ORIGINAL ARTICLE

Money matters: The role of public sector wages in corruption prevention

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Abstract

Economic theory as well as conventional wisdom from corruption-ridden countries suggest that low wages among public employees lead to corruption, but cross-sectional empirical research has largely failed to confirm this relationship. In this article, we investigate the relationship between experiences of corruption and wage levels for public sector employees, utilizing both objective and expert survey data, with global coverage. The statistical analysis shows that higher wages, as compared to the average wage in the country, is associated with less corruption. There is also some support, but weaker, for the hypothesis that corruption increases when wages fall below subsistence levels.

1 | INTRODUCTION

'I am confiscating your driving licence. You can collect it at the police station on Monday, but you will have to wait all day, maybe longer. Shall we settle the matter here?' This was the offer given to a correspondent for *The Economist* (2011) by a police officer in Mexico. Such episodes are commonplace. According to Transparency International (TI), in some Mexican states, more than four out of five traffic stops result in a bribe being paid. Mexico is by no means unique, or the worst example. In a recent global survey, about one in four respondents reported paying a bribe when accessing public services in the last year (Transparency International 2017a).

A common explanation for why public officials take bribes is that they are underpaid (Becker and Stigler 1974). The empirical link in existing research is, however, surprisingly weak. Cross-country comparisons have found weak or no correlations between corruption and wages for public employees (Rauch and Evans 2000; Van Rijckeghem and Weder 2001; Dahlström et al. 2012). A few experimental micro-level studies focusing on 'petty' corruption have found some effects (Di Tella and Schargrodsky 2003; Borcan et al. 2014), but also contradictory evidence (Foltz and Opoku-Agyemang 2015). Moreover, case studies have suggested that wage increases have been a key component of anti-corruption reform (Quah 1999, 2001; Alam and Southworth 2012), while others have pointed to massive corruption among relatively well-paid public officials (Buttle et al. 2016; van Vuuren 2004).

This article examines the link between wages and corruption theoretically and empirically. We elaborate on two inter-related theoretical perspectives on the link between wages and corruption. First, the relative wage hypothesis:

public employees want to maximize their income, and make a choice whether to take bribes or not depending on the size of the bribe, their wage, and their prospects for earning in other occupations (Becker and Stigler 1974). All else equal, higher wages should be associated with less corruption. But if wages are higher in other occupations, for instance in the private sector, the risk of losing the public wage is less pressing, and employees therefore engage in more bribe-taking. A complementary angle to this hypothesis is that public employees may consider the wage as being unfair if it is low in relation to other occupations. The subjective assessment of the wage as unfair can result in less loyalty to the organization and more bribe-taking among public employees (see Akerlof and Yellen 1990).

Second, the subsistence wage hypothesis: even if public employees do not strive to maximize their income with any means possible, there is still reason to suspect that corruption is almost inevitable once wages fail to cover basic needs. The logic of survival dictates that a person that is unable to survive on the official wage must seek some other income—for instance, bribes. If this hypothesis is correct, we should expect corruption to be substantially higher in contexts where official wages fail to cover basic needs.

In our empirical analysis we use several data sources to examine the two different perspectives on how wages matter. The most-cited cross-country studies (Rauch and Evans 2000; Van Rijckeghem and Weder 2001) are based on decades-old data, only include a small number of countries, or employ measures of wages that focus on the higher levels of the civil service (Dahlström et al. 2012). Our empirical analysis contributes with different sets of recent data on a broader range of countries. The data employed allow us to measure wages in various ways in order to address the two perspectives on how wages may be related to corruption. Our results indicate that higher relative wages prevent corruption, and that there is also some, albeit weaker, empirical support for there being a meaningful threshold at subsistence levels. This article thus contributes to a deeper understanding of the problem by teasing out some contradictions in the literature, presenting new cross-country evidence, and pointing to a new direction for research.

2 | PREVIOUS RESEARCH

Corruption can take many forms. The common definition 'misuse of public power for private gain' (Rose-Ackerman 1999, p. 91) fits grand schemes where private businesses and senior officials conspire to defraud the government of billions of dollars, nepotistic hiring of relatives to public jobs, as well as the extraction of informal payments for public services, among others. We focus on a clear-cut example of corruption: bribe-taking by public employees, sometimes referred to as 'petty corruption'. The name refers to the smaller sums involved, but is still somewhat misleading, since the phenomenon affects billions of people and can have important detrimental effects on, for instance, incomes and access to healthcare. Previous research has argued that this form of corruption has a direct relationship with wages.

Existing research on the topic broadly falls into two categories: cross-country comparisons using broad indicators of wages and corruption, and micro-level studies on specific reforms. The results are a mixed bag.

Beginning with the studies in the cross-country category, two studies that rely on expert assessment of wage levels (Rauch and Evans 2000; Dahlström et al. 2012) find that the correlation between wages and corruption is close to zero. It should be noted that the survey questions employed in this research are about wages for 'higher officials' and 'senior officials', rather than public employees in general. A few other studies instead rely on objective wage data, usually using wage levels in the manufacturing sector as a reference point (La Porta et al. 1999; Treisman 2000; Van Rijckeghem and Weder 2001). Only Van Rijckeghem and Weder find, with a small sample of countries, the expected negative association, but the effects are weak: wages would have to be increased dramatically to eradicate corruption.

The results from experimental micro-level research are also inconclusive. Studying a crackdown on corruption in a Buenos Aires hospital, Di Tella and Schargrodsky (2003) find that higher wages were associated with lower corruption, measured as unexplained price mark-up on hospital supplies. Borcan et al. (2014) investigate the effects of a large cut to teacher salaries in Romania, and find indications that corruption in a high-stake exam might have increased as a result. On the other hand, in what should be a straightforward test of the hypothesis, Foltz and

Opoku-Agyemang (2015) report that a doubling of the wages for police officers in Ghana did not result in a decrease in petty corruption, despite being the expressed intention of the reform.

Anecdotal evidence also paints a mixed picture. It has, for example, been argued that one reason for the wide-spread corruption in Georgia before the 'Rose Revolution' was that the government for years was unable to pay out all wages and pensions (Alam and Southworth 2012). Studies of 'informal payments' in the healthcare sector in countries such as Albania, Bulgaria, Georgia, Malawi and Tanzania (to name a few) reveal that healthcare staff, in particular, and also patients, perceive inadequate salaries to be an important reason why this type of petty corruption flourishes (Balabanova and McKee 2002; Belli et al. 2004; Muula and Maseko 2006; Vian and Burak 2006; Stringhini et al. 2009). The largely successful anti-corruption efforts in Singapore have also been attributed partly to substantial salary increases (Quah 1999, 2001). There are, however, also many accounts, especially about police forces, where corruption continues to be a problem despite comparatively high wages. The police in both Indonesia (Buttle et al. 2016) and South Africa (van Vuuren 2004) have been described as well paid and corrupt at the same time.

In the next section, we explain how different accounts of the importance of wages rest on different but largely compatible perspectives on how wages should matter for reducing corruption.

3 | THEORY: HOW WAGES MATTER

It is frequently assumed that holding all else constant, higher wages should be associated with less corruption. But all theories also include some points of comparison that indicate when wages will be sufficiently high to deter corruption. Below, we elaborate on two approaches to the problem, which we call the relative wage hypothesis and the subsistence wage hypothesis.

