Perception vs. Experience: Explaining Differences in Corruption Measures Using Microdata

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Abstract

Understanding corruption is at the heart of treating the dysfunctionality of many countries' public sectors. Yet, most corruption research suffers from one common problem: There is no "objective" measure of public-sector corruption for a cross-section of countries. Most studies on the determinants or the effects of corruption rely on indicators of corruption perception. In recent years, a second type of indicator reflecting stated experiences with bribery has become available. If corruption perception is primarily informed by experience with corruption, these two types of indicators should be very highly correlated. In fact, they are not. This paper deals with the divergence between these two types of corruption indicators. We examine the variation in individual corruption perception that cannot be explained by individual corruption experience alone. We find that both respondent characteristics and country characteristics affect corruption perception beyond what can be explained by individuals' first-hand experience of corruption. Some of these biases may force us to reevaluate results of corruption research that is based on perception data, as well as the anti-corruption policies designed after these results.

JEL-Codes: D730, C800, K420, O170.

Keywords: corruption experience, corruption measurement, corruption perception, governance indicators, institutional quality, subjective indicators.

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1 - Introduction

The fight against corruption is high on the agendas of nation state governments, of NGOs such as Transparency International, and of many international organizations, including the World Bank. Academic research, but also political consulting, primarily relies on a small number of subjective indicators of corruption, among which Transparency International's Corruption Perceptions Index (CPI) is best known. It is crucial for both research and the design of anti-corruption policies that the corruption indicators being used are an accurate reflection of reality. There are several important reasons why accurate corruption indicators are needed:

(1) The effects of corruption can only be estimated if a reliable proxy for its prevalence exists.

(2) Adequate policy measures cannot be selected and evaluated ex-post if the information specific to the targeted problem is not sufficiently precise.

(3) The Millennium Challenge Corporation, an independent bilateral US foreign aid agency, allocates some of its grants based on countries' corruption perception scores, as do other aid agencies. If these indicators are not valid, substantial amounts of aid are being misallocated.

(4) A similar argument can be made for the choice of location of many multinational corporations.

This paper deals with the divergence between two types of corruption indicators. Some corruption perception indicators focus on expert or general population surveys to determine the perceived significance of public-sector corruption in a specific country. Both the World Bank's corruption indicator and the CPI are based on such data. Other indicators, like the International Crime Victims Survey, are not based on perception of corruption, but on personal experience with bribery. They ask, for instance, whether, how often, and to whom a person had to pay a bribe over the course of the past 12 months. Treisman (2007) already noted that the first type of indicator is not simply a transformation of the second.

Neither corruption perception nor reported corruption experience is necessarily an expedient measure of what researchers are actually interested in. *Prima facie*, one might expect experience-based indicators to be more reflective of corruption reality than perception-based indicators; and much of the literature seems to concur that the latter are more susceptible to systematic biases (see, e.g., Kurtz and Schrank 2007). If there are significant and systematic deviations between the two types of indicators, this implies that neither should be used as a proxy for corruption without due consideration. First, one needs to understand why individuals evaluate corruption differently than how they seem to experience it. This is precisely the question we want to address here. Analogously to earlier studies, we analyze the conditions under which individuals report a higher level of corruption perception, given their own corruption experience. Traits of respondents and characteristics of their countries both might play a role in the formation of corruption perception.

Our study contributes a number of improvements over previous research in this literature. In our theory section, we discuss concrete cognitive biases that could be at play when individuals with bounded rationality are asked to evaluate corruption levels. Previous research has simply claimed that some characteristics of individuals or countries may influence priors about corruption levels in a country, without providing any further explanation of this mechanism. Using data from the Global Corruption Barometer (GCB), we are able to not only produce empirical results for a much larger set of countries compared to any existing study, but we are also able to directly link corruption perception to the corruption experience of individual respondents, which leads to much more informative and reliable empirical results.

Based on 184,018 individual-level observations in 109 countries, we find that a number of respondent and country characteristics are related to levels of corruption perception that systematically differ from what individual corruption experience would predict. Corruption experience itself has a significant and robust effect on corruption perception. Independently of their experience with corruption, individuals who are male, Protestant, earn a high income, and are not working perceive corruption levels to be lower than they are perceived by others. More importantly, higher economic growth and income per capita are associated with downward-biased corruption perceptions. Results of corruption research that is exclusively based on

perception indicators thus need to be rethought, and what might be even more important, all sorts of anti-corruption policies that have been designed based on these results need to be reevaluated.

In Section 2, we survey the extant literature on measuring biases in corruption perception. Section 3 introduces the GCB dataset, discusses the construction of our corruption indicators, and describes their properties. Section 4 deals with theoretical explanations for the differences between corruption perception and experience. We offer a number of theoretical conjectures about the conditions under which one would expect systematic differences between perception and experience measures. The data used for corroborating these predictions is also described. In Section 5, we discuss how the relationship between corruption perception and experience can be modeled empirically and we present our regression results. Section 6 discusses our findings and their potential implications. Section 7 concludes with a summary of the main results and an outlook on open research questions.

2 - A Survey of the Literature

Over the last 15 years, a sizable literature has emerged on both the determinants and the effects of public-sector corruption (Aidt 2019 provides a knowledgeable and up-to-date survey). However, almost all studies in this literature use indicators of corruption perception, which do not necessarily reflect the actual prevalence of corruption in a country. When indicators of corruption experience are used instead, some of the established empirical results are not robust. Consequently, some have expressed concern that "the subjective data may reflect opinion rather than experience, and future research could usefully focus on experience-based indicators" (Treisman 2007:211). At the same time, it can be asked whether respondents systematically report their direct involvement in acts of crime. It is a punishable offense in some countries to bribe a public official. In other countries, social stigma may deter respondents from answering honestly (Bertrand and Mullainathan 2001). Furthermore, corruption perception can be based on more information than simply someone's personal experience. Depending on the reliability of that information, reported perception offers additional insights. That is, of course, the idea behind conducting expert surveys.

For quite a long time, there has been a broad consensus that perceptions cannot be measured in an objective or intersubjectively verifiable way and that they are thus of little value to economists. However, to study determinants or effects of corruption, some proxy for its prevalence is required. Therefore, Transparency International, an NGO that fights corruption worldwide, developed its 'Corruption Perceptions Index' (CPI) in the 1990s. The CPI is basically a survey of surveys, which summarizes data from various international and non-governmental organizations. It has since become the standard measure of public-sector corruption used in academia and political consulting. The World Bank's 'Worldwide Governance Indicator' (WGI) for control of corruption was developed at a later date, but it followed a very similar approach to measuring corruption. Recently, the Varieties of Democracy (V-Dem) dataset introduced its own corruption indicators.

As the use of these corruption indicators in empirical analyses spread, subjective indicators in general, and those for corruption in particular, have come under criticism (see, e.g., Andersson and Heywood 2009; León et al. 2013; Voigt 2013). Due to increasing discontent with the limitations of subjective indicators, researchers have recently invested in the development of more "objective" indicators of corruption (see Bandiera et al. 2009; Di Tella and Schargrodsky 2003; Ferraz and Finan 2008; Golden and Picci 2005; Olken 2006, 2007; Reinikka and Svensson 2004). However, these measures are usually confined to single countries, and within countries often to specific industries. Also, judicial statistics (see, e.g., Chen and Liu 2018; Glaeser and Saks 2006; Zakharov 2019) are typically not suitable for cross-country comparison (Escresa and Picci 2017 being one innovative exception).

