# Private virtues, public vices: social norms and corruption

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## Abstract

**Purpose** – Corruption has traditionally been associated with an absence of pro-social norms such as trust and altruism. This paper challenges this view by examining market corruption – one-shot exchange transactions between strangers in the shadow of the law. The paper aims to propose that in the absence of repeat interactions and legal remedies to prevent contractual violations, acts of market corruption will require strong norms of generalized trust and altruism. As such, pro-social norms facilitate, rather than mitigate, market corruption.

**Design/methodology/approach** – The paper utilizes meta-analysis to examine the relationship between pro-social behavior in economic experiments and prevailing corruption levels.

**Findings** – The results from meta-analyses of both trust- and dictator game experiments show positive, significant relationships between pro-social norms and prevailing corruption levels.

**Research limitations/implications** – The findings of the paper suggest the need for further research into the relationship between societal norms and different types of corruption.

**Practical implications** – Policymakers should be wary about attempting to combat corruption through bottom-up policies designed to strengthen pro-social norms. Such policies may be counter-productive in that they are likely to provide the breeding ground for more acts of market corruption.

**Originality/value** – Conventional wisdom suggests a negative association between pro-social norms and corruption levels. The paper proposes that the relationship is not that simple. Indeed, the meta-study findings suggest the reverse relationship in the case of petty (market) corruption.

**Keywords** Developing countries, Corruption, Meta-analysis, Experiments, Social norms

**Paper type** Research paper

## 1. Introduction

In its account entitled "Honest officer nabs Nigerian smuggler", *The Egyptian Gazette* (2012) recently reported the case of a passenger who offered a customs official a $100 bribe not to examine the contents of a suitcase. The officer, his suspicions duly aroused, searched the bag, confiscating its contents of illicit pharmaceuticals, and detaining the hapless traveler. At first glance, the story is, in itself, quite unremarkable given the prevalence and persistence of corruption plaguing the majority of developing countries (Asongo, 2013; Cameron *et al.*, 2009). However, below the surface, the thwarted smuggling incident exemplifies an intricate relationship between acts of corruption

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and social norms – the informal rules which represent common understandings as to what constitutes acceptable behavior in any given society (Elster, 1989).

The prevailing view in the corruption literature avers that the existence of corruption is indicative of an absence of social norms such as altruism and trust (La Porta *et al.*, 1997; Rose-Ackerman, 2001). Based on this posited negative relationship, policymakers charged with combating corruption have typically focused on bottom-up reforms designed to strengthen social norms (Barr and Serra, 2010).

However, as corrupt practices transpire in the "shadow of the law", they are absent legal recourse in the event of partner malfeasance (Lambsdorff, 2002). In such situations, informal safeguarding mechanisms (social norms such as reciprocal trust occasioned by repeat interactions) will be crowded in, facilitating mutually-beneficial corrupt exchange (Kingston, 2007). However, while this may explain the persistence of parochial corruption – repeated interactions between "partners" (Husted, 1994), it does not explain how incidences of market corruption – one-off illicit exchanges between strangers – are consummated.

We propose that absent legal sanctions and reciprocal trust as safeguards, parties need to rely on such social norms as trust and altruism to structure and enable market corrupt acts. As such, we predict a positive relationship between corruption levels and social norms. If so, then bottom-up measures designed to inculcate such norms will be counter-productive, and instead, combative efforts should be focused on top-down policy reforms (Abbink, 2004).

To test this conjecture, we conduct meta-analyses of two experiments tapping into trust and altruism – the trust game (TG) and the dictator game (DG), which are then correlated to corruption levels (measured by Transparency International's Corruption Perceptions Index (CPI)) at the time when the experiments were conducted. The CPI is the generally-preferred index for studies into corruption (Barr and Serra, 2010; Cameron *et al.*, 2009). Interestingly, we find no evidence of a negative correlation between corruption levels and social behavior. Rather, the meta-study reveals statistically significant evidence of stronger altruistic behavior in societies with higher levels of corruption, together with a positive correlation between trust and corruption levels. Our findings tentatively suggest that the presence of social norms may actually facilitate, rather than retard, corruption.

We make three important contributions to the literature. First, without wishing to establish a causal relationship, our paper constitutes the first attempt to explicitly correlate meta-analysis data from two different experiments measuring social norms with corruption levels. Second, by restricting our focus on experiments conducted anonymously on a non-iterative basis (characteristic of market corruption), we extend the literature by empirically examining the boundaries of social norms in exchange conditions characterized by a lack of both formal contracts and reciprocal trust. Finally, on the basis of our findings, we suggest that top-down policy reforms should be adopted in the fight against corruption.

The remainder of the paper is structured as follows. The next section reviews the relevant literature on social norms and corruption and develops the theoretical argument. Section 3, we discuss the methodology of our meta-analyses. Section 4 presents the results of these meta-analyses, while Section 5 discusses these results and concludes.

