

UCD CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2011

**The Mental Health Cost of Corruption:
Evidence from Sub-Saharan Africa**

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WP11/26

November 2011

**UCD SCHOOL OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD DUBLIN 4**

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Abstract

This paper examines the effect that experiencing corruption has on an individual's mental health using microeconomic data from the Afrobarometer surveys. The results show a statistically significant and economically meaningful effect in both binary and ordered probit models using both an experience of corruption index and a simple binary variable. Having to pay a bribe to obtain documents and permits, to avoid problems with the police or to access medical care emerge as the arenas in which corruption can have a damaging effect on mental health. Some evidence is presented that an individual needs to experience such corruption more than 'once or twice' for this effect to become evident.

Keywords: Mental Health; Corruption; Well-Being; Sub-Saharan Africa

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1 Introduction

Corruption makes frequent appearances in popular and academic debates on foreign aid, democratisation and a host of other development issues. Given this prominence, it is important to understand all the benefits that policies aimed at curbing corruption might bring. Using Afrobarometer data, this paper assesses the impact of an individual's experience of providing bribes in exchange for various services on their self reported mental health. While corruption has been found to be an undesirable phenomenon in terms of many outcomes, its impact on individual mental health has so far escaped the attention of applied researchers.

Well-being is an increasingly popular dependent variable in applied microeconomics and related disciplines.¹ There are studies examining the impact of corruption on happiness (e.g. Graham and Chattopadhyay (2009)) and on self-reported life satisfaction (e.g. Tavits (2008)). There is a pertinent literature that empirically examines various determinants of mental health. Good examples of this literature are Heflin, Siefert and Williams (2005) and Gardner and Oswald (2007). This paper though is concerned with the potential mental health costs of corruption (and tangentially on its effect on self-reported living standards). To the best of my knowledge, there are no existing studies that examine corruption's effect on mental health.

While happiness, life-satisfaction, self-reported living conditions and mental health are clearly related concepts, they are perhaps best viewed as components of overall well-being. One can imagine an individual who works a highly stressful job which leaves him in poor mental health but considers himself happy as he can provide his family with a high standard of living. Likewise, consider the individual who works the same job, provides the same standard of living but is very unhappy due to an unfaithful wife. This distinction is backed up by rounds two and three of the Afrobarometer data where the correlation between mental health and self-reported living standards is only 7%.

Mental health is an interesting outcome in its own right and an understudied one in the context of the developing world. There is, however, a channel through which corruption could operate on more traditional economic outcomes through mental health. If experiencing corruption causes stress, then lowering corruption may carry an indirect economic benefit. Banerjee and Duflo note in their recent book '*Poor Economics*', that stress is associated with the level of cortisol produced in the body and point to research that shows that cortisol is detrimental to rational decision making, for example, van den Bos, Harteveld and Stoop (2009) and Porcelli and Delgado (2009).² There may be also be direct benefits to the pockets of victims which could impact on their mental health. Indeed, the results below show that

¹Carol Graham provides an excellent overview in her book '*Happiness Around the World*' and Helliwell and Putnam (2004) is notable for using both life satisfaction and happiness as dependent variables.

²See Banerjee and Duflo (2011) pp. 140-141.

income and poverty have an effect on mental health. However, some, such as Huntington (1968) and Lui (1985), suggest that corruption could ‘grease the wheels.’ If this were the case, then it could conceivably mitigate or negate any adverse economic impacts.

The remainder of this paper proceeds as follows: Section 2 describes the data and the econometric approach; Section 3 presents the results from the pooled data and contrasts them with those obtained from a model that uses living standards as the dependent variable; Section 4 includes some round specific variables; Section 5 considers some variables that are likely to be endogenous and shows that their inclusion does not change the key result; Section 6 looks at the type and level of corruption and Section 7 concludes.

2 Data and Methodology

2.1 Mental Health

The data for this paper comes from rounds two and three of the Afrobarometer. The Afrobarometer is a representative (calculated for each country) cross sectional survey of public perceptions, social and economic conditions and political attitudes in Sub-Saharan Africa. Both of these rounds contain the necessary variables for this study; mental health and experience of corruption. Round two was conducted in 2002 and 2003 in sixteen countries and round three covered eighteen countries and was carried out in 2005 and 2006. Both rounds of data from Zimbabwe were dropped due to missing variables.³

The measure of mental health in the Afrobarometer is stress. The question asked is the following: ‘In the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out or exhausted?’ The possible (usable) responses are ‘never’, ‘just once or twice’, ‘many times’ and ‘always.’ The values 0 (never) to 4 (always) are attached to the responses. This measure of mental health has some advantages over others which one could conceive of. By asking the respondent to attribute a physical response (tiredness) to their stress, the variable is at least somewhat objective. That is not to say that the measure is perfect. People are unlikely to be able to perfectly attribute their tiredness to its various determinants and there are other elements to mental health beyond stress levels. The fact that the variable captures only one aspect of mental health and is self-reported must be kept in mind throughout.

³The data and full methodology can be obtained from www.afrobarometer.org.