Olken (2009) was the first study to convincingly ascertain the accuracy of corruption perception by directly comparing Indonesian villagers' reported perception of corruption in a road-building project located in their village with an objective measure of corruption in that project. He found that reported perception is informative, but also biased. Olken's analysis illustrates the limitations of empirical research on corruption that relies solely on perception indicators.

In the meantime, a handful of indicators that measure stated experience with corruption have become available. These include the 'International Crime Victims Survey' (ICVS, published by the United Nations Interregional Crime and Justice Research Institute), which asks the general population for their experience with bribery and other crimes. Data on corruption experiences of businesspeople with the public sector come from the World Bank's 'World Business Environment Survey' (WBES), which was conducted in 1999-2000, and its continuously collected 'Enterprise Surveys' (ES). Finally, Transparency International publishes the 'Global Corruption Barometer' (GCB), which, among other things, asks citizens about their corruption experience with different types of public organizations.

These experience-based indicators are not objective in the sense of being intersubjectively verifiable, but they are an attempt to move from opinions towards facts. Their advantages over the existing objective indicators are evident. Data is available for a large cross-section of countries, and corruption levels do not need to be inferred indirectly from indicators such as wasteful spending or other suspicious activities. Research on how to deal with reticent respondents promises to further increase the reliability of experience-based corruption indicators in the future (see, e.g., Karalashvili et al. 2018). The availability of this new type of corruption indicator leads to the question posed here: How are experience-based indicators related to the established perception-based indicators? Do they measure the same thing? And if not, why do these types of indicators systematically differ from each other? A number of studies have tried to address these questions. Most of them rely on the ICVS or the WBES (sometimes in combination) and only very few use GCB data.

Using data from an early GCB survey in 60 countries, Weber Abramo (2008) observes that experience with corruption is not highly correlated with corruption perceptions. Rather, opinions about corruption are correlated with other opinions, such as evaluations of human rights violations. Weber Abramo concludes that his findings "challenge the value of perceptions of corruption as indications of the actual incidence of the phenomenon" (Weber Abramo 2008:3). Based on 43 countries and ICVS-data, Mocan (2009) finds that corruption perception at the country level is primarily determined by institutional quality (measured as the

perceived risk of expropriation). Once institutional quality is controlled for, the average experience with bribery in the population is unrelated to average perceived corruption, as measured by the CPI and the WGI.

Analyzing both the ICVS and the WBES dataset, Donchev and Ujhelyi (2014) find that experience with corruption is not a robust predictor of corruption perception at the country level. Interpreting their regression results for up to 58 countries, Donchev and Ujhelyi argue that some of the factors commonly believed to reduce corruption cause a systematic bias in corruption perception indices. Economic development, Protestantism, democratic institutions, and centralized governments cause countries to be perceived as less corrupt at a given level of corruption experience. In a complementary analysis of microdata for 21 countries, Donchev and Ujhelyi find that respondent characteristics influence corruption perception even when individual corruption experience is controlled for. Corruption experience functions as a robust predictor of individual corruption perception. The study by Donchev and Ujhelyi (2014) is an important contribution to the literature, although it suffers from clear shortcomings. Corruption experience is, for example, measured independently of whether the survey respondent had even been in contact with any public authority.[1] The micro-level corruption perception indicator they use also confounds private and public sector corruption. Moreover, the persuasiveness of Donchev and Ujhelyi's results is impaired by the small number of countries for which corruption perception and experience are matched on the individual level. Finally, the employed World Bank indicator of corruption already includes data on corruption experience, which renders their country-level analysis based on this indicator problematic.

Charron (2016) uses an original dataset of corruption perception and experience in 24 European countries. He finds a robust relationship between corruption perception and experience. A major advantage of the dataset employed by Charron is the availability of regional data, which is unique in this literature. This dataset, however, does not take into account that corruption experience presupposes respondents having had

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[1] This can lead to a systematically underestimated relationship between experience and perception, if respondents are more likely to avoid interaction with public officials where corruption levels are high.

contact with the respective public authorities and the corruption perception measure contains problematic elements as well. For example, it is asked whether bribery is used to obtain advantages that people are not entitled to, which allows for a broad scope of subjective interpretation. It is even more problematic that survey responses are aggregated to the regional and country level, where the author then distinguishes between the two groups of respondents with and without corruption experience.

To sum up, the empirical evidence on the association between corruption perception and experience can be described as mixed. After earlier studies found no significant relationship when controlling for differences in institutional quality, recent studies based on microdata have identified a robust link between perception and experience.[2] However, these studies suffer from a number of limitations: Their country coverage is low, which makes especially inference on country-level determinants of the difference between perception and experience problematic. In addition, all studies make at most very limited use of microdata. Only Donchev and Ujhelyi (2014) relate perception and experience to each other on the individual respondent level, but their sample size of 21 countries is very small. Furthermore, many of these studies use indicators of corruption that are problematic in the context of their particular application.

3 - Measuring Corruption Perception and Experience

Our corruption data is from Transparency International's GCB and we include all waves from 2006 to 2016. Previous studies have frequently relied on other datasets, such as the WBES. Although these datasets may have certain advantages (e.g., they distinguish between the frequency and the size of bribes), we prefer to rely on the GCB. It is based on a representative sample of the population, whereas the WBES is confined to businesspeople. Also, the WBES and the ES do not ask for corruption perception. Hence, using these datasets precludes the analysis of microdata in which corruption perception and experience are measured for

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[2]   Goel et al. (2012) and Liu and Peng (2015) ask if awareness of corruption can influence the incidence of bribery, but they arrive at very different evaluations. Goel et al. find a negative association, Liu and Peng show a positive relationship.

the same individuals. It is self-evident that asking different subjects (private persons, experts or managers) in differently designed surveys about either their perception or their experience is a very ineffective research design to study the gap between perceived and experienced corruption.

Although the ICVS provides data that is frequently used to proxy corruption, several serious drawbacks impede a reliable analysis of this data. First, it is only available for a very small sample of countries. Second, it merely provides a crude measure of corruption perception, as it offers only two response categories for the level of corruption in different areas of the public sector. Third, it can be questioned whether this variable even constitutes a serious attempt at measuring corruption perception. When comparing it to the World Bank's ES, the question in the ICVS is evidently quite similar to the World Bank's "hypothetical question" used to elicit the corruption experience (not perception!) of businesspeople (see Clausen et al. 2011:442f.).

Regarding corruption *perception*, the GCB asks respondents to evaluate corruption in various types of organizations, i.e., the government, political parties, parliament, local government, police, the military, the judiciary, tax authorities, education, medical and social services, customs, businesses, media, NGOs, traditional leaders, and religious bodies. Possible answers are integers between 1 ("not at all corrupt") and 5 ("extremely corrupt"). As corruption in the private sector has been demonstrated to be conceptually and empirically distinctive, we disregard corruption perceptions regarding businesses, media, NGOs, traditional leaders, and religious bodies (see Gutmann and Lucas 2018). Our indicator of corruption perception (**P**) is calculated as the mean value of the remaining perception indicators and rescaling results in a continuous variable ranging from 0 to 100 for which higher values reflect higher levels of perceived corruption. The Pearson correlation coefficient between our perception indicator and the CPI on the country level is 0.51.