## 2. Literature review and theory development

A notable feature of a bribery contract is the implicit nature of the exchange. In other words, a bribe is not legally enforceable and the contracting parties do not enjoy the benefit

of legal recourse in the event of contractual violation (Abbink *et al.*, 2002). Individuals are neither able to *ex ante* evaluate the willingness or ability of counterparts to deliver on their promises, nor prevent the other party from distorting information to extract *ex post* rents (Husted, 1994). Monitoring and enforcement problems are further compounded by the typical time delays between payment of the bribe and disbursement of the service (or vice-versa) (Bardhan, 1997). Moreover, corruption unfolds in the "shadow of the law" (Lambsdorff, 2002), where the exchange relationship is formed against the omnipresent threat of detection, denunciation, or entrapment. Individuals are acutely aware that revelation of illicit activity to the prosecuting authorities may result in monetary fines, arrest, incarceration, and even death (Armantier and Boly, 2008), rendering corruption a "troublesome business" for both parties (Lambsdorff and Frank, 2011, p. 116).

The prevailing view proposes that individuals imbued with strong social norms such as generalized trust are more likely to have confidence in others and will thus endorse strong standards of normative and legal behavior (Uslaner, 2004), reducing corruption levels (Rose-Ackerman, 2001). Empirical support for this position (Barr and Serra, 2010; La Porta *et al.*, 1997) has prompted policymakers in developing countries to focus ostensibly on bottom-up reforms to strengthen social norms (Bardhan, 1997).

However, corruption levels remain persistent and pervasive despite the nontrivial underlying contractual hazards identified above (Lambsdorff, 2002). This begs the question as to why parties continue to engage in corrupt practices when the risks of partner malfeasance are so high. Many scholars draw parallels with the legal arena of social exchange, proposing that informal social norms are crowded-in in such situations, structuring and enabling mutually-beneficial exchange (Landa, 1981). In other words, the threat of social (rather than legalistic) sanctions ensures contractual compliance. By extension, familiar partners who repeatedly interact in acts of parochial corruption in highly-embedded social structures develop reciprocal trust as a safeguarding mechanism (Kingston, 2007; Wade, 1982). Specifically, repeated interactions between partners increase the shadows of the past and the future, mitigating monitoring and enforcement problems, thus rendering parochial corrupt contracts self-enforcing (Rothstein and Eeh, 2009; Tonoyan, 2005).

Nevertheless, many acts of bribery do not transpire against a backdrop of reciprocal trust arising from repeated interactions with familiar partners (Bó, 2005). It therefore becomes pertinent to examine the conditions which structure and enable one-shot acts of market corruption between strangers. The present paper avers that the nontrivial contractual hazards elucidated above mean that individuals contemplating entering a one-off act of market corruption must have a profound belief that the counterpart is imbued with strong social norms of generalized trust and altruism. Specifically, bribers need to implicitly trust that bribees will refrain from exploiting the first-mover's vulnerability, while bribers similarly need to trust that the bribee will remunerate him for the deliverables and not divulge the nature of the transaction to the authorities (Lambsdorff, 2002). Similarly, norms of altruism toward strangers are also likely to be present in market corrupt transactions. As Lambsdorff and Frank (2011) note, public officials need to perform favors to advance the interests of the counterpart without knowing that they would ever be compensated for their efforts and risk. Altruism may also reflect inequity aversion (Fehr and Schmidt, 1999). In this regard, various scholars have suggested that bribing relatively low-paid public sector officials can be seen as compensating them for exerting extra effort, reducing income inequalities (Aidt, 2003; Méon and Weill, 2010).

On the basis of the above, we posit a positive relationship between corruption levels and social norms such as generalized trust and altruism. As such, the presence of strong social norms becomes a "breeding ground for corruption" (Tonoyan, 2005, p. 55). Whereas Mandeville (1988 [1723]) argued that private vices (a morally unrestrained libertine's spending on base passions) lead to public benefits (employment, and thus, societal benefit), we propose that private virtues (imbued norms of trust and altruism) will facilitate public vices (corruption). If so, then bottom-up measures designed to combat corruption through strengthening social norms may be counter-productive.

We propose to empirically examine this conjecture by conducting meta-analyses of two well-known economic experiments – the TG and the DG. Lab experiments have, in recent years, come into the forefront in the corruption literature (Abbink *et al.*, 2002; Banuri and Eckel, 2012). Furthermore, the pecuniary nature of economic experiments such as the TG and DG means that they are typically conducted in developing countries such as Cameroon (Etang *et al.*, 2011), Indonesia (Cameron, 1999), Nigeria (Gowdy *et al.*, 2003), Pakistan (Delevande and Zafar, 2011) and Zimbabwe (Barr, 2003), which are typically blighted by corruption.

In the sequential TG (Berg *et al.*, 1995), subjects are anonymously paired and assigned to either the role of sender or receiver. The former may send any portion of a given endowment (i.e. from zero to the full amount) to the receiver, keeping the residual. The amount passed on is then tripled by the experimenter, and the receiver may pass back either nothing (keeping everything) or any portion of the tripled amount back to the first player. The amount passed on reflects the sender's willingness to trust the receiver. Robust results suggest that senders pass on approximately 50 per cent of their endowment to receivers (Johnson and Mislin, 2011).

In the DG, the first player ("dictator") has to decide how much of a given amount should be shared (anonymously) with a second player, who must passively accept what has been given. As the Nash equilibrium for the dictator is to give nothing, any positive contribution is a sign of altruistic behavior. Evidence consistently shows that dictators offer around 20 per cent of their endowment to their counterpart (Engel, 2011).