3.1 | The relative wage hypothesis

One of the most influential theoretical contributions on the relationship between wages and corruption is the model developed by Becker and Stigler (1974). They consider a situation in which an enforcer of some regulation chooses whether to enforce the law, or engage in malfeasance by taking a bribe and refraining from enforcement. Employees weigh the benefits from receiving a bribe with the costs of foregone (future) earnings in case of detection. The choice is dictated by the enforcer's wage, opportunities for alternative employment, probability of detection, and the size of the offered bribe for refraining from enforcement. To determine the minimum wage required to deter corruption, Becker and Stigler propose the following equation:

$$w_n = pv_n + (1-p)(b + w_n)$$

where n is the time period, w is the wage, p is the probability of getting caught, b is the bribe, and v is the value the employee receives if caught. This value represents the incomes that can be obtained in other occupations after dismissal, minus any fines. If the employee is not caught, he or she receives $b + w$, that is, the wage plus the bribe amount. The equality of the equation illustrates the point at which the official is indifferent between taking and not taking a bribe. This means that bribe-taking will not be rational if the wage (w) goes up, unless the wage increase is offset by a reduction in the probability of getting caught (p), or by an increase in bribe amounts (b), or an increase in opportunities for earnings elsewhere if fired (v).

If public employees could easily get a higher-paid job outside the public sector, bribe-taking would always be rational, even if the probability of getting caught was one, assuming that there were no other punishments than losing the public sector job. In reality, punishments for corrupt behaviour such as jail or other fines are always present, so in theory bribe-taking is not certain even if the public sector wage is slightly lower than that of comparable jobs.

Prospects for alternative employment naturally vary between individuals with different skills and experiences, but a natural point of comparison is wages in the private sector. On this basis we can thus formulate our first hypothesis:

H1: Higher public sector wages relative to other sectors are associated with less corruption.

The calculus done by public employees might, however, be more complicated than a simple arithmetical comparison of expected income under different scenarios; subjective factors related to notions of fairness might also matter. George Akerlof and Janet Yellen (1990) argue that workers have a conception of what a 'fair' wage should be. When remuneration is below this fair wage, they will put in less effort. The idea is that humans value equity, and seek to balance the value of 'inputs' and 'outcomes'. Inputs, in this case, is the effort put in by the employee in his or her work. The main outcome is the wage. If that is too low, one way to balance the scales is to put in less effort. Simply put, 'when people do not get what they deserve, they try to get even' (Akerlof and Yellen 1990, p. 256). Case studies of teachers in sub-Saharan Africa reveal that low pay is perceived to lead to less motivation, and subsequent absenteeism in order to seek other income, as well as professional misconduct (Bennell and Akyeampong 2007). Another way to get even would be to increase the value of outcomes, for instance by accepting bribes.

But what is a fair wage? Akerlof and Yellen hypothesize that employees will compare themselves to others with similar jobs. Previous research (and common sense) indicates that employees do compare their pay to others. Those that are lower paid compared to others are less satisfied with their wage and also with their workplace (e.g., Brown et al. 2008; Card et al. 2012). Such comparisons could be made both with other employees in the same workplace (if wages are set individually), or in other parts of the public sector, or with the private sector. For instance, in a case study of Nigeria, representatives of the National Teachers' Union were dissatisfied that teachers were placed on the same grade level as nurses (Bennell and Akyeampong 2007); here, the comparison was made with another sector, but with comparable (or less) skill requirements.

The empirical expectation in the fair wage perspective is thus the same that comes out of the Becker and Stigler model—when an employee earns less than he or she could earn elsewhere, the risk of corruption increases—but the underlying decision-making procedure is different. In one perspective, maximizing income is in focus, in the other, avoiding injustice.

3.2 | The subsistence wage hypothesis

The relative wage hypothesis holds that corruption will increase if the difference between what public employees earn and what they could earn elsewhere becomes too large. But it does not say anything about discontinuities; the same mechanism should apply to underpaid teachers as well as heads of agencies that are tempted by high private sector salaries. An alternative perspective is that there are important threshold effects at the lower end of the pay scale; specifically, around the level that is required for subsistence. In cases where wages are below what is required for subsistence, public employees are forced to find other sources of income, such as moonlighting in other occupations while being absent from regular work, or seeking bribes.

We follow the development economics literature and define consumption subsistence as a 'standard of living that allows for the satisfaction of the minimum (physical and mental) basic needs of life' (Steger 2000, p. 345). In many places, wages below subsistence levels are the reality. A study reported that a doctor's salary in Guinea-Bissau's public sector only barely covered house rent, and that a doctor in Angola could buy only two litres of cooking oil for the monthly wage (Roenen et al. 1997, p. 128). Similarly, teachers' wages in sub-Saharan Africa have consistently been far below what is required for providing the basic needs of a family; basic costs of living are 'typically' two or three times higher than the government salary (Bennell and Akyeampong 2007, p. 14). In other cases, wages are paid, but with severe delays. A review of Nigeria found that 23 out of 36 states owed public sector employees wages, sometimes up to nine months' worth of them (Iyabo Lawal 2015).

If public employees are not able to live on their wage, they will seek other ways of fulfilling their most fundamental needs. Experimental evidence, moreover, indicates that scarcity of resources leads people to make other decisions than they otherwise would because they tend to focus on the 'problems where scarcity is most salient' even though those decisions may harm them in the longer run (Shah et al. 2012; Haushofer and Fehr 2014). In cases where public sector wages are below what is needed for subsistence, the desire to acquire some kind of income is therefore likely to dwarf concerns about moral integrity (see also Yam et al. 2014) or the risk of getting caught taking a bribe. A public commission report in Uganda summarized the conundrum neatly: 'the civil servant had either to survive by lowering his standards of ethics, performance and dutifulness or remain upright and perish. He chose to survive' (cited in Besley and McLaren 1993, p. 133). Thus, we can formulate our second hypothesis:

H2: Public sector wages that are below what is required for subsistence are associated with more corruption.

Previous research has distinguished between 'need' and 'greed' corruption, where the former signifies that citizens have to engage in corruption in order to get access to basic services or fair treatment, and the latter implies corruption aimed at unfair advantages (Bauhr 2017). Citizens exposed to need corruption are expected to respond with more outrage and dissatisfaction with government. Our focus is not on citizens but on the bribe-takers, that is, the perpetrators of 'need corruption'. However, it is likely that similar psychological mechanisms are at play. Public employees that feel they need to take bribes in order to survive can more easily justify breaking the law. Many in-depth studies have also shown low wages to be a commonly expressed motivation for taking bribes or informal payments, as well as a reason for which citizens express understanding for bribe-taking (Balabanova and McKee 2002; Chiu et al. 2007; Moldovan and Van de Walle 2013).

One can also reconcile H_2 with the utility-maximizing theory of Becker and Stigler (1974). They do not discuss potential threshold effects related to the cost of living, but if it is impossible to pay for basic necessities such as food or housing on the official wage, the whole cost–benefit analysis changes, due to the repeated nature of the model. The model assumes that the public employee weighs the bribe against the value of future earnings that may be lost if caught taking a bribe. If one adds that the length of the lifetime is, in turn, affected by the current wage, the expected lifetime earnings of a wage below subsistence level become very low. If subsistence is impossible, there will be no future income stream. Simply put, if you expect to starve this year it does not matter what the expected earnings are in the next five years.