Prima facie, experience-based measures of corruption might appear to be more accurate than perception-based indicators. But measuring experienced corruption also poses challenges: Corruption is frequently criminalized and claiming to have paid a bribe then amounts to admitting illegal behavior. The propensity to offer or accept a bribe might differ across legal regimes, cultures, religions, and so on.

Formulating the question regarding experience of either the respondent or any other household member is a first attempt to mitigate that problem. To refrain from an outright lie, respondents might even refuse to answer the question at all. To correct for this, we did not rely only on all "yes" answers, but we also treat an explicit refusal to answer the question as a positive response. Furthermore, even if respondents seek to answer truthfully, they might not remember how long ago they had to pay a bribe. These and other lapses of memory, however, should constitute random noise.

Our *experience* measure is based on a hierarchical question in the GCB. Its first part reads: "In the past 12 months have you or anybody living in your household had a contact with the following institution/organization?" Given that this question is answered in the affirmative, a second question is asked with respect to each organization the respondent or a member of their household was in contact with: "In the past 12 months have you or anyone living in your household paid a bribe in any form to each of the following institutions/organizations?" Our sample includes only individuals that were in contact with at least one public-sector organization. Compared to the case of corruption perception, it is less obvious how an indicator of overall corruption experience should be constructed. This question is typically not discussed in the extant literature, but Figure 1 gives an impression of the empirical relationship between corruption experience and corruption perception.

<<< Figure 1 about here >>>

As Figure 1 illustrates, individuals with one or more corruption experiences report notably higher corruption perception levels than individuals without any corruption experience over the past 12 months. However, beyond that corruption perception does not seem to be increasing in the number of corruption experiences. Based on the insights from this empirical pattern, we construct our indicator of corruption experience as a binary indicator indicating that an individual had at least one corruption experience over the past 12 months. Appendix 1 is a list of all countries in our dataset with their reported prevalence of corruption experience and their level of perceived corruption.

4 – Theory and Data for Explaining Differences between Perception and Experience

Systematic differences between perception and experience of corruption can have various causes. Some of the cognitive biases affecting subjective survey data have been discussed by Bertrand and Mullainathan (2001). Our most important theoretical arguments have already been summarized indirectly by Knack (2007:282) in his demand that "more research is needed concerning the impact of optimism, recent economic performance, and highly publicized corruption scandals on country-level corruption indicators". More optimistic respondents and those who face favorable (economic) conditions are expected to give a more optimistic assessment of risk.[3] It can consequently be expected that individuals who are unemployed, earn a low income, or are living through an economic recession will report a higher perception of corruption. This argument is not new and has, for example, been used as a major criticism against the use of subjective indicators in the literature on institutions and economic growth (Kurtz and Schrank 2007; Rodrik 2004). Jahedi and Méndez (2014) provide experimental evidence supporting such a bias in corruption perception.

A related bias is the *positivity bias* in perception, which leads older adults to pay more attention to positive stimuli and to experience fewer negative emotions than younger adults. This bias differs not only between age groups, but also among societies (Mezulis et al. 2004). Both optimism and the positivity bias can link individual and country characteristics to systematic differences in corruption perception without changing actual (and hence experienced) corruption. Aside from cognitive biases, the availability of information on corruption experience of other members of society can also affect one's perception of corruption. If information about corruption is widely disseminated, for example via free media, individuals might adjust their perception of corruption upwards.

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[3] We do not distinguish between dispositional optimism and relevant related forms of emotion, mood, etc. In line with Puri and Robinson (2007), we define optimism as generalized positive expectations about future events. Thus, optimistic individuals may underestimate the prevalence and consequences of corruption. See, for example, Johnson and Tversky (1983) for the effect of mood on risk assessment.

Next, we discuss four categories of concrete factors that might explain systematic differences between corruption perception and experience. Most of these factors are in some way reflective of the above-mentioned explanations for biases in corruption perception indicators. For example, one cannot directly measure the availability of information on corruption to the public, but we can test the role of institutional details that should encourage the dispersion of such information.

(1) Individual socio-demographic characteristics, such as age, income, and education;

(2) Aggregate political indicators, including press freedom, democracy, and the like;

(3) Aggregate economic indicators, such as income and economic growth;

(4) Culture, ethnicity, and religion, referring to attitudes and beliefs prevalent in the population.

All arguments here refer to differences in corruption perception that cannot be explained by corruption experience alone. Donchev and Ujhelyi (2014) describe this as a model of boundedly rational individuals who update their priors based on their own experience with corruption. Corruption perception **P** is not only a function of individual corruption experience **E**, but also of characteristics of the individual **I** and country characteristics **C**, which systematically shape individuals' beliefs about corruption in their country. Corruption perception can thus be described as:

$$\mathbf{P} = f\left(\mathbf{E}, \mathbf{I}, \mathbf{C}\right) \tag{1}$$

When looking at the *socio-demographic characteristics* of respondents (**I**), it was already mentioned that age might induce a positivity bias. Younger adults are expected to have higher corruption perceptions compared to older adults with the same corruption experience. One could also argue that higher levels of education are, *ceteris paribus*, correlated with better information on, and a higher sensitivity to, corruption. Caplan (2002) provides evidence that education may be linked negatively to individuals' optimism regarding future economic conditions, which could also imply higher corruption perception. Psychological research suggests that women systematically express more concern for a wide range of risks, although their rank-

ordering of these risks is identical to that of men (Gustafson 1998). Hence, we expect a higher corruption

perception among women. Olken (2009) finds, conditional on including village fixed effects, that younger,

male, and better educated respondents report higher corruption perceptions.

High individual income could be related to lower perception via increased optimism (Puri and

Robinson 2007). High-income individuals are also more likely capable of using corrupt institutional

structures to their advantage. However, Olken (2009) finds evidence for higher individual income being

linked to higher corruption perception. The occupational status of an individual is relevant in the sense that

someone who is unemployed can be expected to perceive relatively more corruption. Unemployment is not

only linked to lower life satisfaction, the unemployed are also less likely to benefit from corruption, as they

are neither recipients of bribes nor likely to have the financial means to corrupt public officials.

Table 1: Descriptive statistics, individual level

	N	Mean	SD	Min	Max
Perception	184,018	58.21	23.67	0	100
Experience	184,018	0.26	0.44	0	1
Age <30	184,018	0.28	0.45	0	1
Age >50	184,018	0.28	0.45	0	1
Secondary Education	184,018	0.47	0.50	0	1
Higher Education	184,018	0.35	0.48	0	1
Employed	184,018	0.58	0.49	0	1
Unemployed	184,018	0.09	0.28	0	1
Female	184,018	0.50	0.50	0	1
Medium Income	184,018	0.42	0.49	0	1
High Income	184,018	0.15	0.36	0	1
Protestant	184,018	0.12	0.32	0	1

Note: Sample as in Table 2.

Our individual-level covariates are from the GCB dataset. A dummy variable indicates whether the

respondent is a female. A categorical variable distinguishes three age groups: below 30, 30 to 50, and over

50. Individual income is categorized as low, medium, or high. Education is described as basic, secondary

schooling, or university level. The respondent's employment status is classified as employed, unemployed,

or not looking for work (including retired). Table 1 shows the descriptive statistics for our microdata. Figure

2 shows how these characteristics are linked to corruption perception levels for individuals with and without

corruption experience over the past 12 months. The main insight from this figure is that individuals across all categories show increased corruption perceptions after experiencing corruption first-hand.