Crucially, we restrict our attention to studies invoking complete anonymity ("strangers") in one-shot encounters (or extracted first round data) to ensure there is no possibility that reputational mechanisms from repeated interactions will influence results (Barr, 2003). We then relate the results of the experimental behavior in these social dilemmas to the prevailing CPI scores in the countries concerned.

## 3. Methodological approach

Meta-analyses are, in effect, a quantitative literature review, where the results from several prior individual studies can be integrated into a single, generalizable finding (Zelmer, 2003). While individual studies are based on relatively small sample sizes, the advantage of a meta-study is that it is based on data collected from a much larger population dispersed over a greater geographical area, reducing the impact of sampling error (Johnson and Mislin, 2011). In experimental economics, meta-analyses have become increasingly prevalent in recent years as a means of elucidating more generalizable findings of the presence (or otherwise) of social norms, particularly in developing countries (Cardenas and Carpenter, 2008).

Following previous experimental meta-studies, we employ a systematic search strategy to identify replications of the games. We include both relevant publications and

working papers. As a point of departure, we used the references from the single meta-studies for each of the two games – Johnson and Mislin (2011) for the TG (citing 162 replications) and Engel (2011) covering 41 papers for the DG. Next, we included the references from the Cardenas and Carpenter (2008) meta-study embracing both games. Then we searched the databases of the Web of Science, Google scholar and Jstor for the keywords "trust game" and "dictator game", checking all the reference lists for these studies.

An important part of our methodological approach is that the observations in each data set are comparable. This necessitated a somewhat narrow definition of what constitutes an iteration of each game. In order to maintain consistency in the measurement of our dependent variables (the effect measure), we used the average amount sent (for the TG) and the average amount given (for the DG). Naturally, there remains significant variation in terms of stake size, number of rounds, different subject pools and so forth in the studies. To facilitate comparability and to focus on the theoretically interesting base constructs (trust and altruism), we chose to restrict our analysis to results of standard games. In most cases, experimental studies extend the standard games in some way, but they frequently report the figure for the baseline experiment (control treatment) permitting comparability.

Specifically, we only consider two-player games, excluding studies into the effects of coalition formation (Okado and Riedl, 1999) and third-person games (Kagel and Wolfe, 2001) on subject behavior. To reflect the present paper's conception of market corruption as characterizing one-off interactions between strangers (Husted, 1994), prior experiments must have been conducted with double-blind anonymity (Forsythe *et al.*, 1994), which excluded games played with familiar partners (Karlan, 2005). Relatedly, we restrict our analysis to either one-shot games or extracted first round data for multiple games. Moreover, games must have been played with real money rather than hypothetical stakes to ensure the necessary financial incentives which underlie corrupt transactions, excluding such studies as Bohnet and Baytelman (2007). To reflect the typically petty sums involved in acts of market corruption (Husted, 1994), we restricted studies to relatively low stakes (conventionally USD 10) as much as practicable. Finally, experiments conducted prior to the first CPI in 1995 (such as Cameron, 1999) or in countries not registered for CPI data (Fiji in Henrich *et al.* (2006)) were duly omitted from the present meta-analysis.

The search procedure together with the well-defined selection criteria yielded the present data set. The constituent studies for the TG and DG are reported in Appendices 1 and 2, respectively, and these studies are correspondingly marked with an asterisk in the reference list. For the TG, we have 66 data points from experiments conducted between the years 1998 and 2010 from 37 different countries. Forty one of these data points originated from Johnson and Mislin (2011) meta-study. The DG studies cover a total of 45 observations collected between 1998 and 2011 spanning 23 different countries. A total of 22 of these data points stemmed from the meta-studies of Engel (2011) and Cardenas and Carpenter (2008).

From each paper we extracted the following information: the effect measure, the country in which the experiment took place, the year in which the data was collected, and the CPI score for that country at the time that the data were collected, the number of players (N). A number of prior meta-studies identify GDP per capita (in purchasing power parity (PPP) terms) and Gini coefficient as important control variables (Cardenas and Carpenter, 2008). Consistent with this approach, we cite data for both variables for the year in which the experiments were conducted (or the closest year in situations

where the data were incomplete). The sources for the GDP per capita and Gini coefficient figures were the CIA World Factbook and UNDP World income inequality database, respectively. CPI figures were derived from the Transparency International database. Surprisingly, many studies do not report the date when the data were collected. In such instances we approached the authors themselves to elicit this information, and when this was not possible, we used the year prior to the first submission of the paper as the relevant year. As Banuri and Eckel (2012) note, CPI scores and rankings remain relatively unchanged over several years, providing credence to the above approach. For several countries, multiple data points were available. Consistent with prior meta-studies (Oosterbeek *et al.*, 2004), we treated them separately when gathering the GDP and Gini coefficients, before calculating a country average.

## 4. Experimental results

For both meta-studies we use the same analytical approach, i.e. a linear regression, to examine the extent to which the effect measure correlates with any of the variables of interest. The variables are, as described above, the effect sizes as dependent variables, and the CPI index, year, GDP (log transformed), and the Gini coefficient as independent variables.