Of course, it is not always clear what 'the minimal basic needs of life' are. The minimum number of calories required to sustain bodily functions is a lower bound, but also far less than what is required for a 'normal life' or even a 'decent life'. Such norms naturally vary depending on the level of economic development. What is seen as acceptable might also vary between individuals, even in the same context. In an interview study of health workers in sub-Saharan Africa, it was noted that both doctors that lived in houses without electricity or running water and those that had large houses and five cars engaged in activities to make sure that their income rose to 'acceptable standards of living' (Roenen et al. 1997, p. 133).

The two hypotheses presented here are not mutually exclusive. Costs of living are likely to be an important determinant of whether the wage is seen as fair or not (Van Rijkeghem and Weder 2001). And the main prediction of both hypotheses, that higher wages, all else equal, should be associated with less corruption, is the same. But there are some differences. The subsistence wage hypothesis suggests that corruption is driven primarily by need; above subsistence levels, public service motivation might still deter corruption. Many civil servants might be driven by 'a desire to serve the public interest' (Perry and Wise 1990), and would thus oppose corruption. If that is the case, there should theoretically be little difference in corruption rates between contexts where the wage level is very bad or awful, or between good and very good. The only thing that matters is whether the wage is high enough for subsistence. If the relative wage hypothesis instead is correct, corruption should be higher when the salaries of public employees are below those of comparable occupations, regardless of whether they cover their basic needs or not. In the following, we describe our empirical strategy to test the two hypotheses.

4 | DATA AND RESEARCH STRATEGY

Our research design is a cross-country comparison of countries with different wage levels. As such, an important aspect concerns the point of reference for wage levels. To this end, scholars have compared wage levels for civil servants with manufacturing wages (Van Rijckeghem and Weder 2001), GDP per capita (Treisman 2000), as well as private sector managers with similar responsibilities (Rauch and Evans 2000; Dahlström et al. 2012). All are reasonable operationalizations, but they imply different assumptions about how wages matter. Comparing wages to other wages or to GDP suggests that it is the relative level of wages that matters while comparisons of senior public servants' wages with those of senior managers in the private sector only capture wages at higher levels of the public administration.

Our two hypotheses state that higher wages should be associated with less corruption, either as compared to wages in other sectors, or in comparison to basic costs of living. In order to test these hypotheses, we therefore employ several different operationalizations of the independent variable, building on both objective and subjective wage indicators. Objective data are taken from the International Labour Organization (ILO) statistics (International Labour Organization 2019).[1] As the data availability varies considerably between countries and years, we take the average of all existing data for the period 2014 to 2016 in order to maximize the number of countries covered while still being comparable to both the corruption data and the other wage measures.

Wage comparisons are probably more salient the closer they are to the employee in question; an employee that receives less than colleagues with the same qualifications is likely to feel unfairly treated. However, analysing the effects of within-workplace pay differences requires micro-level data on both salary and corruption outcomes. Previous research (Van Rijckeghem and Weder 2001) has therefore relied on comparisons with private sector wages, an approach also taken in this article. In order to investigate the relative wage hypothesis, we therefore take the ratio of public sector wages to the average wage for all sectors.

This measure thus captures public employees' wage relative to other wages and allows us to capture prospects for alternative sources of income; what Van Rijckeghem and Weder (2001) term 'the rate of temptation' and potentially how fair the wage is considered to be. Ideally, we would like to compare each individual's salary, or that of a specific occupation in the public sector, to the salaries of similar individuals and occupations. However, given that our wage indicator is an average for the entirety of the public administration, we have to resort to a broader comparison.

We use two different measures to examine the subsistence wage hypothesis. Our first measure of subsistence compares the public sector wage to the price of a reference basket of goods. Here, we use data from the site Numbeo.com (Numbeo 2019), which collects user-generated data on prices in a number of cities all over the world, which they use to calculate a country index, based on a basket of mainly food, transportation, clothing and utilities, which can be considered a minimal level of basic needs, that is, subsistence level. The price of this reference basket for the year 2015 is then compared to the public sector wage according to the ILO. In Myanmar, Cambodia and Ghana, the three countries that score the lowest on the resulting measure, the average public sector wage only covers about a tenth of this basket, whereas public employees in Switzerland and Denmark can afford about two (and employees in Qatar almost three). The resulting measure is thus to a large extent similar to a Purchasing Power Parity-adjusted wage (the correlation is $r = 0.94$ between our measure and the log of wages adjusted for PPP); the advantage of this approach is that it offers a scale that shows where the level of subsistence is likely to be located. We should, if the subsistence wage hypothesis is correct, see little difference in rates of corruption between countries with different wage levels above the subsistence wage.

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[1] We use data on monthly earnings according to economic activity, and use the category 'Public administration and defence; compulsory social security' for determining public sector wages. This category includes employees working with public administration of health and education, regulation, social services, tax collection, police, fire fighters, defence, the judicial system, and more (United Nations 2008). It does not, however, cover employees in education or health such as teachers or nurses. The categories that include these classes also include employees in the private sector which makes them unsuitable for our purposes.
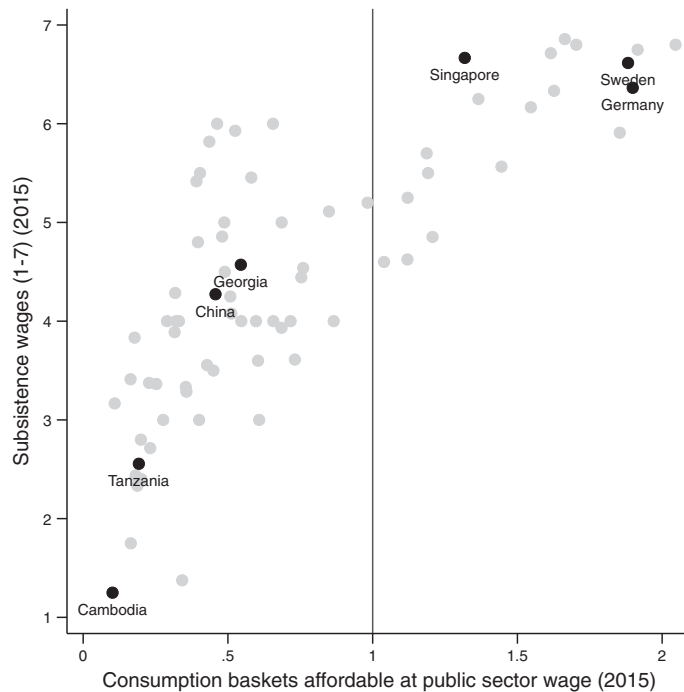
FIGURE 1 The correlation between expert survey ratings of whether public employees can sustain themselves on their wage and number of typical baskets of goods affordable on the average public sector salary

The second measure we use to capture subsistence wages is based on answers in an expert survey carried out in 2014 by the Quality of Government (QoG) Institute (Dahlström et al. 2015). The experts were asked if they agreed with the following statement: 'Public sector employees are paid salaries on which they can sustain themselves.' The response alternatives ranged from 1 ('Hardly ever') to 7 ('Almost always').[2] While one could argue that the question is dichotomous—either the wages are sufficient, or they are not—the scale allows for answers that could average out differences between geographical regions and sectors of employment in a country.