Figure 1: Mental Health in the Afrobarometer Countries

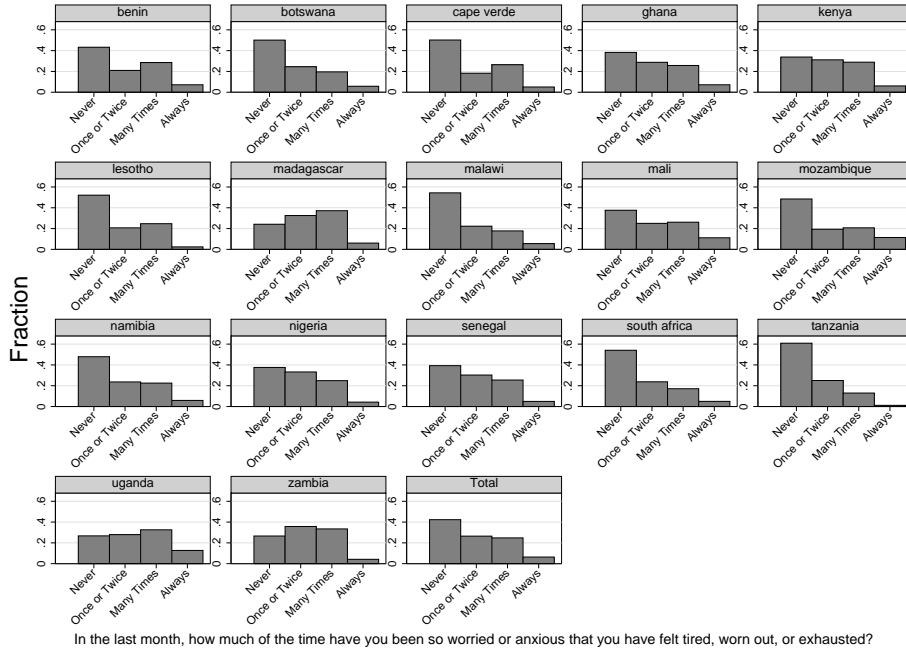
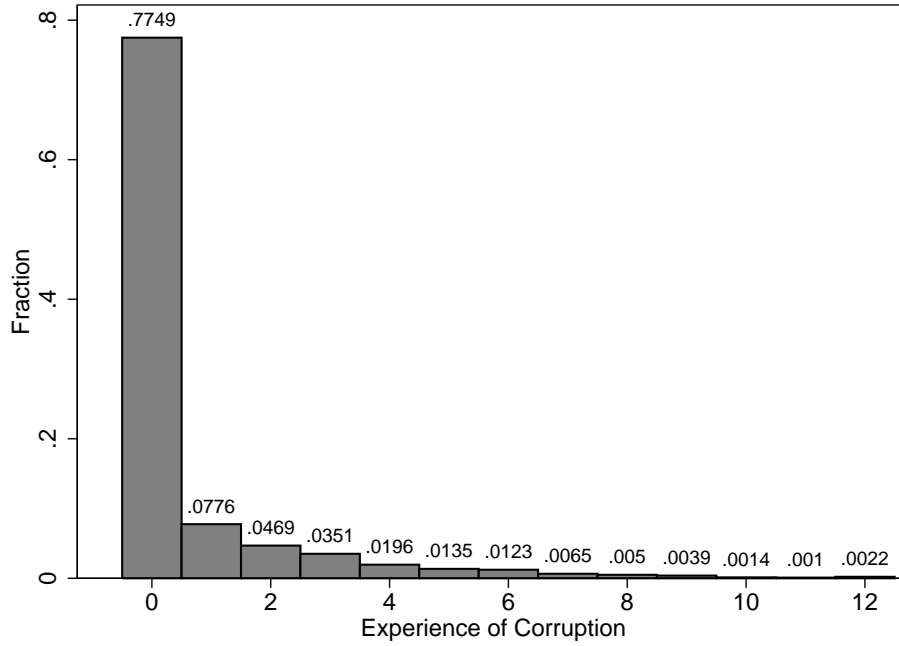


Figure 1 shows the distribution of the mental health data (pooled over both rounds) in each country and overall. The distribution varies across country as one would expect but in almost all cases over 20% of respondents fall in the two least desirable categories. As one man’s once or twice may be another’s many times, and in the absense of a corrective measure such as an anchoring vignette, I create a binary variable which takes a value of one if the respondent answers ‘many times’ or ‘always’ and zero otherwise. This dummy will be used in most of the analysis, though for robustness I do make use of the unadulterated ordered responses.

2.2 Corruption

The Afrobarometer offers a rare opportunity in that it has information on an individuals *experience* of corruption as opposed to perceived corruption. Specifically, it has information on how often the respondent has had to pay a bribe in several situations. The question takes the form: ‘In the past year, how often (if ever) have you had to pay a bribe, give a gift, or do a favour to government officials in order to X?’ The potential responses are very similar to the options for the mental health question, namely ‘never’, ‘once or twice’, ‘a few times’

Figure 2: Experience of Corruption in the Afrobarometer Countries



and ‘often.’⁴ The following matrix shows the specific corruption questions used from each round.⁵

	Bribe for Document or Permit	Bribe for School Placement	Bribe for Household Service	Bribe to Avoid Problem with Police	Bribe for Anything Else	Bribe for Medicine or Medical Attention
Round 2	X	X	X	X	X	
Round 3	X	X	X	X		X
Pooled	X	X	X	X		