For the TG, models 1-4 show non-significant results (Table I). Interesting insights derive from the results in model 5. CPI and Gini are both significant and negatively

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| CPI | −0.477 | −0.429 | −0.040 | −0.364 | −1.231* | −0.185 |
| | (0.606) | (0.614) | (0.878) | (1.018) | (0.663) | (3.123) |
| Year | | −0.471 | | | | |
| | | (0.625) | | | | |
| GDP | | | | −0.323 | | |
| | | | | (2.321) | | |
| Gini | | | | | −0.380** | −0.252 |
| | | | | | (0.167) | (0.409) |
| CPI × gini | | | | | | −0.029 |
| | | | | | | (0.086) |
| Africa | | | 3.882 | | | |
| | | | (8.901) | | | |
| Asia | | | 10.930 | | | |
| | | | (8.519) | | | |
| Australasia | | | −2.296 | | | |
| | | | (9.278) | | | |
| Europe | | | 3.405 | | | |
| | | | (7.394) | | | |
| Latin America | | | 1.477 | | | |
| | | | (8.271) | | | |
| North America | | | Reference | | | |
| Constant | 50.374*** | 995.219 | 44.660*** | 52.794*** | 69.259*** | 64.394*** |
| | (3.191) | (1,252.452) | (9.688) | (17.675) | (8.855) | (16.782) |
| Observations | 37 | 37 | 37 | 37 | 37 | 37 |
| $R^2$ | 0.017 | 0.034 | 0.156 | 0.018 | 0.147 | 0.150 |

**Notes:** Significant at: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$; standard errors in parentheses

**Table I.**
Ordinary least-squared regression for TG

correlated with the endowment share that can be observed in the TG. In other words, both higher CPI scores and higher levels of income inequality lead to lower contributions in the TG. Interaction effects are non-significant (model 6). Also note that the sign of a basic negative correlation for CPI can also be found in models 1-4 (though not significant). This analysis shows that societies with a lower perception of corruption seem to trust their counterparts in the TG less than in societies with a higher perception of corruption. This basic insight already denotes what can be found in the DG below.

Turning to the DG, the OLS regressions are reported in Table II. We find in model 1 that the higher the corruption perception index, the lower the share that subjects are willing to give to the second player in the game. In other words, the less corrupt a society, as measured by CPI, the less altruism we find in the DG. This basic result, in which 13.9 per cent of the variance is explained by the model, is a clear indication that altruism declines as the perception of corruption decreases. This effect also holds in model 2 when we control for the variable year. Model 3, which tests the role of regional effects, is non-significant. Model 4 also shows a non-significant positive effect for the Gini coefficient, indicating that the level of income inequality in a particular society is not correlated with the observed altruism in the DG. Although showing non-significant results for CPI and Gini coefficient, model 5 shows that the significance of CPI is also given when GDP is controlled for. It reinforces the findings from models 1 and 2, namely that DG contributions are higher

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| CPI | −1.191* | −1.499** | −0.596 | −0.973 | −3.123* | −0.581 |
| | (0.647) | (0.668) | (1.112) | (0.858) | (1.633) | (10.238) |
| Year | | 1.045 | | | | |
| | | (0.737) | | | | |
| GDP | | | | | 3.972 | 4.619 |
| | | | | | (3.092) | (4.078) |
| CPI × GDP | | | | | | −0.247 |
| | | | | | | (0.982) |
| Gini | | | | 0.088 | | |
| | | | | (0.221) | | |
| Africa | | | 6.819 | | | |
| | | | (9.418) | | | |
| Asia | | | 6.962 | | | |
| | | | (9.856) | | | |
| Australasia | | | 13.211 | | | |
| | | | (12.714) | | | |
| Europe | | | 5.985 | | | |
| | | | (7.450) | | | |
| Latin America | | | 10.440 | | | |
| | | | (9.845) | | | |
| North America | | | Reference | | | |
| Constant | 38.965*** | −2,053.801 | 29.338** | 34.412*** | 13.274 | 6.716 |
| | (3.446) | (1,476.185) | (11.041) | (11.981) | (20.285) | (33.325) |
| Observations | 23 | 23 | 23 | 23 | 23 | 23 |
| $R^2$ | 0.139 | 0.218 | 0.217 | 0.146 | 0.205 | 0.207 |

**Table II.**
Ordinary least-squared regression for DG

**Notes:** Significant at: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$; standard errors in parentheses

in more corrupt societies, also when we control for GDP. Model 6 shows that possible interaction effects are insignificant.

Figure 1 shows a graphical representation of the results with basic scatterplots and trend lines. Both figures illustrate a clear downward trend. The average amounts sent in the TG and given in the DG are negatively related to the prevailing CPI score.