In all, 1,294 public administration experts answered questions about the public administration in their country of expertise. A substantial majority of the experts have PhDs in relevant fields, work at universities, and are born and based in the country that they are assessing. In general, respondent characteristics do not correlate with the ratings (Dahlström et al. 2015). Only countries where at least three experts have answered the question are included in the analysis and the mean number of experts per included country is 10.6. Their answers are averaged out to obtain the country value. The experts should here be seen as informants, and not as a representative sample of the country population.

Finally, to be able to compare our results with previous research that has focused on wage levels among senior civil servants (Rauch and Evans 2000; Dahlström et al. 2012), we also include a variable for wages among senior public employees. For this variable, we use another question in the same expert survey asking whether senior officials have wages that are comparable with those of employees in the private sector. The exact wording is: 'Senior officials have salaries that are comparable with the salaries of private sector managers with roughly similar training and responsibilities.'[3]

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[2] The item is included in a battery of items with a common question: 'Thinking about the country you have chosen, how often would you say the following occurs today?'

[3] The item is included in the same battery as the previous question.
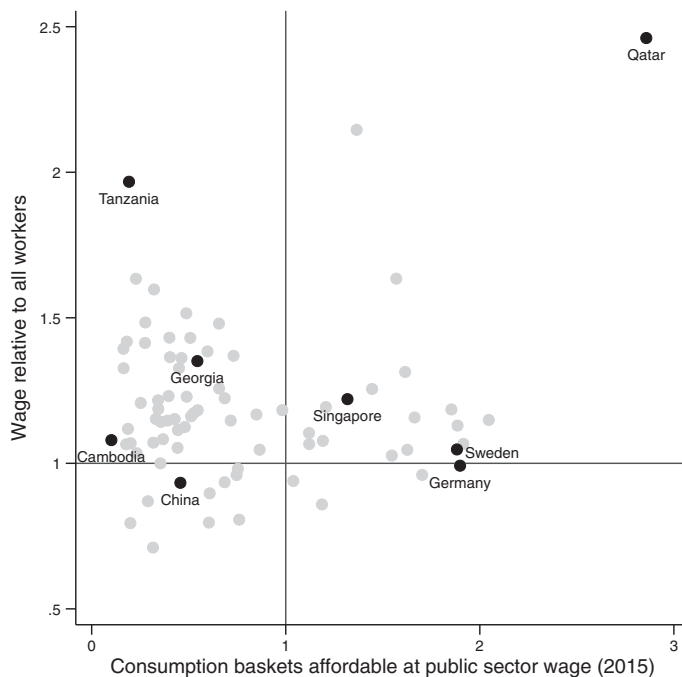
FIGURE 2 The correlation between relative public sector wages and number of typical baskets of goods affordable on the average public sector salary

Being able to afford more baskets of goods is in the data associated with higher values on the expert survey of public employees being able to sustain themselves on their wage, which is evident from Figure 1 (to increase readability, only selected countries are labelled). The high correlation lends credence to the expert survey; however, there is no visible threshold in the ratings. But as both the expert rating and the objective data are aggregates of different sectors and geographical areas in a country, there will inevitably be some uncertainty about the exact values.

Figure 2 shows the relationship between wages in relation to average wages in the country, and with costs of living. The correlation is weak ($r = 0.13$) and insignificant: there are countries where public employees earn more than the average but still below what is required for basic needs (such as Tanzania), and countries where public employees earn well above subsistence levels, but no more than the average in the country as a whole (Germany). In general, the average public sector wage is, however, higher than the total average, as most countries are above the line denoting parity.

Finally, there is a correlation between the two expert-rated variables, of competitive wages for senior civil servants and subsistence wages for public employees in general ($r = 0.53$), but there is also considerable variation, as can be seen in Figure 3. In Cambodia, wages are low in general, whereas Singapore, a state noted for its deliberate push to raise civil service wages (Quah 1999, 2001), stands out as a country where public employees definitely seem to have subsistence wages, and where salaries of senior managers are comparable to those in the private sector, as could be expected. In Sweden, public sector wages are deemed to be enough for subsistence, but wages for senior civil servants are not comparable to those earned by private sector managers with similar responsibilities.

4.1 | Corruption

In cross-country comparative corruption research, the most commonly used measures of corruption are the Corruption Perceptions Index compiled by Transparency International, the Control of Corruption Index included in the
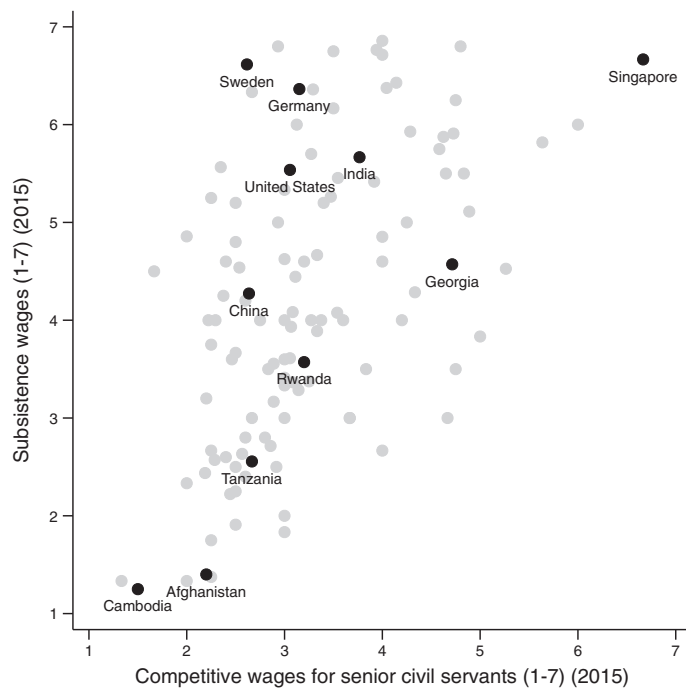
FIGURE 3 The correlation between competitive wages for senior civil servants and subsistence wages for public employees in general, using subjective measures

World Bank Governance Indicators, and the expert surveys conducted by the International Country Risk Guide (see Treisman 2007; Kaufmann et al. 2010). These indices are very broad, incorporating many different studies of corruption, regardless of scope and level (Kaufmann et al. 2009), while our theoretical expectations concern low-level corruption involving ordinary people. The type of corruption captured by the broader indices is likely to have many other, possibly more important, explanations than wage levels. Moreover, they have been more fully explored by previous research (Rauch and Evans 2000; Van Rijckeghem and Weder 2001; Dahlström et al. 2012).