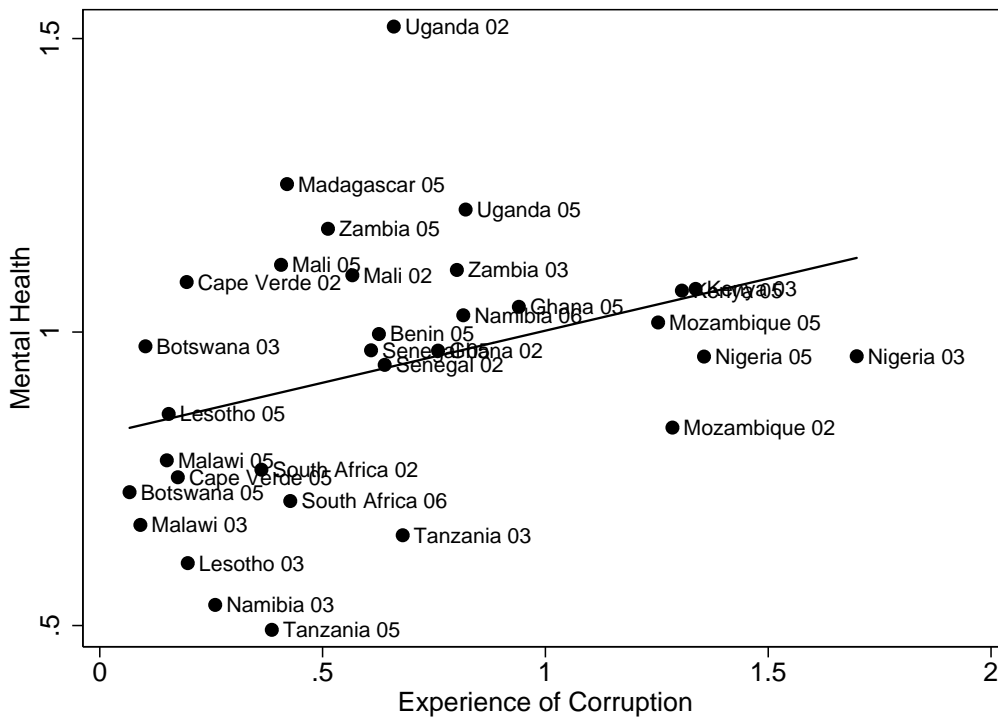
By using the numerical values attached to the responses (0-3 where 0 is never and 3 is often) and adding across the questions, I create an experience of corruption index. What exactly is included in the index varies with the data being used as indicated in the above matrix. Thus, for the pooled data, the index takes values from 0-12. Figure 2 shows the breakdown of this index for the pooled data.

On first inspection, the fact that 77% of people in this representative survey do not report any experience of corruption in the past year may seem incongruent with the narrative often told about Sub-Saharan Africa. However, one can of course flip this and say that 23% of

⁴The Round 2 survey for Mozambique allowed the additional response of ‘always.’ As only a tiny proportion of the sample opted for this option in any of the corruption questions and it was not an option in other countries, I add those who did to the ‘often’ category.

⁵Round 2 asks about paying a bribe to cross a border. I opt not to use this as it is not possible to tell if the bribe is paid to agents of the respondents own country or of another and it was not asked in Mozambique.

Figure 3: Country Averages of Mental Health and Experience of Corruption



Larger numbers indicate worse average mental health and higher average levels of corruption.

people have had some recent experience of corruption. It must also be recognised that not all possible scenarios in which corruption can take place are covered in these surveys.

While a simple index such as this has its flaws, it does allow for the frequency (or intensity) of corruption to be taken into account. As an alternative I employ a dummy variable that takes a value of 1 if the respondent has had experience of paying a bribe in any of the above categories at any level of intensity. Using this variable reduces concerns about the endogeneity of mental health and corruption. Whereas the index may be endogenous due to the possibility that people with higher stress levels may report that they have experienced corruption more frequently than they actually have, the dummy variable should be free of this problem.

Figure 3 plots the country averages (for each round) of mental health against the corruption index. At the macro level, and with admittedly few data points, there does seem to be a relationship between the two. Countries with higher corruption scores tend to have worse (higher) average mental health.

2.3 Poverty and Crime

While most of the control variables used in this paper are self-explanatory or can be explained as they come up, two warrant detailed description. The first is the poverty index which for most of the analysis will be used as a control for material living standards. The Afrobarometer collects data on what they refer to as ‘lived poverty.’ The surveys ask ‘over the past year, how often, if ever, have you or your family gone without X?’ With options (and their attached values) ‘never’ (0), ‘just once or twice’ (1), ‘several times’ (2), ‘many times’ (3) and ‘always’ (4). In the spirit of Amartya Sen’s ‘*Development as Freedom*’ and similar to the approach of Mattes, Bratton and Davids (2003) and others who have used the Afrobarometer data, I create an index from these lived poverty variables by adding them. The index for Round 2 is comprised of shortages of food, water, medical care, electricity, cooking fuel and a cash income, while Round 3 uses all of these but electricity (which wasn’t asked).⁶

The second important control variable is an experience of crime index. Being a victim of a crime is commonly held to be a stressful event and so it must be controlled for in a study such as this one. Indeed, Stafford, Chandola and Marmot (2007) find that the *fear* of crime is detrimental to a host of mental health indicators, including an anxiety measure. While the fear of crime will be included along with other likely endogenous variables, all specifications will contain a variable that captures an individual’s reported experience of crime. Following Graham and Hoover (2007), the answers to the questions ‘over the past year, how often (if ever) have you or anyone in your family had something stolen from your house?’ and ‘over the past year, how often (if ever) have you or anyone in your family been physically attacked?’ are added, where the possible responses are identical to the poverty questions.

2.4 General Approach

For the majority of this paper, the results presented will be the marginal effects obtained from simple binary probit models where the outcome takes a value of one if the respondent is in the bad mental health category as defined above. Thus, positive marginal effects indicate that increases in the variable in question are detrimental to mental health. Standard errors are clustered by country and region and all specifications include country fixed effects (and where appropriate year fixed effects).

I begin with the pooled data before moving on to examine the two rounds separately. The reason for this is that there are interesting variables in each round that do not appear in the other. The data includes interesting variables that are likely to be endogenous but

⁶While Round 3 does ask about school expenses, I omit this as there are many things which could fall under this category that we may not wish to include in a poverty index such as private school fees.

that could dampen or eliminate the estimated effect of corruption. As there are no suitable instruments, I cautiously include these variables to see if they alter the estimated effect of corruption. Finally, I remove the restrictions inherent in the corruption index that requires all types of corruption and all intensities to have the same effect.