<<< Figure 2 about here >>>

The second category of potentially relevant factors is *aggregate political indicators*. Here we expect political institutions to play a role in the dispersion of information about corruption. According to Sharafutdinova (2010), both political competition and press freedom are associated across Russian regions with corruption perception that is increased relative to experienced corruption. Political competition in democracies may promote access to information on corruption cases, as the political opposition benefits from making these cases public. That argument is supported by Potrafke's (2019) finding that corruption perceptions in democracies increase significantly in the year before an election. Reports on corruption issued by a free press can increase the perception of corruption in the population without individuals having increased experience with corruption (Rose and Mishler 2010). Evidence from Spanish elections for local government shows that press coverage on corruption scandals can have significant adverse consequences for the incumbent (Costas-Pérez et al. 2012). Critical reporting on corrupt politicians is thus more likely to occur where the press is free from government influence (Djankov et al. 2003).

The judicial system is often argued to be important for the dispersion of reliable information on corruption. Judicial independence may improve public awareness of corruption. Independent judges are unlikely to be influenced by the political costs of adjudicating corruption cases. Information provided to the public by independent courts is also deemed more trustworthy. Nevertheless, there are also important differences between independent media and an independent judiciary. The media tend to scandalize events, as this is good for business and public opinion is essential to their ability to hold politicians accountable. Whereas the media might undermine the public's trust in authorities to increase their perception of corruption, this is not the case for independent judges. Moreover, an independent judiciary is often less relevant to bringing cases of corruption to light, than to successfully prosecute and adjudicate already

uncovered acts of corruption. Therefore, the relationship between judicial independence and corruption perceptions is less clear. Corruption could even be perceived as less of a problem when there are independent judges who eventually make sure that many corrupt politicians are successfully prosecuted.

We employ a dummy variable coded by Bjørnskov and Rode (2019), who have updated the democracy dataset by Cheibub et al. (2010), to distinguish democracies from autocracies. From the Varieties of Democracy (V-DEM) project, we obtain two indicators for high court and low court judicial independence. Both are very highly correlated and we simply use their mean value as our indicator of *de facto* judicial independence. From the same data source we use an indicator of media freedom that is supposed to capture the extent to which governments respect press and media freedom, the freedom of ordinary people to discuss political matters at home and in the public sphere, and the freedom of academic and cultural expression.[4]

The third group of factors potentially causing differences between corruption perception and experience are *aggregate economic indicators*. As in the argument regarding individual income, we expect income per capita and its growth rate to be associated with increased optimism that in turn results in reduced corruption perceptions. In contrast, economic conditions entailing an unequal distribution of income and wealth might increase corruption perception. This may be due to individuals' discontent with their economic condition (as we argued for individuals that are unemployed), but it could also be caused by greater prevalence of grand corruption relative to petty corruption in highly unequal societies.[5] Data on income and growth comes from the World Bank's World Development Indicators. The data on income inequality based on disposable income is from the Standardized World Income Inequality Database 8.2 by Solt (2009).

The last group of potentially relevant determinants is called *culture, ethnicity, and religion*. If we assume that corruption perception is based on an estimated willingness of other members of society to engage

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[4] Alternative indicators of judicial independence by Feld and Voigt (2003) and Voigt et al. (2015) or of media freedom by Freedom House do not offer a comparable country coverage.

[5] However, there does not seem to be much support for the idea that petty and grand corruption do not systematically coincide across countries (see, e.g., Kahana and Qijun 2010; Seligson 2006 for arguments against this point of view).

in corrupt transactions, then interpersonal trust should be fundamental to the formation of corruption perceptions and it should bias them independently of actually experienced corruption (Wroe et al. 2013). Ethnic fractionalization can also be associated with distrust among members of society. Olken (2009) finds such an upward bias of perception relative to actual corruption in more ethnically fragmented Indonesian villages. Finally, it has been claimed that Protestants react particularly negatively to corruption (Treisman 2000). If that is the case, Protestants might have an inflated corruption perception.

Bjørnskov and Méon (2013) provide a consolidated dataset of social trust. The data on ethnic fractionalization comes from Alesina et al. (2003). Finally, the share of Protestants in the population is based on the Religious Characteristics of States Dataset by Brown and James (2018).

Appendix 2 provides descriptive statistics for our country level covariates. Our main arguments regarding the institutional, socio-economic, and cultural aspects of relevance can be summarized in three main hypotheses, which we put to the test in the next section:

(H1): Individuals adjust their perception of corruption in their country upwards when they experience public-sector corruption themselves.

(H2): Individuals report higher perception of corruption when corruption cases are more likely to be uncovered and information on these cases is more widely dispersed within society.

(H3): Individuals are more concerned about public-sector corruption when they are less optimistic and experience less favorable economic conditions.

5 - Empirical Analysis of the Relationship between Perception and Experience

To study how the corruption perception of individual i in country j is shaped by their experience with corruption (**E**), but also by other individual traits of the survey respondents (**I**), we estimate a simple linear regression model as shown in Equation (2). Our empirical model follows Razafindrakoto and Roubaud (2010) and is very similar to Olken's (2009:958) research design, with the exception that the latter uses an objective proxy for corruption instead of a corruption experience indicator. In different model specifications, we add year fixed effects, country fixed effects, and country-year fixed effects. In a final step, we employ David Hendry's general-to-specific method to eliminate redundant predictors from the general unrestricted model and thereby identify a parsimonious undominated representation of that general model (see Hendry 1995; Hendry and Krolzig 2005; the search algorithm was implemented by Clarke 2014).

$$\mathbf{P}_i = \alpha + \beta*\mathbf{E}_i + \gamma*\mathbf{I}_i + \varepsilon_i \tag{2}$$

The results in Table 2 show OLS estimates in model (1). All regression results are based on 184,018 observations and standard errors are clustered in 109 countries. Thus, our results are representative of far more countries and based on many times more individual-level information than any previous study on the relationship between corruption perception and experience. To understand the relationships of corruption experience and the socio-demographic characteristics of respondents with an individual's corruption perception, in models (2) to (4) we add fixed effects to account for unobserved heterogeneity between countries and time periods. While time fixed effects leave our coefficient estimates largely unaffected, we find significant differences after controlling for country fixed effects. Model (5) reduces model (4), which uses country-year fixed effects, to a more parsimonious representation by eliminating some of the variables that are not relevant to explaining corruption perceptions after accounting for experience. Notably, all indicators for the age and education level of respondents are eliminated from the model.