We therefore rely instead on Transparency International's Global Corruption Barometer, which is based on a biannual survey of ordinary people's experiences of bribe-paying, a measure that traditionally has been used less in cross-country corruption research (Treisman 2007). Our variable is the percentage of respondents (of those that have been in contact with public services) that have paid at least one bribe the last 12 months. The advantage of this survey is that it relies on experiences rather than perceptions, and also that it is likely to capture the type of corruption most relevant to the research question. Since all survey samples have some inherent uncertainty, we use the average of the last two surveys, from the 2013 and 2015–17 waves (the latter wave was rolled out over a period of several years), for the countries where that is possible. If only one of the 2013 or the 2015–17 waves is available, we use the one that is available, to increase the number of observations (Transparency International 2013, 2015). As shown in Figure 4, there is a strong correlation between this measure and the broader indices (it is even included as a component in the Corruption Perceptions Index), but among the countries scoring low on the broader indices (denoting higher levels of corruption) there is large variation in experiences of bribe-paying. In countries that score high on the Corruption Perceptions Index (denoting lower levels of corruption), bribes are reportedly very uncommon.

We use Ordinary Least Squares regression to estimate the relationships between the variables. All models control for the log of GDP per capita (from the World Development Indicators from the World Bank), the level of democracy (the revised combined polity score from Marshall et al. 2013) from the year 2015, oil rents as a percentage of GDP (World Bank 2014) to account for the 'Oil curse' (Arezki and Brückner 2011), and a dummy indicating
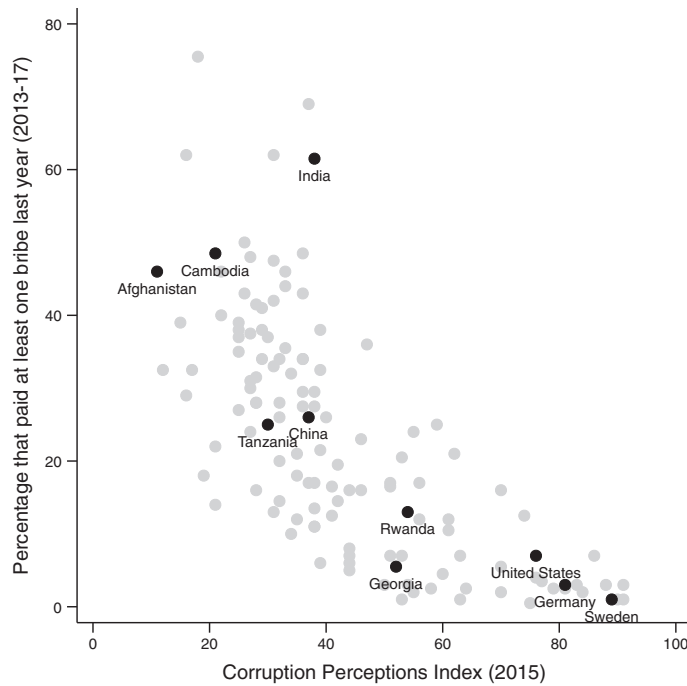
FIGURE 4 The correlation between experiences of corruption and a broad corruption index

TABLE 1 Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Corruption (% paying bribe)	136	22.50	16.41	0.50	75.50
Relative wage (ILO)	77	1.18	0.26	0.71	2.34
Baskets affordable on wage (ILO)	72	0.65	0.50	0.07	2.05
Competitive wages for senior civil servants (Expert survey)	106	3.21	0.91	1.33	6.00
Subsistence wages for public employees (Expert survey)	106	4.16	1.46	1.25	6.86
Ln(GDP/capita)	131	8.48	1.46	5.42	11.41
Imputed Freedom House/Polity score	134	7.07	2.68	0.25	10.00
Colony dummy	134	0.57	0.50	0.00	1.00
Oil rents	131	0.92	3.36	0.00	32.80

Note: Only countries with values on the corruption variable are included.

whether the country has ever been a colony (Hadenius and Teorell 2007).[4] Descriptive statistics for the variables used in the analysis are presented in Table 1.

5 | RESULTS

For illustration, we first investigate the relationship by examining the correlation between the corruption measure and two of the wage measures (Figure 5). There is a stark difference: the correlation between relative wages and

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[4] All control variables have been taken from the QoG standard dataset (Teorell et al. 2019).
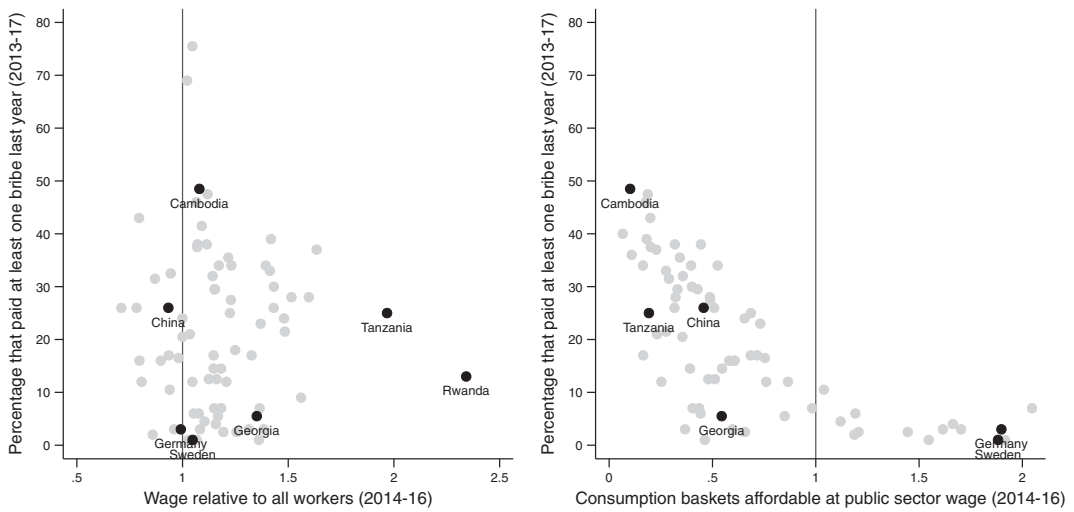
FIGURE 5 The correlation between experiences of corruption and two different wage measures based on objective data
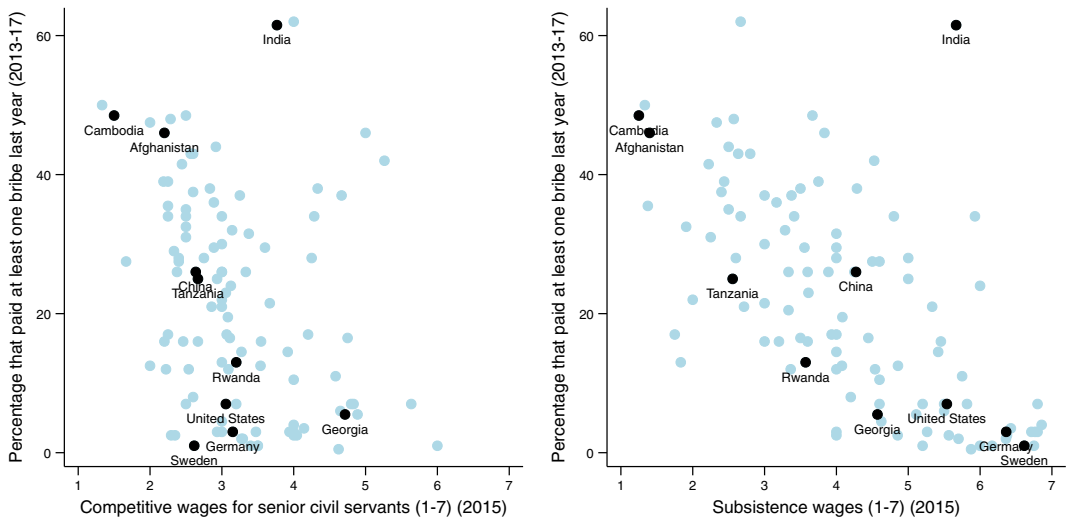

FIGURE 6 The correlation between experiences of corruption and subjective wage measures

corruption is non-existent (left graph), while there is a strong correlation between bribery rates and the public sector wage relative to costs of living (right graph). All countries where public sector employees can afford at least one typical basket of goods report comparatively low corruption rates.

