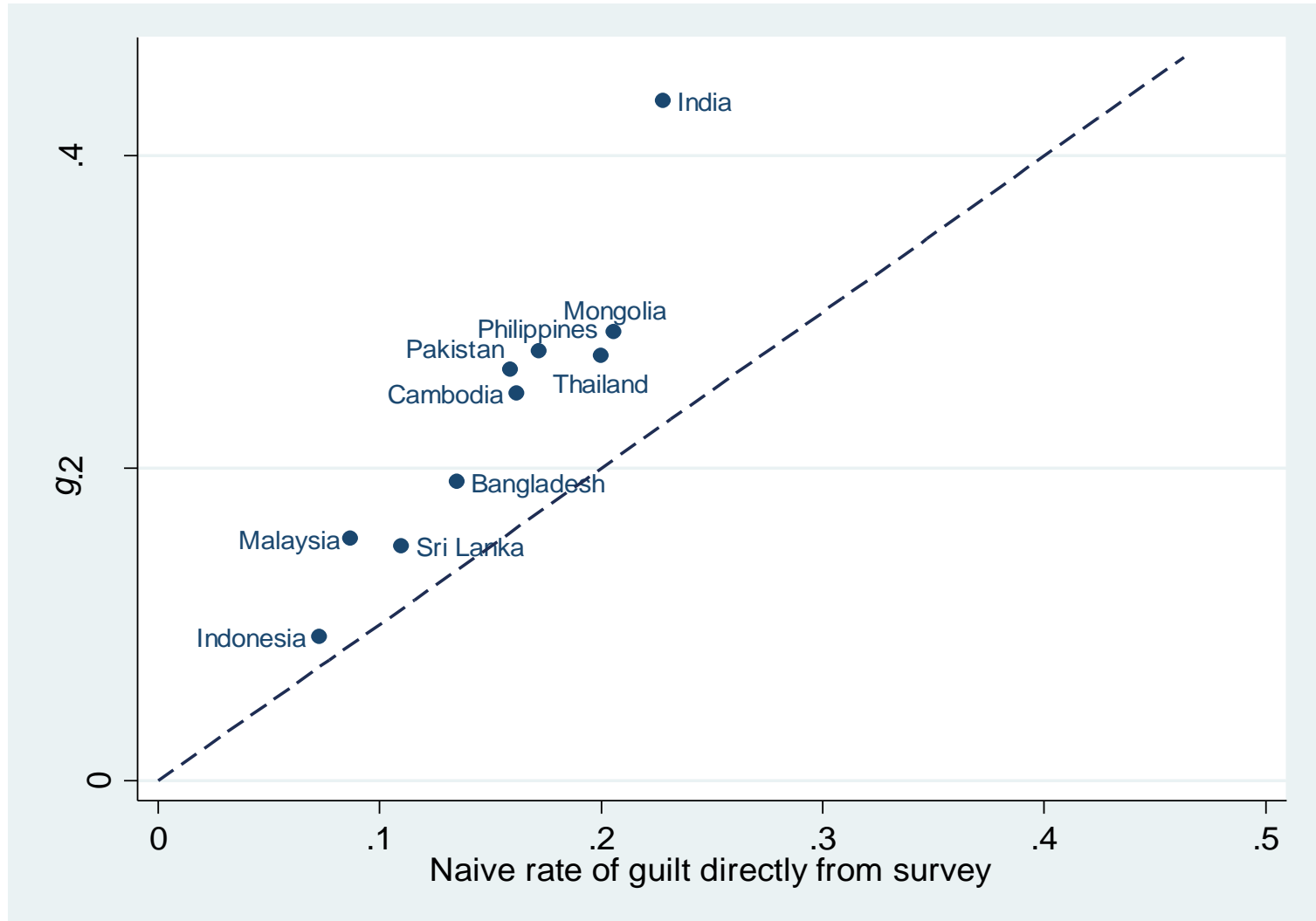
<i>Reticence (r)</i>	0.737*** (14.12)
<i>Probability reticent person answers question reticently (q)</i>	0.689*** (40.62)
<i>Guilt (g)</i>	0.371*** (5.11)
<i>Effective reticence (rq)</i>	0.508*** (13.05)
Number of Observations	707