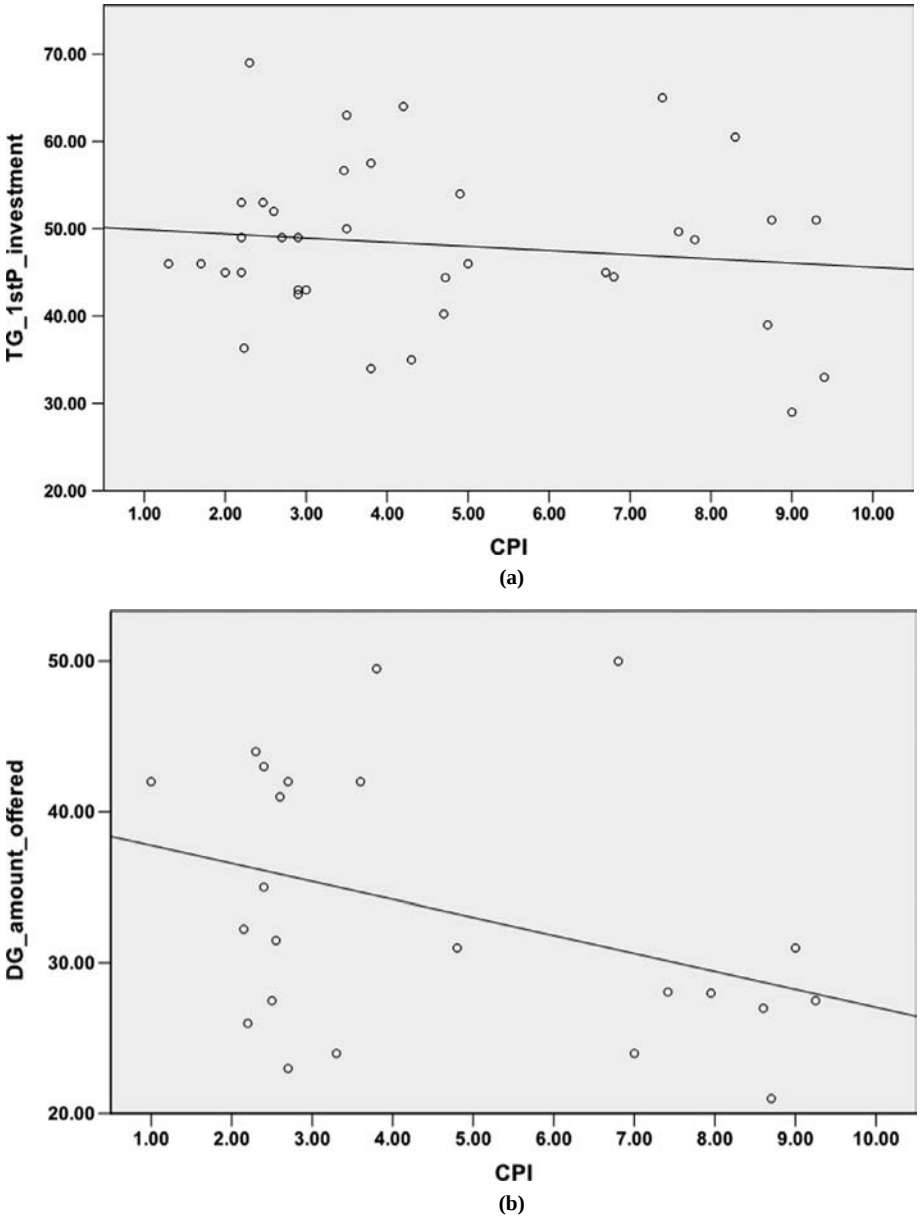


**Figure 1.**
Scatterplot with results from the meta-studies of (a) TGs and (b) DGs

In other words, these findings suggest that more corrupt societies (i.e. with lower CPI scores) are associated with stronger norms of trust and altruism.

## 5. Discussion and conclusion

The principal finding of the present meta-study is that the effect measure for each game is higher in societies characterized by higher level of corruption. Our findings lead us to question the prevailing "moral approach" (that pro-social norms militate against market corruption). Our contention – that pro-social norms may indeed facilitate corrupt practices may be eminently plausible when one considers the role of social norms in supporting illicit exchange transactions. Operating in the shadow of the law and faced with an inherently high threat of malfeasance combined with inefficacious monitoring, a high risk of mutual denunciation and nontrivial penalties, individuals will prefer exchange partners who are trustworthy and altruistic. Absent such attributes in a given society, corruption would fundamentally be too risky a transaction to contemplate. As such, we propose that the existence of strong social norms becomes a precondition for the occurrence and endurance of corrupt social exchange.

This paper makes three important contributions to the literature on social norms and corruption. First, it constitutes the first attempt to correlate corruption levels with experiments tapping into social norms. Second, the findings, which challenge the traditional "moral view", point to the need to develop a more nuanced understanding of this relationship by decomposing corruption into parochial and market types, recognizing that the mechanisms through which societal norms affect each type may differ. Third, if social norms indeed appear to be stronger in countries where corruption is more extensive, policy outcomes emphasizing strengthening social norms (through public information campaigns or socialization programmes) as a means of curbing the deleterious effects of corruption (Barr and Serra, 2010; Hauk and Saez-Marti, 2002) may prove at best, misplaced, and at worst, counterproductive. Rather, policy-makers seeking to combat corruption may be more prudent to encourage multifaceted top-down reforms such as prohibiting the tax deductibility of bribes (Lambsdorff, 2002), increasing the rotation of public officials (Abbink, 2004) or increasing custodial sentences (Huang and Wu, 1994).