Table 2: Individual-Level Determinants of Corruption Perception

	(1) OLS	(2) YFE	(3) CFE	(4) CYFE	(5) GTS
Experience	9.79***	10.01***	4.27***	4.64***	4.66***
	(1.16)	(1.07)	(0.47)	(0.44)	(0.44)
Age <30	0.81*	0.74	-0.49*	-0.50*	
	(0.39)	(0.37)	(0.23)	(0.22)	
Age >50	-1.67*	-1.55*	-0.62	-0.66*	
	(0.75)	(0.74)	(0.32)	(0.29)	
Secondary Education	-0.13	-0.12	0.53	0.56	
	(0.97)	(0.98)	(0.39)	(0.35)	
Higher Education	-0.44	-0.45	0.51	0.57	
	(1.16)	(1.16)	(0.61)	(0.55)	
Employed	-0.14	-0.11	0.96***	0.93***	1.15***
	(0.42)	(0.42)	(0.20)	(0.20)	(0.21)
Unemployed	2.30**	2.27**	1.44***	1.28***	1.46***
	(0.77)	(0.74)	(0.27)	(0.27)	(0.28)
Female	0.86**	0.93**	0.83**	1.00***	1.06***
	(0.32)	(0.32)	(0.25)	(0.26)	(0.27)
Medium Income	-0.84	-0.82	-0.27	-0.37	
	(0.48)	(0.46)	(0.31)	(0.24)	
High Income	-3.42***	-3.32***	-1.15*	-1.08*	-0.80*
	(0.88)	(0.89)	(0.47)	(0.42)	(0.38)
Protestant	-9.79***	-9.85***	-1.34*	-1.29*	-1.31*
	(2.50)	(2.51)	(0.54)	(0.52)	(0.55)
Constant	57.60***	55.47***	49.18***	48.93***	48.57***
	(1.46)	(1.93)	(0.36)	(0.34)	(0.34)
Observations	184,018	184,018	184,018	184,018	184,018
Countries	109	109	109	109	109

Note: Coefficient estimates with country-clustered standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Our results confirm that corruption experience impacts an individual's perception of corruption in the public sector. After controlling for experience with corruption, the association between survey respondent characteristics and corruption perception mostly confirms our expectations. However, we find no evidence for a positivity bias among older adults (as soon as country fixed effects are included in the model). We find strong evidence that female respondents report higher perceptions than their male counterparts. The opposite is true for Protestant Christians, who systematically report lower corruption perceptions. Corruption perception also falls with increasing individual income. The fact that self-reported high-income individuals show reduced corruption perceptions is a first sign that favorable economic conditions might be associated with improved ratings for a country's quality of governance. The results for individual occupational status

have a somewhat unexpected effect on corruption perception. Although unemployed individuals report a higher perception of corruption than respondents with a job, this difference is not statistically significant after including country fixed effects. What seems to matter more is the difference between individuals who are retired or not working *vis-à-vis* those in the workforce. Individuals in employment or seeking employment report significantly higher perception levels than those who are not participating in the labor market.

In a next step, we replace the country fixed effects in equation (2) with indicators for country-level characteristics (**C**) that could systematically bias corruption perception away from individual experience with corruption. In other words, we are now explicitly modelling country characteristics to understand their effect on corruption perceptions, rather than just eliminating them from the estimation process.

$$P_i = \alpha + \beta*E_i + \gamma*I_i + \delta*C_j + \varepsilon_i \tag{3}$$

Table 3 presents the coefficient estimates for country-level characteristics only. In models (1) to (3) we include the three groups of country-level covariates of interest individually in the model, before we test all country characteristics in model (4) for their influence on corruption perception. Model (5) again uses general-to-specific modelling to reach are parsimonious representation of the general unrestricted model in (4). Only two country level characteristics seem to be unrelated to corruption perceptions: income inequality and ethnic fractionalization are two measures for the heterogeneity of society that we expected to undermine trust in public institutions. However, what we do find is that an indicator for social trust itself is highly statistically significant. Societies with high trust levels have lower corruption perceptions than their experiences with corruption would predict. The same holds true for the share of Protestants in society, although we control for the individual affiliation of respondents with Protestantism.

With respect to political institutions, we find the expected positive effect of democracy and particularly of media freedom on corruption perception. These political institutions seem to bring to light cases of corruption, thereby making the population more critical of the behavior of their political representatives. This suggests the paradoxical situation that individuals are most concerned about the behavior of politicians where

these politicians are actually the most accountable. However, we do find the opposite effect of judicial independence. As we have argued above, judicial independence might not bring more cases of corruption to light, but it ensures that corrupt politicians are in fact held accountable. This might explain why individuals at a given level of corruption experience who live with a more independent judiciary consider corruption less of a problem for their country.

Finally, regarding a country's economic conditions we find our predictions and the concerns of large parts of the corruption literature, including Knack (2007), confirmed. Societies that are thriving economically perceive corruption to be less of a problem, even at the same level of experienced bribery. This raises the question to what extent the frequently demonstrated link between control of corruption and economic success depends on the use of perception-based indicators.

Table 3: Country-Level Determinants of Corruption Perception

	(1) Group 1	(2) Group 2	(3) Group 3	(4) GUM	(5) GTS
Democracy	5.73*			5.75**	4.68*
	(2.30)			(2.11)	(2.04)
Judicial Independence	-7.46***			-4.40***	-4.33***
	(1.13)			(1.06)	(1.08)
Media Freedom	27.67***			23.52***	24.07***
	(6.33)			(5.28)	(5.22)
Log-income		-3.58***		-2.19*	-2.29**
		(0.81)		(0.84)	(0.70)
Growth		-60.85***		-57.53***	-52.03***
		(14.93)		(12.81)	(13.23)
Inequality		31.59		25.13*	
		(16.49)		(11.60)	
Share Protestant			-10.72*	-11.70*	-11.08*
			(4.70)	(4.53)	(4.49)
Trust			-33.65***	-17.57*	-22.09**
			(7.65)	(6.80)	(6.58)
Fractionalization			6.37	-3.48	
			(3.69)	(4.12)	
Observations	170,107	170,107	170,107	170,107	170,107
Countries	94	94	94	94	94

Note: Coefficient estimates with country-clustered standard errors in parentheses. Individual respondent characteristics as shown in Table 2 are included in all regression models, but their coefficients are omitted from the Table. * p<0.05, ** p<0.01, *** p<0.001.

Our empirical results support all main hypotheses that we set out to test. (1) Individuals adjust their perception of their country's corruption level upwards after experiencing corruption themselves. (2) Individuals report increased corruption perception when free media and electoral competition are able to uncover cases of corruption in the public sector. (3) Finally, individuals report lower perceptions relative to their corruption experience when they are doing well economically or when they come from a society with high income or high economic growth rates.

Table 4 compares our main findings to those of previous studies. The comparison in Table 4 highlights three facts: (1) Our results are based on a significantly larger sample than those of other studies. (2) Our data allows us to test many more country and individual characteristics for their effect on corruption perceptions than previous studies were able to evaluate. And (3) many of our results contradict those of previous studies.

Donchev and Ujhelyi (2014) find no effect of individual income or gender on corruption perception, but significant effects of age and formal education. We find the opposite. On the country level, their results indicate a negative effect of democracy on average perception levels, where our results show a positive effect. Our results are also not in line with those of Olken (2009) who finds effects for age and education where we do not find significant effects. Even worse, Olken estimates the effect of individual income and gender with the opposite sign compared to our findings.

While our individual-level results should not have any serious consequences (as long as corruption data is produced from representative samples of the population) biased perception on the country level might constitute a problem for cross-country corruption research. Given that individuals in democracies might overstate their perception of corruption, the corruption-reducing effect of democratic institutions might have been underestimated so far. In contrast, economic growth might have less definitive consequences for corruption, as corruption perception appears to be downward biased when the economy does well. Similarly, while it has been claimed that Protestants are linked to lower levels of corruption, they may in fact simply be linked to understated perception of corruption.