- Note as benchmark: mean “Yes” response to CQ is only 18%, need to adjust for “effective reticence” to get accurate estimate of guilt, i.e. scale up by $1/(1-rq)$

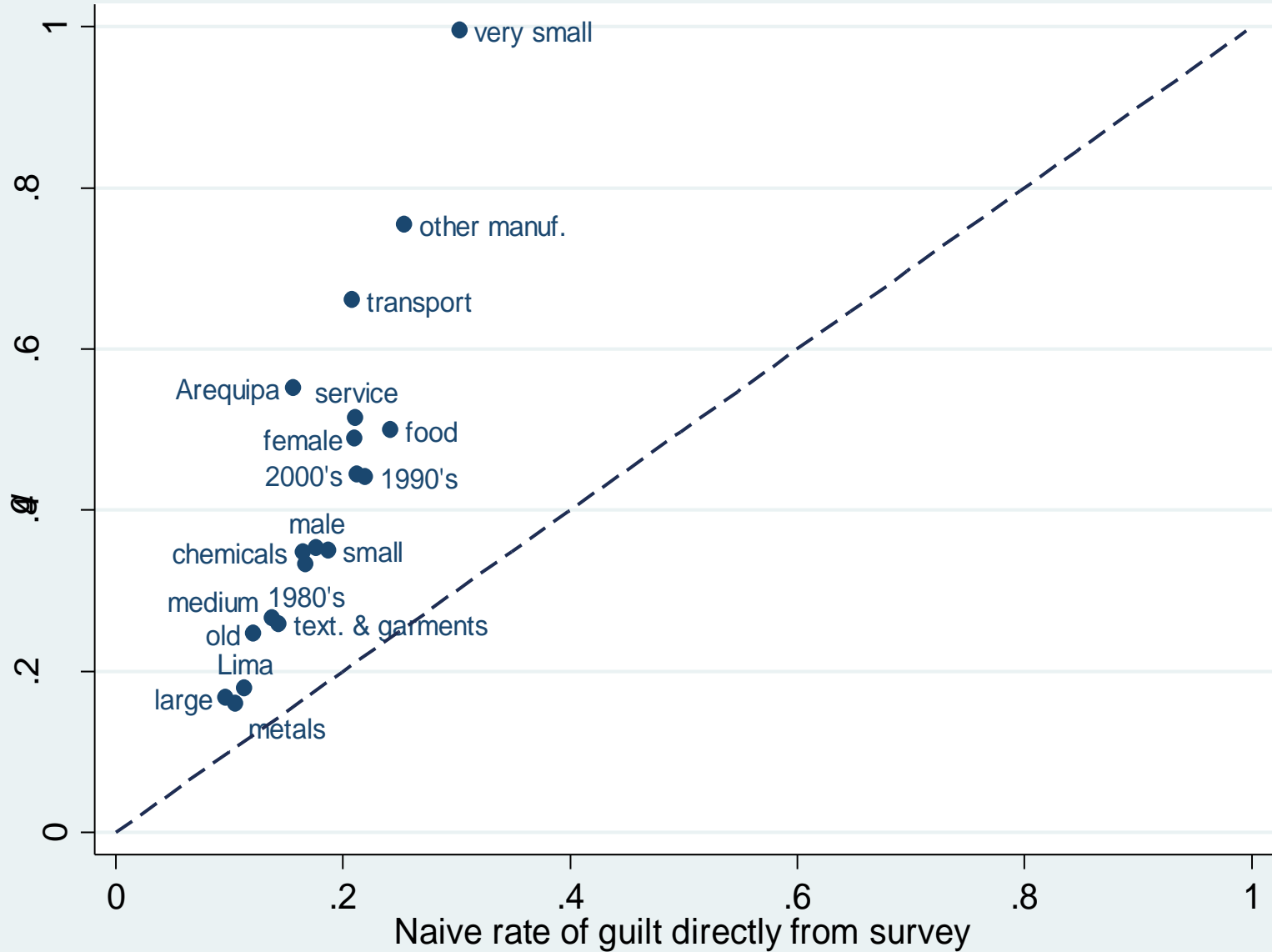
Contrasting Two Countries in GWP

	Indonesia	India
<i>Reticence (r)</i>	0.413 (3.26)	0.814 (29.48)
<i>Probability reticent person answers question reticently (q)</i>	0.510 (5.80)	0.586 (20.89)
<i>Effective reticence (rq)</i>	0.211 (2.93)	0.477 (14.88)
<i>Guilt (g)</i>	0.092 (2.86)	0.435 (8.51)
<i>Naïve guilt rate estimated directly from survey responses</i>	0.073	0.228