Turning to our subjective, expert-coded measures of wage levels, in Figure 6 we see a similar pattern: there is a relationship between competitive wages for senior civil servants and corruption ($r = -0.32$, left graph) but it is substantially weaker than the relationship between corruption and subsistence wages ($r = -0.66$, right graph). An interesting outlier is India, where salaries generally are deemed to be sufficient for subsistence, but corruption still is rampant. Of the 30 experts that answered the survey for India, 11 answered 7 on the 7-point scale: public sector employees can 'almost always' sustain themselves on their salary, with a mean value of 5.7. Still, bribery rates are here reportedly very high, in all surveyed sectors, including schools, medical services, police and utilities

TABLE 2 Regression results: wages and bribe-paying

	(1)	(2)	(3)	(4)	(5)	(6)
Relative wage (ILO)	−16.35**		−13.89*			
	(−2.82)		(−2.58)			
Consumption baskets affordable on wage (ILO)		−2.809	0.453			
		(−0.71)	(0.11)			
Competitive wage for senior civil servants (Expert survey)				−0.580		0.134
				(−0.42)		(0.09)
Subsistence wage (Expert survey)					−2.478	−2.535
					(−1.38)	(−1.24)
Ln(GDP/capita)	−10.75***	−7.588**	−10.25***	−4.919***	−3.943	−3.650
	(−7.07)	(−3.36)	(−4.21)	(−3.51)	(−1.68)	(−1.50)
Democracy (Freedom House/Polity)	0.492	−0.544	0.0738	−2.169**	−1.346	−1.549*
	(0.85)	(−0.88)	(0.10)	(−3.32)	(−1.95)	(−2.13)
Colony dummy	−1.227	−1.624	0.260	0.907	0.844	1.246
	(−0.41)	(−0.57)	(0.08)	(0.39)	(0.35)	(0.52)
Oil rents	2.365***	1.613**	1.933**	0.228	1.465*	1.319*
	(3.78)	(2.82)	(3.00)	(1.04)	(2.32)	(2.03)
Constant	130.7***	93.80***	126.3***	81.74***	74.75***	73.52***
	(7.64)	(5.45)	(6.06)	(8.72)	(5.76)	(5.18)
Observations	77	72	68	103	103	102
Adjusted R^2	0.617	0.616	0.625	0.559	0.577	0.578

Note: Dependent variable: Percentage reporting paying a bribe in the last 12 months (Transparency International). OLS, unstandardized coefficients. *t*-statistics in parentheses, based on robust standard errors.
*p < .05.; **p < .01.; ***p < .001.

(Transparency International 2017b). Corruption here seems to have other explanations than a need driven by low salaries.

However, the subsistence wage measure is closely linked to the level of economic development, which could affect corruption in other ways. In Table 2 we therefore turn to regression analysis, where we control for economic development and other possible confounders. We first include the two measures that build on objective ILO data separately, and then together, and then do the same for the two expert-coded measures.

With control variables, the pattern is different, compared to the bivariate correlations. Taking economic development and the other control variables into account, wages compared to costs of living does not have an independent effect (model 2). However, it is important to bear in mind the strong correlation between this wage measure and economic development (r = 0.86); countries where public employees can sustain themselves on their official wage are in general richer, and vice versa. Relative wages do, however, have an effect (model 1). Higher public sector wages in relation to the average in the country is significantly associated with less corruption. The same pattern holds true when we include the two wage variables at the same time (model 3).

Turning to the expert-coded wage measures, we see in model 4 that there is no meaningful relationship between competitive wages for senior civil servants and corruption, a result that is in line with previous research (Rauch and Evans 2000; Dahlström et al. 2012).
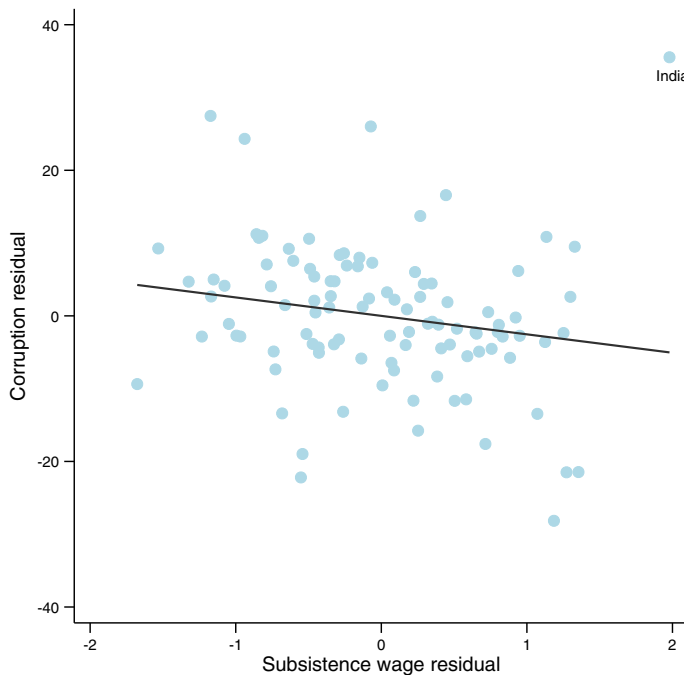
FIGURE 7 Partial regression plot of the relationship between subsistence wages (using expert survey data) and corruption, based on Table 2, model 6

The coefficient for subsistence wages (in models 5 and 6) is stronger, albeit not statistically significant. Closer inspection reveals that the lack of significance is explained by an influential outlier mentioned earlier, namely India. If we rerun models 5 and 6 without India, the coefficient for subsistence wages is substantially stronger (around −4) and statistically significant. Figure 7 shows the partial regression plot for the relationship between subsistence wages and corruption, that is, the relationship while controlling for the other variables in the model. India is clearly skewing the overall trend. However, the world's second most populous country cannot, of course, be dismissed as a statistical aberration, and thus requires more detailed study in future research.

Our results reinforce those of Van Rijckeghem and Weder (2001), who measure wages for the entire public sector compared to the manufacturing sector, and find a negative association. However, the relationship found here is stronger. An oft-cited result from Van Rijckeghem and Weder (2001) is that wages would have to be increased dramatically to eliminate corruption, and they state that 'quasi-eradication of corruption is associated with a relative wage of two to eight times the manufacturing wage'. In contrast, from model 1 we can calculate that corruption is expected to be close to zero at a public sector wage that is 2.25 times the total average wage in the country. A high, but not unobtainable, level since that level is reached by, for instance, Rwanda.