3 Pooled Results

3.1 Effects of Control Variables

Before turning to the main concern of the paper, the impact of corruption, it is worth commenting on the main control variables as they are interesting in their own right. While not the main focus, they do suggest where resources to combat poor mental health in developing countries might be best spent. Looking at the first two columns of Table 1, one can see that being older increases the probability of being in the poor mental health category by a considerable amount. This is a consistent finding throughout, as are the findings that women are roughly 4% more likely to be in the undesirable category and that the better educated are more likely to be in better mental health. Overall, there is only weak evidence that being the head of the household matters, perhaps because the stress of responsibility is countered by a bigger share of the household's resources.

The dummy variable for whether the individual is an urban dweller is insignificant in the pooled data. However looking ahead, one can see that the urban variable is significant when one uses each round of data on its own, but in opposite directions. While this screams 'coding error', careful examination of the data reveals that in both rounds the proportion coded as urban is roughly 38%. In addition, the variable is only significant at the conventional cutoff of 5% in one case using the Round 3 data. The explanation for this appears to be electricity. If the poverty index is constructed for the Round 2 data omitting the electricity component, the urban variable is insignificant. So, when access to electricity is controlled for, being an urban dweller is deleterious to mental health.

The results in terms of the unemployed dummy are also unexpected. The effect is negative in the Round 2 model, suggesting that in Africa the mental costs of unemployment are not the same as they are in the developed world. In other words, controlling for your material needs (i.e. the poverty index), not having a job is good for one's mental health. Interestingly, the effect is insignificant if one uses income decile as the control as opposed to the poverty index. It is also the case that being unemployed in the sense of not having a job that pays a cash income (and looking for one), might not be as appropriate a definition of unemployment in Sub-Saharan Africa as it is in the developed world. Finally, both crime and poverty have significant and sizable negative effects on mental health as one would expect.

Table 1: Main Results: Pooled Data

Dependent Variable:	Bad Mental Health ^a		Bad Living Conditions ^b	
	(1)	(2)	(3)	(4)
Age Category: (Relative to 18-24)				
25-44	0.0413*** (0.0071)	0.0409*** (0.0071)	0.0634*** (0.0074)	0.0635*** (0.0075)
45-64	0.1005*** (0.0120)	0.1010*** (0.0121)	0.0961*** (0.0102)	0.0961*** (0.0101)
65+	0.1979*** (0.0172)	0.1993*** (0.0173)	0.1089*** (0.0137)	0.1090*** (0.0137)
Female	0.0426*** (0.0058)	0.0433*** (0.0058)	-0.0149*** (0.0057)	-0.0150*** (0.0058)
Head of Household	0.0134* (0.0069)	0.0139** (0.0069)	0.0035 (0.0064)	0.0037 (0.0064)
Urban	-0.0024 (0.0088)	-0.0022 (0.0087)	-0.0072 (0.0097)	-0.0070 (0.0098)
Unemployed	-0.0078 (0.0076)	-0.0079 (0.0076)	0.0649*** (0.0086)	0.0649** (0.0086)
Education: (Relative to Informal\Incomplete Primary)				
Complete Primary\Some Secondary	-0.0396*** (0.0072)	-0.0400*** (0.0072)	-0.0379*** (0.0099)	-0.0378*** (0.0099)
Complete Secondary	-0.0572*** (0.0097)	-0.0580*** (0.0096)	-0.0766*** (0.0138)	-0.0765*** (0.0138)
Post-Secondary Qualification\Some University	-0.0746*** (0.0107)	-0.0743*** (0.0107)	-0.1483*** (0.0141)	-0.1478*** (0.0140)
University Complete\Postgraduate	-0.0796*** (0.0181)	-0.0782*** (0.0181)	-0.2093*** (0.0226)	-0.2083*** (0.0225)
Poverty Index (0-20 Scale)	0.0142*** (0.0012)	0.0143*** (0.0012)	0.0293*** (0.0012)	0.0294*** (0.0012)
Experience of Crime Index (0-8 Scale)	0.0230*** (0.0025)	0.0234*** (0.0025)	0.0017 (0.0035)	0.0019 (0.0035)
Experience of Corruption Index (0-12 Scale)	0.0132*** (0.0023)		0.0035* (0.0019)	
Experience of Corruption Dummy		0.0528*** (0.0091)		0.0095 (0.0092)
Country Dummies	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES
Observations	43589	43589	43801	43801
Pseudo R ²	0.0689	0.0688	0.1382	0.1382
Predicted Probability	0.2974	0.2973	0.4797	0.4797
Observed Probability	0.3101	0.3101	0.4802	0.4802

Notes: Probit marginal effects reported. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

^b The dependent variable takes the value of 1 if respondent answers 'very bad' or 'fairly bad' to the question 'in general, how would you describe your own present living conditions?' and 0 if the answer was 'neither good nor bad', 'fairly good' or 'very good.'

3.2 Main Results

Turning to the main focus of this paper, columns 1 and 2 of Table 1 present the marginal effects obtained from running a model of the type outlined in Section 2.4 above. From Column 1, we can see that each step on the experience of corruption index is associated with a 1.3% increase in the probability of being in the bad mental health category. This is a sizable effect. Someone with an experience of corruption score of six, midway along the index, is 7.9% more likely to have poor mental health. By comparison, the increase in probability for someone midway along the poverty and experience of crime indices are 14% and 9% respectively.