Table 4: Comparison with results of previous studies

	Table 2	Donchev and Ujhelyi	Olken
Age		**inv. U**	-
Education		+	+
Employed	+		**n/a**
Unemployed	+	**o.c.**	**n/a**
Not Working	**o.c.**	+	**n/a**
Retired	**o.c.**	**o.c.**	**n/a**
Female	+		-
Income	-		+
Countries	109	21	1
Observations	184,018	11,248	3,727

	Table 3	Donchev and Ujhelyi micro-level	Donchev and Ujhelyi macro-level	Charron regional level	Charron country level
Democracy	+	**n/a**	-	**n/a**	
Judicial Independence	-	**n/a**	**n/a**	**n/a**	**n/a**
Press Freedom	+	**n/a**	**n/a**	**n/a**	
Income per capita	-	+	-	-	
Economic Growth	-	**n/a**	**n/a**	**n/a**	**n/a**
Economic Inequality		**n/a**	**n/a**		
Trust	-	**n/a**	**n/a**	**n/a**	**n/a**
Share of Protestants	-		-	**n/a**	**n/a**
Ethnic Fractionalization				**n/a**	
Independent units	94	21	43	180-209	24

Note: "+": positive effect; "-": negative effect; " ": no statistically significant effect; "n/a": variable not in model specification; "o.c.": omitted category; "inv. U": inverse U-shape.

<<< Figure 3 about here >>>

The final step of our empirical analysis concerns taking a closer look at effect heterogeneity. Figure 3 shows predicted corruption perceptions based on a version of model (4) in Table 2 with added interaction terms between corruption experience and all individual respondent characteristics. The figure shows that with increasing age and increasing education level, individuals react more strongly to experiencing corruption.

Moreover, women tend to have higher corruption perceptions than men when they have not experienced corruption, but once bribery is experienced first-hand, this gender difference disappears. Also noteworthy is the fact that individual income is associated with lowered corruption perceptions, but only for individuals that have no experience with corruption. Finally, Protestants start out having significantly lower corruption perceptions than others, as long as they have not experienced corruption. After an experience with corruption, this relationship is turned around and Protestants show even higher perceptions of corruption than non-Protestants. One possible reason for why Protestant societies tend to exhibit low levels of corruption might be the strong reaction of Protestants to experiencing corruption first-hand.

6 - Conclusions and Outlook

Our analysis shows that differences between corruption perception and experience are not only a quantitatively important phenomenon. They are also systematically related to individual socio-demographic characteristics of respondents as well as the political, economic, and social environment in which they operate. The results of our analysis give valuable insights on how individuals react to corruption and form their perception of its prevalence and relevance. Furthermore, these results cast doubt on some of the findings the corruption literature has produced using corruption perception indicators in cross-country regressions. Democracy and media freedom might be even more effective in curbing corruption than hitherto accepted (e.g., Bhattacharyya and Hodler 2015; Paldam 2020; Schulze et al. 2016). In contrast, falling corruption perception during episodes of economic growth might be – at least to some extent –a psychological effect (e.g. Paldam 2002, 2020; Gründler and Potrafke 2019). What should be less affected by our research are findings regarding the effects of corruption, as these are often caused by the perception of corruption by economic and political actors and not necessarily by the objective level of corruption (see Farzanegan and Witthuhn 2017).

Over the last years, a strand of literature has emerged that questions and attempts to evaluate the reliability of subjective indicators of institutional quality, particularly regarding corruption perceptions. While our

study has contributed new insights to this debate, important questions remain largely unanswered. At least two possible endeavors to further close the gaps in our understanding of perception-based indicators lend themselves as logical next steps in this larger research agenda: (1) Experiments in the lab and the field could shed light on the behavioral mechanisms that bring about some of the observed biases in corruption perception. (2) If Transparency International keeps collecting data for the Global Corruption Barometer over the coming years, a pseudo-panel analysis could offer new insights into factors that systematically bias corruption perception.

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Appendix 1: Corruption Data, Country-Mean

Country	Obs.	Experience	Perception	Country	Obs.	Experience	Perception
Afghanistan *	946	0.61	52.50	Luxembourg	1,545	0.10	42.30
Albania	1,698	0.71	60.81	Macedonia *	2,977	0.38	68.21
Argentina	1,711	0.12	67.32	Malawi	690	0.62	66.28
Armenia	803	0.24	71.20	Malaysia	3,231	0.14	51.94
Australia	710	0.04	51.11	Maldives *	342	0.10	58.94
Austria	1,874	0.07	42.78	Mexico	1,375	0.29	69.89
Azerbaijan	1,686	0.52	56.12	Moldova	2,399	0.39	64.17
Bangladesh	1,034	0.68	58.46	Mongolia	1,321	0.49	71.11
Belarus	798	0.29	59.85	Morocco	1,404	0.44	45.08
Bolivia	2,936	0.35	71.99	Mozambique	680	0.69	62.46
Bosnia and Herzegovina	1,782	0.15	71.51	Nepal	499	0.37	48.93
Brazil	684	0.04	57.58	Netherlands	3,163	0.04	39.18
Brunei *	690	0.05	30.19	New Zealand	1,057	0.05	43.04
Bulgaria	2,713	0.12	71.40	Nigeria	4,637	0.60	67.99
Burundi	554	0.67	69.86	Norway	2,315	0.01	38.59
Cambodia	925	0.84	56.53	Pakistan	3,558	0.45	68.66
Cameroon	2,722	0.64	74.82	Palestine *	864	0.55	41.24
Canada	3,394	0.03	48.52	Panama	1,134	0.15	72.71
Chile	1,326	0.17	58.34	Papua New Guinea *	773	0.27	56.97
China	868	0.09	54.69	Paraguay	318	0.39	76.71
Colombia	1,324	0.18	68.92	Peru	3,389	0.24	72.32
Congo *	412	0.58	64.76	Philippines	2,441	0.25	58.55
Congo, Dem. Rep. *	573	0.67	80.98	Poland	672	0.21	54.44
Croatia	2,102	0.18	69.07	Portugal	1,296	0.03	57.31
Czech Republic	3,231	0.17	59.39	Romania	2,464	0.35	64.48
Denmark	2,950	0.02	29.63	Russia	3,828	0.27	70.78
Dominican Republic	783	0.29	63.17	Rwanda	640	0.50	44.43
El Salvador	957	0.31	71.67	Senegal	2,593	0.55	68.47
Ethiopia	1,005	0.53	45.38	Serbia	2,647	0.35	65.20
Fiji *	1,212	0.10	47.84	Sierra Leone	1,124	0.69	68.47
Finland	3,604	0.02	31.56	Singapore	1,995	0.06	32.73
France	2,011	0.04	41.45	Slovenia	762	0.05	60.98
Gabon *	368	0.62	73.01	Solomon Islands *	345	0.22	54.49
Georgia	363	0.06	36.10	South Africa	2,310	0.26	58.36
Germany	1,236	0.02	42.73	South Sudan	689	0.69	52.74
Ghana	1,246	0.49	69.21	Spain	2,483	0.04	50.96
Greece	2,493	0.23	63.01	Sri Lanka	696	0.34	54.92
Hong Kong	3,203	0.05	45.28	Sudan	617	0.28	43.78
Hungary	1,248	0.23	58.00	Sweden	834	0.02	33.45
Iceland	3,051	0.02	46.00	Switzerland	3,031	0.02	33.90
India	2,140	0.32	62.45	Taiwan *	2,319	0.05	58.91
Indonesia	2,582	0.28	64.79	Tanzania	490	0.52	66.25
Iraq	1,349	0.57	54.29	Thailand	2,011	0.16	56.21
Ireland	816	0.05	54.85	Turkey	3,616	0.21	66.55
Israel	1,424	0.04	59.95	Uganda	1,861	0.70	64.42
Italy	715	0.16	60.42	Ukraine	3,457	0.44	73.95
Japan	1,563	0.22	63.80	United Kingdom	3,129	0.03	49.12
Kenya	983	0.49	66.49	United States	2,866	0.03	60.89
Korea, South	3,343	0.03	62.40	Vanuatu *	372	0.18	50.99
Kosovo	2,521	0.19	54.40	Venezuela	2,868	0.25	69.32
Kuwait	676	0.16	35.37	Vietnam	1,451	0.33	45.70
Latvia	681	0.17	56.96	Yemen *	816	0.66	73.94
Lebanon	1,549	0.24	67.68	Zambia	1,389	0.45	60.58
Liberia	1,478	0.88	70.88	Zimbabwe *	902	0.50	68.90
Lithuania	2,287	0.34	66.11				

Note: *: Missing data on country-level covariates.