Reliance on oil rents is associated with more corruption. Economic development is associated with lower rates of corruption, albeit insignificantly so in the last two models, where the expert measure of subsistence wages is included—the two variables are highly correlated ($r = 0.82$). The dummy for whether the country was ever a colony is insignificant, even though there is a bivariate correlation; the effect is driven by the fact that former colonies on average are poorer. More democracy is associated with less corruption in the larger sample, but the relationship is only significant in models 4 and 6.

In sum, we can conclude that the empirical analysis indicates that higher public sector wages are associated with less corruption and thus we have support for H_1. The empirical support for H_2 is, however, weaker. We find that

subsistence wages are associated with less corruption, but the relationship does not reach statistical significance when controlling for economic development.

6 | CONCLUSION

The role of public employees' wages is a long-standing issue in corruption research. Despite strong theoretical foundations, as well as convincing anecdotal evidence, comparative research has so far failed to identify any strong relationship between pay levels and corruption. This article contributes to this research theoretically and empirically. Theoretically we present two different but largely compatible perspectives on how wages matter for corruption and formulate two hypotheses on this basis. First, a view common in empirical research and theory, that the most relevant point of comparison is potential for earnings outside the current public sector job. Second, a view common in policy reports and case studies, that what matters more is wages in relation to costs of living. Once wages fall below the subsistence threshold, corruption is likely to flourish, since it becomes a survival strategy for the public employees to seek other sources of income, among which bribes are likely to become an important one.

By utilizing corruption data which are rarely used in previous research but are more suitable for measuring bribe-taking in the public sector, we are able to address the two theoretical perspectives empirically. We find an association between lower levels of corruption and higher public sector wages relative to other sectors, which lends support to our first hypothesis. However, while there are strong bivariate correlations between subsistence wages and lower levels of corruption, most of the relationship disappears in models with control variables, meaning that if there is any independent effect of subsistence wages, we cannot disentangle it from the general effects of economic development.[5] And finally, when we focus on wages for senior civil servants (in contrast to public sector wages in general), we find no relationship with corruption. Thus, if there is potential for reducing malfeasance with wages, it is primarily on the lower rungs of the administrative ladder, where wages sometimes even risk falling below subsistence levels.

The inconclusiveness of the results regarding subsistence wages deserves more attention. Given that it is a hypothesis whose validity is often taken for granted in the policy literature while receiving scant attention in scholarly research, this article contributes by discussing the theoretical underpinnings of the hypothesis, as well as by illustrating the empirical difficulties in measuring it accurately. Nevertheless, more research is needed, especially on interesting outliers such as India, that combines supposedly decent wages with high levels of corruption. Future research would have to find new ways of empirically assessing what level is enough for subsistence, taking into account societal norms as well as individual considerations.

While the empirical design here is cross-sectional, focusing on differences in levels across countries, expected effects of reforms that increase wages are of course most relevant for policy-makers. Even though lack of data prevents us from drawing conclusions about such effects, we can take theoretical stock of the additional factors that come into play when thinking about expected causal effects of reforms. If we assume, on the basis of our results, that low wages increase the risk of corruption, reductions in wages are likely to push more employees 'over the edge' to where the wage is deemed too low (see Borcan et al. 2014). However, once wages are low, recruitment to the public sector will be biased towards dishonest individuals (Besley and MacLaren 1993) and norms of corruption will take root. Reforms that raise wages are therefore not guaranteed to eliminate corruption (see van Vuuren 2004; Foltz and Opoku-Agyemang 2015; Buttle et al. 2016). If wages affect both the behaviour of public employees and the pool of candidates that apply to the public sector, it is entirely plausible that wage reductions will increase corruption, while wage increases still do not decrease it; an asymmetrical effect. This helps to explain the contradictory results of the micro-level studies of Borcan et al. (2014) which found that corruption increased when wages decreased, and Foltz and Opoku-Agyemang (2015), that found that a wage increase did not result in a decrease in corruption.

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[5]If we substitute the dependent variable for Transparency International's Corruption Perceptions Index, the relationship between corruption and relative wages as well as subsistence wages is strong and statistically significant.

If that is the case, decent wages for public employees could be a necessary part of public sector reform to curb corruption, but are not enough in isolation. The largely successful reforms in Georgia and Singapore both included drastic increases in public sector wages (Quah 1999, 2001; Alam and Southworth 2012) but were part of a broader set of reforms. In Georgia, the entire traffic police force of 16,000 officers were fired overnight, and then replaced by new hires. The wages were also raised tenfold, which according to observers made recruitment easier (Alam and Southworth 2012, pp. 15–19). The result was a sharp decrease in both crime rates and perceptions of corruption in the force.

Furthermore, there might be extreme cases where there is little political will to reduce corruption. For instance, case studies of the police force in Nigeria and Indonesia suggest that the entire police apparatus might be corrupt and held together through patronage networks (Agbiboa 2015; Buttle et al. 2016). Corruption at lower levels is tolerated or even encouraged by superiors (who expect a cut). In an even more extreme case, corruption permeates the entire state of Afghanistan (Chayes 2015). Afghan officials are expected to earn money from bribes, and are therefore paid low wages. Low wages are in such cases not a cause of corruption, but a symptom of a deeper rot.

Corruption continues to be one of the most pressing issues facing societies all over the world, and wage reform is an oft-proposed antidote. Given the seriousness of the problem and the asymmetric effects of wage increases and decreases, no single reform is likely to work as a silver bullet, but the results of this study are at least encouraging—in general, citizens of countries where public sector wages are higher report being asked to pay bribes less frequently.

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REFERENCES

Agbiboa, D. E. (2015). Protectors or predators? The embedded problem of police corruption and deviance in Nigeria. *Administration & Society*, *47*, 244–281.

Akerlof, G. A., & Yellen, J. L. (1990). The fair wage-effort hypothesis and unemployment. *Quarterly Journal of Economics*, *105*, 255–283.

Alam, A., & Southworth, V. R. (2012). *Fighting corruption in public services: Chronicling Georgia's reforms*. Washington, DC: World Bank.

Arezki, R., & Brückner, M. (2011). Oil rents, corruption, and state stability: Evidence from panel data regressions. *European Economic Review*, *55*, 955–963.

Balabanova, D., & McKee, M. (2002). Understanding informal payments for health care: The example of Bulgaria. *Health Policy*, *62*, 243–273.

Bauhr, M. (2017). Need or greed? Conditions for collective action against corruption. *Governance*, *30*, 561–581.

Becker, G. S., & Stigler, G. J. (1974). Law enforcement, malfeasance, and compensation of enforcers. *Journal of Legal Studies*, *3*, 1–18.

Belli, P., Gotsadze, G., & Shahriari, H. (2004). Out-of-pocket and informal payments in the health sector: Evidence from Georgia. *Health Policy*, *70*, 109–123.

Bennell, P., & Akyeampong, K. (2007). *Teacher motivation in sub-Saharan Africa and South Asia*. Department for International Development, Researching the Issues 71. London.

Besley, T., & McLaren, J. (1993). Taxes and bribery: The role of wage incentives. *Economic Journal*, *103*, 119–141.