One problem with this comparison is that, as can be seen from Figure 2, very few people experience such high levels of corruption. To address this issue, and some others that could be raised in the construction of the index, Column 2 uses a dummy variable that takes a value of one if the respondent has any experience of corruption and zero otherwise. Even throwing away the information on the intensity of a person's experience of corruption, the effect is still statistically significant at the 1% level and the magnitude is still sizable. At 5%, it is larger than the effect of being a woman and similar to the effects of completing primary and secondary education. Corruption seems to be a serious problem in terms of mental health, even when compared against such stressful factors as poverty and crime.

As mentioned in Section 1, to talk about one outcome as *the* measure of well-being would be a mistake. The Afrobarometer contains another measure of well-being, self-reported living conditions. While it is not happiness or self-reported life satisfaction, it is the sort of thing we think of when we talk of well-being. The question asked is 'in general, how would you describe your own present living conditions?' As noted in the introduction, the correlation between this and mental health is only 7%. By creating a dummy variable that equals one if respondent answers 'very bad' or 'fairly bad' and zero if the answer was 'neither good nor bad', 'fairly good' or 'very good', we can examine whether experiencing corruption is detrimental to this aspect of well-being.

Carol Graham and Soumya Chattopadhyay have found that corruption is detrimental to happiness in Latin America (see Graham (2009) pp. 206-210) but does not seem to be so in Afghanistan (Graham and Chattopadhyay (2009)) and attribute this to different norms and to adaptation. Columns 3 and 4 of Table 1 show that the probability of expressing dissatisfaction with one's living standards in Sub-Saharan Africa is not influenced by experiencing corruption.⁷ It is interesting that two well-being measures, neither of which has theoretical

⁷Using the Round 2 data, Graham and Hoover (2007) find a negative effect of crime on living conditions. The main difference in their specification is that they use the data on income decile as opposed to a lived poverty index. When I do likewise, I too find that crime and corruption are detrimental to self-reported living conditions. However, when I include both lived poverty and income, neither crime nor corruption is significant at the 5% level, though corruption is significant at 10%. Results available on request.

superiority over the other, can yield very different answers. It points to a need for caution when forming a policy or designing an intervention. The difference may arise because while people can adapt their expectations and follow different norms in the face of widespread corruption as Graham and Chattopadhyay argue, they cannot alter their mental reaction.

While it is far from clear that people have a common understanding of ‘always’ and ‘many times’, I am potentially ignoring information by using a dummy variable to measure mental health. In this light, Table 2 reports the raw coefficients and marginal effects from an ordered probit model. We can see from columns 2-5 that the results from Table 1 remain unchanged from this change in approach. Age, gender, education, poverty and crime are all significantly associated with mental health, as is experiencing corruption.

Each point on the corruption index is associated with a decrease of 1.4% in the probability of responding ‘never’ to the mental health question and a 0.016%, 0.089% and 0.035% increase in the probability of responding ‘once or twice’, ‘many times’ and ‘always’ respectively. While these may seem like small effects, consider someone who in the past year has been asked once or twice for a bribe in three of the categories or consistently shaken down in one of the circumstances. This person is 4.2% less likely to report being in, what is in the context of this paper, perfect mental health and 2.7% more likely to be in the second to worst category. While not the primary driver of mental health, which is unsurprising, experiencing corruption has a meaningful impact.

A final point to note is that these may be underestimates of the true effect as the mental health question asks about the individual’s mental health over the past month but the corruption question asks about the individual’s experience of corruption over the past year. The negative effect of corruption may fade, or disappear, over time.

4 Additional Explanatory Variables

Each round of the Afrobarometer contains variables that are not present in the other. Many of these could plausibly play a role in determining an individual’s mental health. This section allows these variables to enter the specification.

4.1 Round 2

Table 3 presents results obtained using just the data from the second round of the Afrobarometer. Column 1 replaces the poverty index with dummy variables showing where the individual roughly falls in the income distribution. With this control for material well-being, our main result is unchanged, compared with both those from the baseline specification and using just Round 2 data (columns 2 and 3).

Table 2: Ordered Probit Results: Pooled Data

Dependent Variable: Mental Health ^a					
	(1)	(2)	(3)	(4)	(5)
	Raw	MFX for	MFX for	MFX for	MFX for
	Coefficients	'Never'	'Once or Twice'	'Many Times'	'Always'
Age Category: (Relative to 18-24)					
25-44	0.1210*** (0.0170)	-0.0472*** (0.0066)	0.0054*** (0.0011)	0.0299*** (0.0041)	0.0119*** (0.0018)
45-64	0.2723*** (0.0267)	-0.1038*** (0.0100)	0.0060*** (0.0014)	0.0670*** (0.0065)	0.0308*** (0.0038)
65+	0.5284*** (0.0367)	-0.1894*** (0.0117)	-0.0099** (0.0039)	0.1237*** (0.0078)	0.0756*** (0.0079)
Female	0.1258*** (0.0142)	-0.0491*** (0.0055)	0.0056*** (0.0009)	0.0311*** (0.0035)	0.0124*** (0.0016)
Head of Household	0.0333* (0.0174)	-0.0130* (0.0068)	0.0015* (0.0008)	0.0082* (0.0043)	0.0033* (0.0018)
Urban	-0.0070 (0.0227)	0.0027 (0.0089)	-0.0003 (0.0010)	-0.0017 (0.0056)	-0.0007 (0.0022)
Unemployed	-0.0253 (0.0198)	0.0099 (0.0078)	-0.0012 (0.0009)	-0.0063 (0.0049)	-0.0025 (0.0019)
Education: (Relative to Informal\Incomplete Primary)					
Complete Primary\Some Secondary	-0.0929*** (0.0183)	0.0363*** (0.0072)	-0.0044*** (0.0010)	-0.0229*** (0.0047)	-0.0090*** (0.0017)
Complete Secondary	-0.1414*** (0.0266)	0.0556*** (0.0105)	-0.0081*** (0.0019)	-0.0347*** (0.0066)	-0.0128*** (0.0023)
Post-Secondary Qualification\Some University	-0.1682*** (0.0336)	0.0664*** (0.0133)	-0.0105*** (0.0025)	-0.0411*** (0.0083)	-0.0147*** (0.0027)
University Complete \Postgraduate	-0.1871*** (0.0455)	0.0740*** (0.0181)	-0.0126*** (0.0041)	-0.0455*** (0.0111)	-0.0158*** (0.0032)
Poverty Index (0-20 Scale)	0.0383*** (0.0034)	-0.0149*** (0.0013)	0.0017*** (0.0003)	0.0095*** (0.0008)	0.0038*** (0.0004)
Experience of Crime Index (0-8 Scale)	0.0686*** (0.0063)	-0.0268*** (0.0025)	0.0031*** (0.0005)	0.0170*** (0.0016)	0.0068*** (0.0007)
Experience of Corruption Index (0-12 Scale)	0.0360*** (0.0057)	-0.0140*** (0.0022)	0.0016*** (0.0003)	0.0089*** (0.0015)	0.0035*** (0.0006)
Country Dummies	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES
Pseudo R ²	0.0483				
μ_1	0.0943 (0.1805)				
μ_2	0.8396 (0.1793)				
μ_3	1.9775 (0.1768)				
Probability that $Y_i = \text{Relevant Category}$		0.4167	0.2870	0.2491	0.0472