Estimated versus naïve rates of corruption



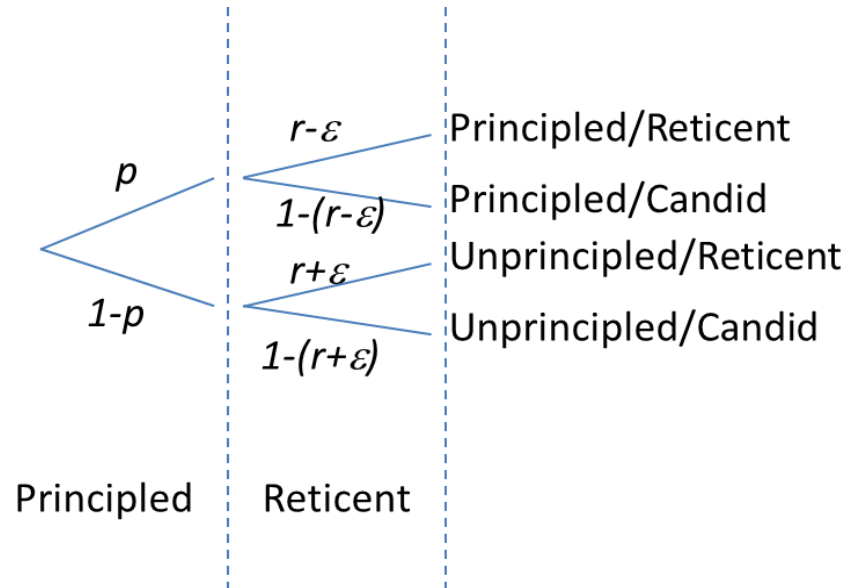
Estimated versus naïve: Peruvian subsamples



Extension: Reticence and Guilt Are Correlated

- More natural to assume that:
 - the guilty are more likely to be reticent
 - guilt is a persistent individual-specific characteristic, i.e. people who are willing to do one bad thing are more likely to be willing to do other bad things
 - we ignored both in benchmark model where guilt independent across questions and guilt and reticence were independent
- Extended model has respondents that are:
 - “principled” with probability p (and $g=0$ always)
 - “unprincipled” with probability $1-p$ (and $g=1$ always)

Correlated Reticence and Guilt



- Nature sorts respondents into four types
- Reticence is more prevalent among unprincipled respondents when $\varepsilon > 0$
- Probability trees for CQ and RRQ are the same as before, but for the appropriate settings of g and $r+\varepsilon$

Implications of Correlated Reticence and Guilt

- When reticence and guilt are positively correlated, more of the “No” responses in fact correspond to guilty individuals
- So estimated rates of guilt ($1-p$ in extended model) should be higher for a given rate of “No” responses
- Unfortunately we don’t (yet?) know how to estimate ε
- However, imposing moderate values for ε leads to substantially higher rates of guilt:
 - e.g. in Peru if $r+\varepsilon=0.9$, $r-\varepsilon=0.5$ $\rightarrow p=0.48$ $\rightarrow g=0.52$, as opposed to $g=0.37$ in benchmark model
- Reticence and guilt could also be *negatively* correlated...
 - but this leads to implausible estimates for other parameters

Conclusions

- Survey respondents aren't always candid when answering sensitive questions
 - not very surprising
 - but surprisingly hard to quantify without a “portable people meter” or other independent verification mechanism
- Random response questions are not very effective as a tool to directly address respondent reticence, but can be useful to make inferences about prevalence of reticence, reticent behaviour, and guilt
- But RRQs are also very costly/cumbersome to implement, so need cheaper “tools” to identify and correct for reticent behaviour
 - looking for cheap “markers” of reticent behaviour
 - experiment in Turkey Enterprise Survey to look at benefits of respondent self-entry of data (using tablets)