Borcan, O., Lindahl, M., & Mitrut, A. (2014). The impact of an unexpected wage cut on corruption: Evidence from a 'Xeroxed' exam. *Journal of Public Economics*, *120*, 32–47.

Brown, G. D. A., Gardner, J., Oswald, A. J., & Qian, J. (2008). Does wage rank affect employees' well-being? *Industrial Relations: A Journal of Economy and Society*, *47*, 355–389.

Buttle, J. W., Davies, S. G., & Meliala, A. E. (2016). A cultural constraints theory of police corruption: Understanding the persistence of police corruption in contemporary Indonesia. *Australian & New Zealand Journal of Criminology*, *49*, 437–454.

Card, D., Mas, A., Moretti, E., & Saez, E. (2012). Inequality at work: The effect of peer salaries on job satisfaction. *American Economic Review*, *102*, 2981–3003.

Chayes, S. (2015). *Thieves of state: Why corruption threatens global security*. New York: W. W. Norton.

Chiu, Y.-C., Smith, K. C., Morlock, L., & Wissow, L. (2007). Gifts, bribes and solicitations: Print media and the social construction of informal payments to doctors in Taiwan. *Social Science & Medicine*, *64*, 521–530.

Dahlström, C., Lapuente, V., & Teorell, J. (2012). The merit of meritocratization. *Political Research Quarterly*, *65*, 656–668.

Dahlström, C., Teorell, J., Dahlberg, S., Hartmann, F., & Lindberg, A. (2015). *The QoG expert survey dataset II*. University of Gothenburg: The Quality of Government Institute.

Di Tella, R., & Schargrodsky, E. (2003). The role of wages and auditing during a crackdown on corruption in the city of Buenos Aires. *Journal of Law and Economics*, *46*, 269–292.

The Economist (2011). A state-by-state guide to graft. 19 May. Available at: http://www.economist.com/blogs/americasview/2011/05/bribery_mexico.

Foltz, J., & Opoku-Agyemang, K. (2015). Do higher salaries lower petty corruption? A policy experiment on West Africa's highways. Unpublished manuscript. Available at: http://cega.berkeley.edu/assets/miscellaneous_files/118_-_Opoku-Agyemang_Ghana_Police_Corruption_paper_revised_v3.pdf.

Hadenius, A., & Teorell, J. (2007). Pathways from authoritarianism. *Journal of Democracy*, *18*, 143–157.

Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science*, *344*, 862–867.

International Labour Organization (2019). ILOSTAT. Available at: https://www.ilo.org/ilostat/.

Iyabo Lawal, I. (2015). 23 states owing workers, says Labour. *The Guardian*, 16 June. http://guardian.ng/news/23-states-owing-workers-says-labour/.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009). *Governance matters VIII: Aggregate and individual governance indicators, 1996–2008*. World Bank Policy Research Working Paper, No. 4978.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues*. World Bank Policy Research Working Paper, No. 5430.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *Journal of Law, Economics, and Organization*, *15*, 222–279.

Marshall, M., Jaggers, K., & Gurr, T. R. (2013). Polity IV project: Political regime characteristics and transitions, 1800–2012. http://www.systemicpeace.org/, Tech. Rep.

Moldovan, A., & Van de Walle, S. (2013). Gifts or bribes? *Public Integrity*, *15*, 385–402.

Muula, A. S., & Maseko, F. C. (2006). How are health professionals earning their living in Malawi? *BMC Health Services Research*, *6*, 97.

Numbeo (2019). Cost of living index. Available at: https://www.numbeo.com/cost-of-living/rankings.jsp.

Perry, J. L., & Wise, L. R. (1990). The motivational bases of public service. *Public Administration Review*, *50*, 367–373.

Quah, J. S. T. (1999). Corruption in Asian countries: Can it be minimized? *Public Administration Review*, *59*, 483–494.

Quah, J. S. T. (2001). Combating corruption in Singapore: What can be learned? *Journal of Contingencies and Crisis Management*, *9*, 29–35.

Rauch, J., & Evans, P. (2000). Bureaucratic structure and bureaucratic performance in less developed countries. *Journal of Public Economics*, *75*, 49–71.

Roenen, C., Ferrinho, P., Van Dormael, M., Conceição, M. C., & Van Lerberghe, W. (1997). How African doctors make ends meet: An exploration. *Tropical Medicine & International Health*, *2*, 127–135.

Rose-Ackerman, S. (1999). *Corruption and government: Causes, consequences, and reform*. Cambridge: Cambridge University Press.

Shah, A. K., Mullainathan, S., & Shafir, E. (2012). Some consequences of having too little. *Science*, *338*, 682–685.

Steger, T. M. (2000). Economic growth with subsistence consumption. *Journal of Development Economics*, *62*, 343–361.

Stringhini, S., Thomas S., Bidwell, P., Mtui, T., & Mwisongo, A. (2009). Understanding informal payments in health care: Motivation of health workers in Tanzania. *Human Resources for Health*, *7*, 53.

Teorell, J., Dahlberg, S., Holmberg, S., Rothstein, B., Pachon, N. A., & Svensson, R. (2019). *The Quality of Government standard dataset, version Jan19*. University of Gothenburg: The Quality of Government Institute, http://www.qog.pol.gu.se doi: https://doi.org/10.18157/qogstdjan19.

Transparency International (2013). *Global corruption barometer 2013*. Retrieved from: http://www.transparency.org/gcb2013/report.

Transparency International (2015). *Global corruption barometer 2015/16*. Retrieved from: https://www.transparency.org/research/gcb/gcb_2015_16/0/.

Transparency International (2017a). *People and corruption: Citizens' voices from around the world*. Retrieved from: https://www.transparency.org/whatwedo/publication/people_and_corruption_citizens_voices_from_around_the_world.

Transparency International (2017b). *People and corruption: Asia Pacific*. Retrieved from: https://www.transparency.org/whatwedo/publication/people_and_corruption_asia_pacific_global_corruption_barometer.

Treisman, D. (2000). The causes of corruption: A cross-national study. *Journal of Public Economics*, 76, 399–457.

Treisman, D. (2007). What have we learned about the causes of corruption from ten years of cross-national empirical research? *Annual Review of Political Science*, 10, 211–244.

United Nations (2008). International Standard Industrial Classification of All Economic Activities (ISIC), Rev. 4. Available at: https://unstats.un.org/unsd/publication/seriesm/seriesm_4rev4e.pdf.

Van Rijckeghem, C., & Weder, B. (2001). Bureaucratic corruption and the rate of temptation: Do wages in the civil service affect corruption, and by how much? *Journal of Development Economics*, 65, 307–331.

van Vuuren, H. (2004). Small bribes big challenge: Extent and nature of petty corruption in South Africa. *South African Crime Quarterly*, 9, 11–16.

Vian, T., & Burak, L. J. (2006). Beliefs about informal payments in Albania. *Health Policy and Planning*, 21, 392–401.

World Bank (2014). *World development indicators*. Retrieved from: http://data.worldbank.org/data-catalog/world-development-indicators.

Yam, K. C., Reynolds, S. J., & Hirsh, J. B. (2014). The hungry thief: Physiological deprivation and its effects on unethical behavior. *Organizational Behavior and Human Decision Processes*, 125, 123–133.