As with all studies, the present, exploratory study is not without its limitations. Methodologically, as with all meta-analyses, the heterogeneity of the requisite studies renders direct comparisons problematic. Meta-analyses are often troubled by large variances caused by procedural differences in the underlying studies and a corresponding lack of power. We have endeavoured to militate against this constraint by carefully selecting studies based on narrow selection criteria, but future meta-analyses which include subsequent data points for the two types of experiment based on the present systematic incorporation criteria will permit greater external validity in this regard. Meta studies may also inherently suffer from the problem of publication bias as the composite studies under review are typically published, and it is generally acknowledged that it is harder to publish non-significant results. Our review has attempted to address this limitation by including a number of working papers (Castillo and Carter, 2003; Delevande and Zafar, 2011), but once again, future meta-studies incorporating results from subsequent working papers may help mitigate this problem. Furthermore, other social norms may also be intuitively associated with market corruption. For example, norms of honesty (conceived of as the truthful revelation of information) are likely to ensure

that commitments are adhered to in the absence of legalistic remedies and reciprocal trust (Maxwell, 1999). For this reason, Tonoyan (2005, p. 44) alludes to the "honest bribe-taker". However, compared to the games in the present meta-study, experiments into honesty have attracted little attention (see West (2003) and Rosenbaum *et al.* (2012) for exceptions). Replications of such "dropped wallet" or revelation game experiments in other contexts would significantly add to our knowledge in this area.

Given the documented role of social norms in structuring a plethora of exchange transactions in the licit arena (Kahneman *et al.*, 1986) and the prevalence and persistence of corruption across developing countries (Transparency International, 2011), we hope that the present exploratory study will stimulate future work in this highly pertinent subject area.

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(The Appendices follow overleaf.)

Appendix 1

**Table AI.**
TG meta-analysis

| Study | Average first player investment (%) | Country | Year data collected | CPI score in that year | *n* | GDP per capita (PPP, USD) | Gini coefficient |
|---|---|---|---|---|---|---|---|
| Akai and Netzer (2009) | 56 | Austria | 2008 | 7.9 | 108 | 37,056 | 35 |
| Akai and Netzer (2009) | 62 | Japan | 2008 | 7.7 | 108 | 34,692 | 25 |
| Ashraf *et al.* (2006) | 42 | USA | 2001 | 7.6 | 112 | 34,320 | 41 |
| Ashraf *et al.* (2006) | 49 | Russia | 2001 | 2.3 | 118 | 7,100 | 44 |
| Ashraf *et al.* (2006) | 43 | South Africa | 2001 | 4.8 | 128 | 11,290 | 58 |
| Bahry and Wilson (2006) | 51 | Russia | 2002 | 2.7 | 650 | 8,230 | 44 |
| Barclay (2004) | 39 | Canada | 2003 | 8.7 | 40 | 30,677 | 33 |
| Barr (2003) | 43 | Zimbabwe | 2000 | 3.0 | 372 | 2,635 | 50 |
| Becchetti and Antoni (2010) | 45 | Italy | 2009 | 4.3 | 368 | 29,619 | 36 |
| Becchetti and Conzo (2011) | 40 | Argentina | 2009 | 2.9 | 152 | 13,900 | 46 |
| Becchetti *et al.* (2011) | 38 | Italy | 2010 | 3.9 | 91 | 30,500 | 36 |
| Bellemare and Kröger (2007) | 29 | The Netherlands | 2002 | 9.0 | 100 | 29,100 | 31 |
| Boero *et al.* (2009) | 39 | Italy | 2007 | 5.2 | 20 | 30,900 | 32 |
| Bouma *et al.* (2008) | 49 | India | 2005 | 2.9 | 92 | 3,452 | 37 |
| Bourgeois-girande and Corcos (2011) | 49 | France | 2010 | 6.8 | 186 | 34,341 | 33 |
| Buchan *et al.* (2006) | 65 | USA | 2001 | 7.6 | 44 | 34,320 | 41 |
| Buchan *et al.* (2006) | 73 | China | 2001 | 3.5 | 50 | 4,020 | 41 |
| Buchan *et al.* (2006) | 68 | Japan | 2001 | 7.1 | 44 | 25,130 | 25 |
| Buchan *et al.* (2006) | 64 | South Korea | 2001 | 4.2 | 52 | 15,090 | 32 |
| Buck and Elwang (2011) | 45 | Ecuador | 2009 | 2.2 | 140 | 7,931 | 54 |
| Burks *et al.* (2003) | 65 | USA | 2000 | 7.8 | 44 | 34,142 | 41 |
| Burns (2006) | 33 | South Africa | 2004 | 4.6 | 308 | 11,110 | 58 |
| Cardenas *et al.* (2008) | 34 | Colombia | 2007 | 3.8 | 562 | 8,587 | 58 |
| Cardenas *et al.* (2008) | 45 | Argentina | 2007 | 2.9 | 496 | 13,238 | 49 |
| Cardenas *et al.* (2008) | 45 | Venezuela | 2007 | 2.0 | 488 | 12,156 | 43 |
| Cardenas *et al.* (2008) | 50 | Peru | 2007 | 3.5 | 541 | 7,836 | 50 |

(*continued*)

Table AI.