Appendix 2: Descriptive statistics, country-level

	N	Mean	SD	Min	Max
Democracy	170,107	0.78	0.41	0.00	1.00
Judicial Independence	170,107	0.91	1.25	-2.25	3.32
Media Freedom	170,107	0.81	0.19	0.17	0.99
Log-income	170,107	8.95	1.48	5.52	11.57
Growth	170,107	0.03	0.04	-0.14	0.13
Inequality	170,107	0.36	0.08	0.24	0.60
Share Protestant	170,107	0.12	0.21	0.00	0.89
Trust	170,107	0.27	0.15	0.06	0.68
Fractionalization	170,107	0.41	0.26	0.00	0.93

Note: Sample as in Table 3.

Appendix 3: Effect heterogeneity of corruption experience by country characteristic

	(1)
Experience*Democracy	-0.15
	(1.90)
Experience*Judicial Independence	-0.44
	(0.78)
Experience*Media Freedom	-6.43
	(6.52)
Experience*Log-income	2.94***
	(0.76)
Experience*Growth	16.52
	(15.96)
Experience*Inequality	-15.96
	(11.91)
Experience*Share Protestant	7.00
	(5.21)
Experience*Trust	6.38
	(6.95)
Experience*Fractionalization	7.66
	(3.87)
Observations	170,107
Countries	94

Note: Interaction terms between corruption experience and country characteristics. All estimated main effects are omitted from the table.

Figure 1: Corruption perception as a function of corruption experience
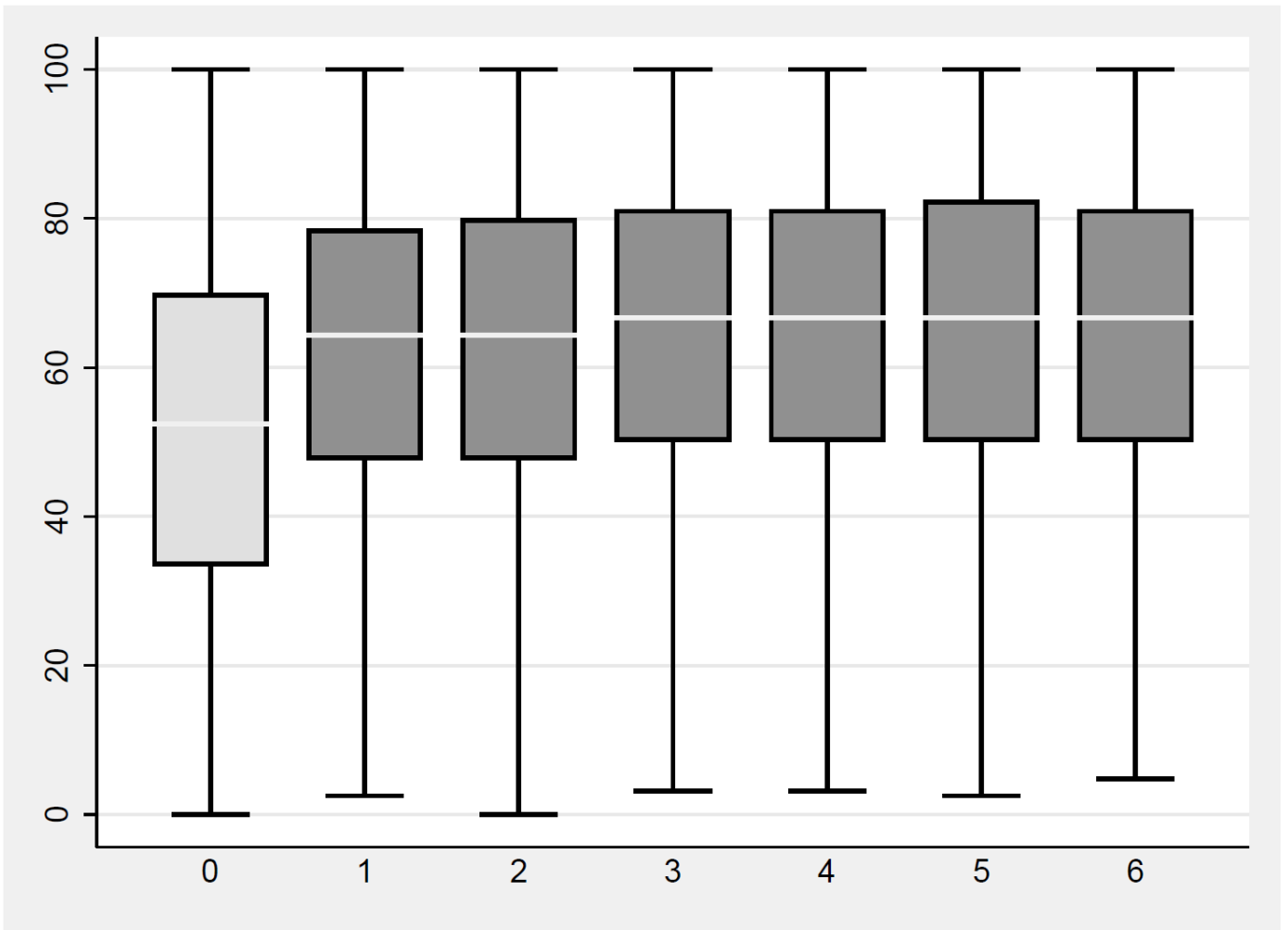
Note: Box plots of corruption perception levels in groups of individuals with a specific absolute number of corruption experiences over the past 12 months.