Notes: Column 1 reports ordered probit coefficients and the remaining columns report the associated marginal effects. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

Table 3: Main Results: Round 2 Data

Dependent Variable: Bad Mental Health ^a				
	(1)	(2)	(3)	(4)
Age Category: (Relative to 18-24)				
25-44	0.0607*** (0.0105)	0.0559*** (0.0095)	0.0560*** (0.0095)	0.0561*** (0.0092)
45-64	0.1315*** (0.0167)	0.1219*** (0.0163)	0.1216*** (0.0162)	0.1221*** (0.0162)
65+	0.2528*** (0.0270)	0.2455*** (0.0263)	0.2458*** (0.0264)	0.2539*** (0.0259)
Female	0.0365*** (0.0087)	0.0367*** (0.0086)	0.0365*** (0.0086)	0.0302*** (0.0092)
Head of Household	0.0136 (0.0094)	0.0038 (0.0088)	0.0055 (0.0088)	-0.0016 (0.0090)
Urban	0.0010 (0.0141)	0.0270** (0.0133)	0.0275** (0.0131)	0.0283** (0.0134)
Unemployed	-0.0176 (0.0132)	-0.0245** (0.0117)	-0.0249** (0.0117)	-0.0255** (0.0118)
Education: (Relative to Informal\Incomplete Primary)				
Complete Primary\Some Secondary	-0.0422*** (0.0106)	-0.0353*** (0.0099)	-0.0349*** (0.0099)	-0.0348*** (0.0102)
Complete Secondary	-0.0548*** (0.0126)	-0.0370*** (0.0129)	-0.0361*** (0.0129)	-0.0372*** (0.0135)
Post-Secondary Qualification\Some University	-0.0882*** (0.0166)	-0.0668*** (0.0168)	-0.0647*** (0.0169)	-0.0646*** (0.0176)
University Complete \Postgraduate	-0.0885*** (0.0274)	-0.0697** (0.0280)	-0.0661** (0.0280)	-0.0713** (0.0287)
Fourth to Seventh Income Decile	-0.0324*** (0.0103)			
Eighth to Tenth Income Decile	-0.0594*** (0.0187)			
Poverty Index (0-24 Scale)		0.0129*** (0.0010)	0.0131*** (0.0010)	0.0120*** (0.0010)
Experience of Crime Index (0-8 Scale)	0.0347*** (0.0040)	0.0275*** (0.0038)	0.0287*** (0.0039)	0.0264*** (0.0038)
Experience of Corruption Index (0-15 Scale)	0.0171*** (0.0032)	0.0144*** (0.0033)		0.0139*** (0.0033)
Experience of Corruption Dummy			0.0432*** (0.0124)	
Time Spent Caring for Own Children ^b				0.0022 (0.0034)
Time Spent Caring for Orphans ^b				0.0027 (0.0051)
Time Spent Caring for Sick in Household ^b				0.0172*** (0.0056)
Country Dummies	YES	YES	YES	YES
Observations	17683	20096	20096	19380
Pseudo R ²	0.0740	0.0851	0.0838	0.0887
Predicted Probability	0.3031	0.2983	0.2984	0.2983
Observed Probability	0.3160	0.3134	0.3134	0.3140

Notes: Probit marginal effects reported. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

^b The response options are as follows: Spend no time (0), less than 1 hour (1), 1-2 hours (2), 3-5 hours (3), more than 5 hours (4).

Table 4: Is There Stress Associated With Needing The Services?