| Study | Average first player investment (%) | Country | Year data collected | CPI score in that year | *n* | GDP per capita (PPP, USD) | Gini coefficient |
|---|---|---|---|---|---|---|---|
| Cardenas *et al.* (2008) | 45 | Uruguay | 2007 | 6.7 | 579 | 11,216 | 47 |
| Cardenas *et al.* (2008) | 46 | Costa Rica | 2007 | 5.0 | 425 | 10,842 | 49 |
| Carter and Castillo (2011) | 52 | South Africa | 2008 | 4.9 | 283 | 9,812 | 58 |
| Cassar *et al.* (2007) | 43 | Armenia | 2005 | 2.9 | 26 | 4,800 | 43 |
| Castillo and Carter (2003) | 49 | Honduras | 2002 | 2.7 | 758 | 2,600 | 55 |
| Charness *et al.* (2008) | 37 | USA | 2006 | 7.3 | 96 | 41,890 | 41 |
| Chaudhuri and Gangadharan (2007) | 43 | Australia | 2004 | 8.8 | 100 | 31,794 | 35 |
| Chaudhuri and Sbai (2011) | 33 | New Zealand | 2009 | 9.4 | 82 | 25,438 | 36 |
| Cochard *et al.* (2004) | 50 | France | 2002 | 6.3 | 40 | 26,920 | 33 |
| Cox (2004) | 59 | USA | 2000 | 7.8 | 64 | 34,142 | 41 |
| Cronk (2007) | 35 | Kenya | 2005 | 2.1 | 100 | 1,240 | 48 |
| Csukás *et al.* (2008) | 59 | Brazil | 2005 | 3.7 | 20 | 8,402 | 55 |
| Csukás *et al.* (2008) | 35 | Greece | 2005 | 4.3 | 20 | 23,381 | 34 |
| Csukás *et al.* (2008) | 59 | Russia | 2005 | 2.4 | 20 | 10,845 | 44 |
| Csukás *et al.* (2008) | 57 | Hungary | 2005 | 5.0 | 40 | 17,887 | 30 |
| Dubois *et al.* (2012) | 37 | France | 2006 | 7.4 | 18 | 31,100 | 27 |
| Ensminger (2000) | 44 | Kenya | 1998 | 2.5 | 40 | 1,600 | 43 |
| Etang *et al.* (2011) | 69 | Cameroon | 2008 | 2.3 | 280 | 2,197 | 45 |
| Fiedler and Haruvy (2009) | 50 | Germany | 2007 | 7.8 | 40 | 34,100 | 27 |
| Greig and Bohnet (2008) | 30 | Kenya | 2004 | 2.1 | 270 | 1,240 | 48 |
| Guillen and Ji (2011) | 59 | Australia | 2009 | 8.7 | 24 | 39,900 | 30 |
| Güth *et al.* (2008) | 44 | Germany | 2007 | 7.8 | 16 | 34,100 | 27 |
| Holm and Danielson (2005) | 53 | Tanzania | 2001 | 2.2 | 200 | 520 | 35 |
| Holm and Danielson (2005) | 51 | Sweden | 2002 | 9.3 | 110 | 26,050 | 25 |
| Innocenti and Pazienza (2006) | 42 | Italy | 2005 | 5.0 | 36 | 28,700 | 33 |
| Johansson-Stenman *et al.* (2009) | 46 | Bangladesh | 2003 | 1.3 | 128 | 1,770 | 31 |

(*continued*)

Table AI.

| Study | Average first player investment (%) | Country | Year data collected | CPI score in that year | *n* | GDP per capita (PPP, USD) | Gini coefficient |
|---|---|---|---|---|---|---|---|
| Koford (2001) | 63 | Bulgaria | 2000 | 3.5 | 30 | 5,710 | 29 |
| Kovács and Willinger (2010) | 51 | Hungary | 2003 | 4.8 | 74 | 14,584 | 30 |
| Kugler *et al.* (2007) | 65 | Austria | 2005 | 8.7 | 32 | 32,500 | 26 |
| Lazzarini *et al.* (2004) | 56 | Brazil | 2003 | 3.9 | 69 | 7,790 | 55 |
| Lev-On *et al.* (2009) | 30 | USA | 2009 | 7.5 | 30 | 46,000 | 45 |
| Mosley and Verschoor (2003) | 49 | Uganda | 2003 | 2.2 | 186 | 1,457 | 43 |
| Qin *et al.* (2011) | 63 | China | 2008 | 3.6 | 60 | 5,300 | 47 |
| Schechter (2007) | 46 | Paraguay | 2002 | 1.7 | 188 | 4,610 | 53 |
| Song *et al.* (2012) | 42 | China | 2008 | 3.6 | 58 | 6,000 | 41 |
| Tan and Vogel (2008) | 35 | Germany | 2004 | 8.2 | 24 | 28,700 | 26 |
| Tanaka *et al.* (2006) | 52 | Vietnam | 2005 | 2.6 | 181 | 3,071 | 38 |
| Tu and Bulte (2010) | 55 | China | 2006 | 3.3 | 286 | 6,757 | 41 |
| Willinger *et al.* (2003) | 42 | France | 2001 | 6.7 | 30 | 23,990 | 33 |
| Willinger *et al.* (2003) | 66 | Germany | 2001 | 7.4 | 30 | 25,350 | 28 |