Figure 2: Corruption perception across socio-economic groups
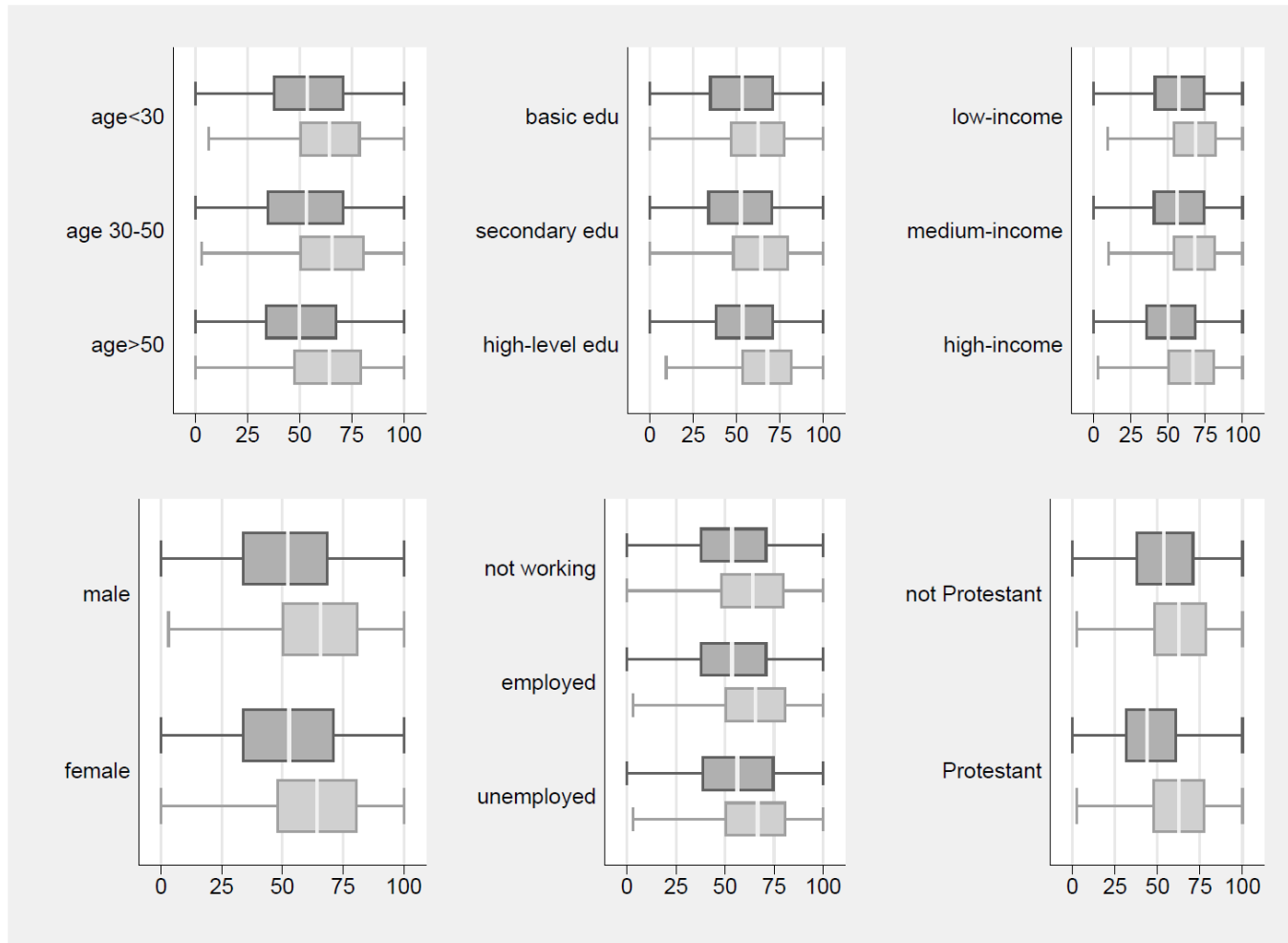
Note: Box plots of corruption perception levels in groups of individuals with different socio-economic characteristics and either with (light grey) or without (dark grey) any corruption experience over the past 12 months.

Figure 3: Predicted conditional corruption perception levels
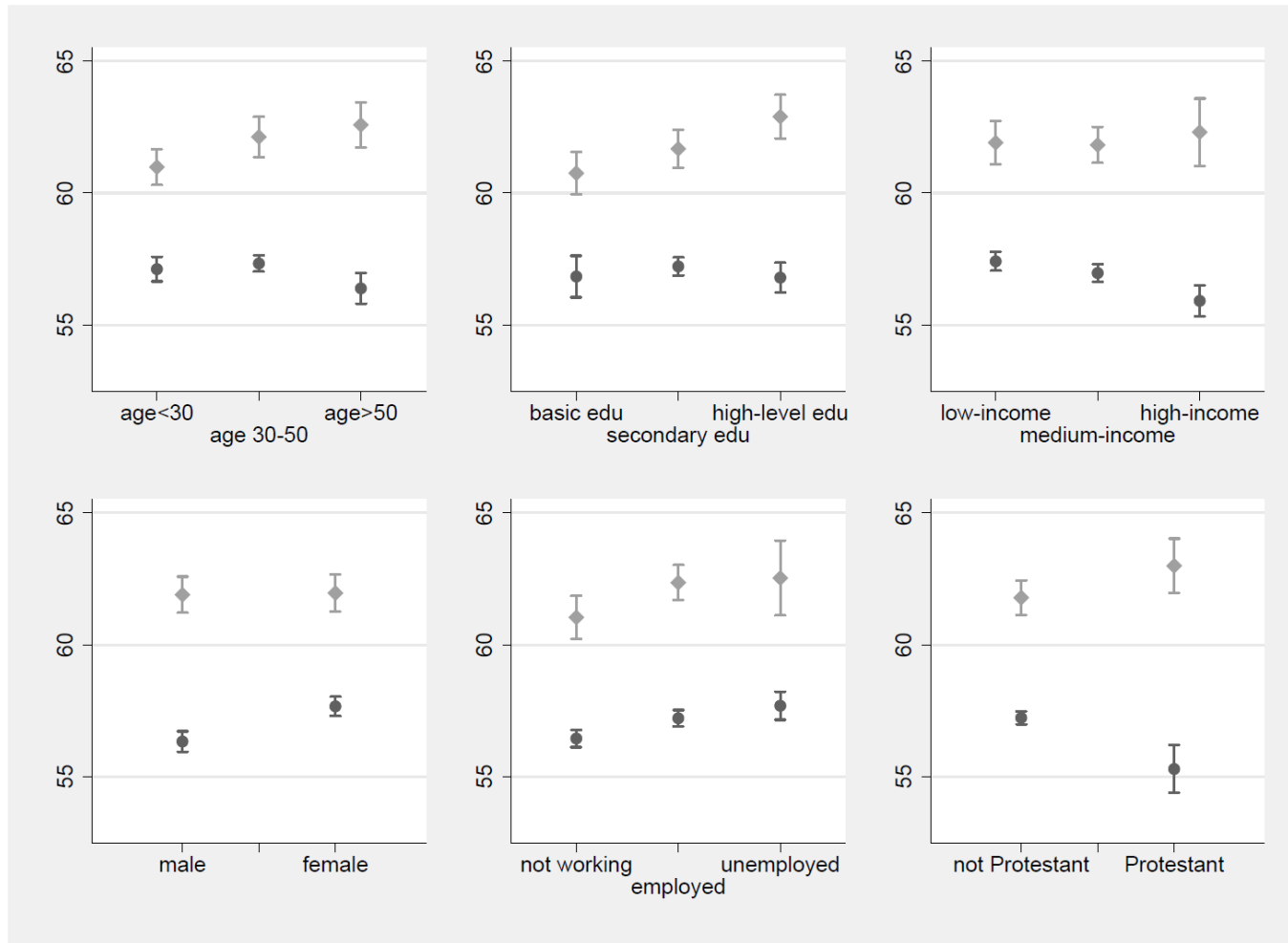
Note: Predicted corruption perception levels and 95%-confidence intervals for groups of individuals with different socio-economic characteristics and either with (light grey) or without (dark grey) any corruption experience over the past 12 months.