Dependent Variable: Bad Mental Health ^a							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience of Corruption Index (0-15 Scale)		0.0115*** (0.0023)	0.0123*** (0.0023)	0.0116*** (0.0023)	0.0121*** (0.0024)	0.0114*** (0.0023)	0.0112*** (0.0023)
Dummy for no Experience of Needing:							
A Document or Permit	0.0292** (0.0146)	0.0343** (0.0145)	0.0002 (0.0155)				
A School Placement	-0.0211 (0.0137)	-0.0208 (0.0135)		-0.0197 (0.0149)			
A Household Service	0.0236 (0.0162)	0.0225 (0.0161)			-0.0048 (0.0132)		
To Avoid A Problem With Police	-0.0280 (0.0200)	-0.0238 (0.0199)				-0.0200 (0.0163)	
Medicine or Medical Attention	-0.0399* (0.0231)	-0.0358 (0.0230)					-0.0301 (0.0186)
Country Dummies	YES	YES	YES	YES	YES	YES	YES
Standard Controls	YES	YES	YES	YES	YES	YES	YES
Observations	22761	22761	22761	22761	22761	22761	22761
Pseudo R ²	0.0696	0.0714	0.0703	0.0705	0.0703	0.0706	0.0708
Predicted Probability	0.2927	0.2924	0.2926	0.2925	0.2925	0.2925	0.2925
Observed Probability	0.3071	0.3071	0.3071	0.3071	0.3071	0.3071	0.3071

Notes: Probit marginal effects reported. All specifications include the controls from Column 1 of Table 5. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

The final column includes variables that capture the time the respondent spends caring for various categories of people. The results suggest that caring for children, be they your own or orphans, is not associated with stress. However, caring for sick people in the household has a significant and undesirable effect on mental health.

4.2 Round 3

The data from the third round allows one to address an important question. Might people who go for these services be more likely to be suffering stress to begin with? If that were the case, then the corruption variable could be just picking up this effect. By comparing those who never experienced the need for each of the services in question with those who did, we can see if this is the case. In the third round of the Afrobarometer, people were offered

the option of responding ‘no experience with this in past year’ to the various corruption questions.⁸ Up to this point, this response has been recoded as ‘never.’ I create dummy variables which take a value of one if the individual has no experience of the service in question in the past year and zero if he has sought the service regardless of his experience of corruption in the situation. Thus, if people who try to access these services are more likely to be suffering stress, the marginal effect should be negative and significant.

Table 4 presents these results. Column 1 shows that only two of these dummy variables have a significant marginal effect. Of these two, one has a sign that not only refutes the hypothesis that those who seek out a document or permit are more stressed than those who do not, but contradicts it. If anything, people who seek out a document or permit are less likely to be in bad mental health than those who do not. The other (medicine or medical attention) has the sign one would expect under the hypothesis above but is only significant at the 10% level. The remaining columns reinforce this conclusion. The effect of corruption is always significant and sizable and we see no evidence that the issue raised above is a cause for concern.⁹

Column 1 of Table 5 reports the results obtained from running the main specification on the data from Round 3. Once again, experiencing corruption is negatively associated with good mental health. This is also the case when using the experience of corruption dummy (Column 3). In a similar vein to Table 4, the second column modifies the corruption index by dropping those who have not experienced all situations. While the magnitude of the effect decreases, it is still significant and economically meaningful.

In the final column I include some additional controls. One might think that corruption is only detrimental to mental health when it is at your expense. To test this, I include a variable that takes a value of one if the respondent was offered an incentive for their vote ‘a few times’ or ‘often.’ As can be seen from the table, this beneficial corruption makes no difference to mental health. In fact, the sign of the effect points to such corruption being negatively correlated with mental health. The finding from Table 3 that having to spend time with children has no effect is supported. The final two variables are included to allow for entertainment, or stress relief. The results indicate that owning a television is quite beneficial to mental health, as it is defined here. While owning a television decreases the probability of being in the bad mental health category by 2%, owning a radio has no statistically significant effect. The inclusion of these variables does not change the main result.

⁸32% of the respondents choose this response for the documents and permits question, 28% for the school placement question, 36% for the household services question, 22% for the accessing medicine or medical treatment question and 32% for the avoiding problems with the police question.

⁹Another way to tackle this issue is to use dummies which contrast those with no experience with those who do but did not experience corruption. The results from this exercise lead to the same conclusion as those presented here and are available on request.

Table 5: Main Results: Round 3 Data

Dependent Variable: Bad Mental Health ^a				
	(1)	(2)	(3)	(4)
Age Category: (Relative to 18-24)				
25-44	0.0328*** (0.0086)	0.0372*** (0.0104)	0.0325*** (0.0086)	0.0366*** (0.0091)
45-64	0.0859*** (0.0147)	0.0884*** (0.0181)	0.0869*** (0.0148)	0.0918*** (0.0150)
65+	0.1720*** (0.0205)	0.1840*** (0.0273)	0.1741*** (0.0206)	0.1777*** (0.0206)
Female	0.0493*** (0.0079)	0.0432*** (0.0094)	0.0502*** (0.0079)	0.0496*** (0.0082)
Head of Household	0.0206** (0.0098)	0.0133 (0.0123)	0.0213** (0.0097)	0.0218** (0.0098)
Urban	-0.0218* (0.0117)	-0.0272** (0.0136)	-0.0214* (0.0116)	-0.0176 (0.0118)
Unemployed	0.0068 (0.0104)	0.0127 (0.0133)	0.0071 (0.0104)	0.0054 (0.0103)
Education: (Relative to Informal\Incomplete Primary)				
Complete Primary\Some Secondary	-0.0448*** (0.0095)	-0.0392*** (0.0128)	-0.0454*** (0.0095)	-0.0399*** (0.0096)
Complete Secondary	-0.0774*** (0.0128)	-0.0916*** (0.0145)	-0.0779*** (0.0127)	-0.0709*** (0.0129)
Post-Secondary Qualification\Some University	-0.0824*** (0.0158)	-0.0726*** (0.0183)	-0.0824*** (0.0158)	-0.0711*** (0.0164)
University Complete \Postgraduate	-0.0933*** (0.0208)	-0.1076*** (0.0250)	-0.0927*** (0.0207)	-0.0832*** (0.0205)
Poverty Index (0-20 Scale)	0.0136*** (0.0017)	0.0153*** (0.0017)	0.0136*** (0.0017)	0.0132*** (0.0018)
Experience of Crime Index (0-8 Scale)	0.0186*** (0.0034)	0.0204*** (0.0041)	0.0190*** (0.0035)	0.0192*** (0.0034)
Experience of Corruption Index (0-15 Scale)	0.0123*** (0.0025)			0.0114*** (0.0026)
Modified Experience of Corruption Index (0-15 Scale) (Dropping Those with no Experience of all Situations in Past Year)		0.0070*** (0.0025)		
Experience of Corruption Dummy			0.0617*** (0.0121)	
Election Incentives Offered				0.0203 (0.0222)
No Children				0.0037 (0.0132)
Owns Television				-0.0212** (0.0102)
Owns Radio				-0.0150 (0.0095)
Country Dummies	YES	YES	YES	YES
Observations	22761	13229	22761	22466
Pseudo R ²	0.0703	0.0742	0.0706	0.0709
Predicted Probability	0.2926	0.2834	0.2925	0.2926
Observed Probability	0.3071	0.2992	0.3071	0.3073