## Appendix 2

| Study | Average amount offered (%) | Country | Year data collected | CPI score in that year | *n* | GDP per capita (PPP, USD) | Gini coefficient |
|---|---|---|---|---|---|---|---|
| Artinger *et al.* (2010) | 25 | Germany | 2009 | 8.0 | 120 | 34,800 | 28 |
| Ashraf *et al.* (2006) | 24 | USA | 2001 | 7.6 | 112 | 34,320 | 41 |
| Ashraf *et al.* (2006) | 26 | Russia | 2001 | 2.3 | 118 | 7,100 | 44 |
| Ashraf *et al.* (2006) | 25 | South Africa | 2001 | 4.8 | 128 | 11,290 | 58 |
| Ben-Ner *et al.* (2008) | 31 | USA | 2006 | 7.3 | 72 | 41,890 | 41 |
| Brañas-Garza *et al.* (2011) | 50 | Spain | 2006 | 6.8 | 27 | 27,400 | 31 |
| Burns (2006) | 26 | South Africa | 2004 | 4.6 | 337 | 11,110 | 58 |
| Carpenter *et al.* (2005) | 33 | USA | 2003 | 7.5 | 19 | 37,600 | 45 |
| Carter and Castillo (2011) | 42 | South Africa | 2000 | 5.0 | 283 | 8,000 | 58 |
| Castillo and Carter (2003) | 42 | Honduras | 2002 | 2.7 | 758 | 2,600 | 55 |
| Dana *et al.* (2006) | 24 | USA | 2004 | 7.5 | 40 | 37,800 | 45 |
| Delevande and Zafar (2011) | 43 | Pakistan | 2009 | 2.4 | 1,412 | 2,600 | 31 |
| Eckel and Petrie (2011) | 24 | USA | 2010 | 7.1 | | 47,200 | 46 |
| Ensminger (2000) | 31 | Kenya | 1998 | 2.5 | 86 | 1,600 | 43 |
| Etang *et al.* (2011) | 44 | Cameroon | 2008 | 2.3 | 280 | 2,197 | 45 |
| Franzen and Pointner (2012) | 31 | Germany | 2010 | 7.9 | 81 | 35,700 | 28 |
| Gowdy *et al.* (2003) | 42 | Nigeria | 2001 | 1.0 | 143 | 840 | 43 |
| Habyarimana *et al.* (2007) | 23 | Uganda | 2006 | 2.7 | 300 | 1,700 | 44 |
| Haley and Fessler (2005) | 23 | USA | 2003 | 7.5 | 25 | 37,500 | 45 |
| Henrich *et al.* (2006) | 40 | USA | 2004 | 7.5 | 27 | 37,800 | 43 |
| Henrich *et al.* (2006) | 36 | Kenya | 2004 | 2.1 | 81 | 1,000 | 48 |
| Henrich *et al.* (2006) | 42 | Ghana | 2004 | 3.6 | 30 | 2,200 | 39 |
| Henrich *et al.* (2006) | 31 | Tanzania | 2004 | 2.8 | 61 | 600 | 38 |
| Henrich *et al.* (2006) | 37 | Russia | 2004 | 2.8 | 56 | 8,900 | 42 |
| Henrich *et al.* (2006) | 41 | Papua New Guinea | 2004 | 2.6 | 60 | 2,200 | 51 |
| Henrich *et al.* (2006) | 26 | Bolivia | 2004 | 2.2 | 38 | 2,400 | 57 |
| Henrich *et al.* (2006) | 44 | Colombia | 2004 | 3.8 | 30 | 6,300 | 57 |
| Henrich *et al.* (2006) | 35 | Ecuador | 2004 | 2.4 | 30 | 3,300 | 49 |
| Hole (2010) | 27 | Norway | 2009 | 8.6 | 20 | 57,600 | 25 |
| Holm and Danielson (2005) | 24 | Tanzania | 2001 | 2.2 | 200 | 520 | 35 |

(*continued*)

**Table AII.**
Dictator game meta-analysis

Table AII.

| Study | Average amount offered (%) | Country | Year data collected | CPI score in that year | *n* | GDP per capita (PPP, USD) | Gini coefficient |
|---|---|---|---|---|---|---|---|
| Holm and Danielson (2005) | 28 | Sweden | 2002 | 9.3 | 110 | 26,050 | 25 |
| Jakiela (2011) | 26 | Kenya | 2007 | 2.1 | 136 | 1,200 | 42 |
| Korenok *et al.* (2012) | 33 | USA | 2011 | 7.1 | 34 | 49,000 | 46 |
| Lesorogol and Ensminger (2007) | 36 | Kenya | 2002 | 1.9 | 68 | 400 | 48 |
| Lesorogol and Ensminger (2007) | 32 | USA | 2002 | 7.7 | 58 | 36,700 | 45 |
| List (2007) | 33 | USA | 2005 | 7.6 | 24 | 40,100 | 47 |
| Martinsson *et al.* (2012) | 55 | Colombia | 2008 | 3.8 | 49 | 8,800 | 54 |
| Oberholzer-Gee and Eichenberger (2008) | 31 | Switzerland | 2007 | 9.0 | 52 | 34,000 | 33 |
| Oxoby and Spraggon (2008) | 21 | Canada | 2003 | 8.7 | 336 | 30,677 | 33 |
| Rankin (2006) | 6 | USA | 2003 | 7.5 | 64 | 37,600 | 45 |
| Schurter and Wilson (2009) | 35 | USA | 2006 | 7.3 | 40 | 41,890 | 41 |
| Servátka (2010) | 17 | USA | 2008 | 7.3 | 34 | 46,000 | 45 |
| Whitt and Wilson (2007) | 24 | Bosnia | 2003 | 3.3 | 681 | 1,900 | 36 |
| Xiao and Houser (2009) | 27 | USA | 2007 | 7.2 | 34 | 45,800 | 45 |
| Yamamori *et al.* (2008) | 24 | Japan | 2003 | 7.0 | 80 | 28,000 | 25 |