Notes: Probit marginal effects reported. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

Table 6: Likely Endogenous Variables: Round 2 Data

	Dependent Variable: Bad Mental Health ^a							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Experience of Corruption Index (0-15 Scale)	0.0108*** (0.0030)	0.0144*** (0.0034)	0.0146*** (0.0033)	0.0145*** (0.0033)	0.0143*** (0.0033)	0.0138*** (0.0034)	0.0124*** (0.0034)	0.0090*** (0.0032)
Poor Physical Health Dummy (Self Reported)	0.4654*** (0.0183)							0.4575*** (0.0181)
Reports Worse or Much Worse Living Standards Than One Year Ago		0.0203** (0.0094)						0.0075 (0.0100)
Reports Worse or Much Worse Living Standards Than Others			0.0252** (0.0102)					0.0137 (0.0105)
Fear of Crime in Home Index (0-3 Scale)				0.0112** (0.0051)				0.0107** (0.0054)
Active Member of a Religious Group					0.0192 (0.0128)			0.0219 (0.0134)
Perception of Worsening of Corruption Problem ^b						0.0088 (0.0119)		0.0089 (0.0127)
Violent Conflicts in Family ^c							0.0338** (0.0078)	0.0198 (0.0124)
Violent Conflicts in Community ^c							0.0075 (0.0100)	0.0018 (0.0104)
Violent Conflicts Between Different Groups in the Country ^c							0.0387*** (0.0117)	0.0335*** (0.0126)
Country Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Standard Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	20056	19879	19189	20077	20065	18330	18896	16505
Pseudo R ²	0.1958	0.0853	0.0839	0.0856	0.0855	0.0844	0.0864	0.1925
Predicted Probability	0.2873	0.2983	0.2974	0.2981	0.2982	0.2997	0.2947	0.2862
Observed Probability	0.3134	0.3135	0.3124	0.3133	0.3133	0.3146	0.3105	0.3119

Notes: Probit marginal effects reported. All specifications include the controls from Column 2 of Table 3. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'In the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

^b Dummy variable that takes a value of 1 if the respondent indicates they think that there is 'more' or 'much more' corruption under the current administration compared to the previous administration.

^c Dummy variable that takes a value of 1 if the respondent answers 'sometimes', 'often' or 'always' and a value of 0 if the respondent answers 'never' or 'rarely.'

5 Endogenous Variables

We now turn to consider the impact of variables that are likely to be endogenous. As in the last section, some of these variables appear in only one round of the data. Due to the lack of appropriate instrumental variables in the Afrobarometer, I cautiously add these variables one by one to the main specification before including them all simultaneously. The objective here is to see if the corruption result remains after introducing factors that intuition says should be key factors in determining mental health. Tables 6 and 7 present the results.

Table 7: Endogenous Variables: Round 3 Data

	Dependent Variable: Bad Mental Health ^a							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Experience of Corruption Index (0-15 Scale)	0.0081*** (0.0024)	0.0123*** (0.0025)	0.0125*** (0.0025)	0.0121*** (0.0025)	0.0123*** (0.0025)	0.0119*** (0.0025)	0.0120*** (0.0025)	0.0080*** (0.0024)
Poor Physical Health Dummy (Self Reported)	0.5030*** (0.0166)							0.4885*** (0.0183)
Reports Worse or Much Worse Living Standards Than One Year Ago		0.0346*** (0.0106)						0.0160 (0.0115)
Reports Worse or Much Worse Living Standards Than Others			0.0415*** (0.0099)					0.0298*** (0.0115)
Fear of Crime in Home Index (0-3 Scale)				0.0185*** (0.0052)				0.0159*** (0.0053)
Active Member of a Religious Group					-0.0044 (0.0104)			-0.0062 (0.0109)
Reports Most People Can be Trusted						-0.0047 (0.0130)		-0.0062 (0.0147)
Reports Ethnic Group is Often or Always Treated Unfairly							0.0434*** (0.0143)	0.0401*** (0.0129)
Country Dummies	YES	YES	YES	YES	YES	YES	YES	YES
Standard Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	22734	22595	21907	22728	22716	22335	19870	18794
Pseudo R ²	0.2035	0.0715	0.0709	0.0718	0.0703	0.0710	0.0681	0.1964
Predicted Probability	0.2796	0.2922	0.2911	0.2922	0.2925	0.2912	0.2965	0.2804
Observed Probability	0.3070	0.3071	0.3059	0.3071	0.3071	0.3060	0.3106	0.3078

Notes: Probit marginal effects reported. All specifications include the controls from Column 1 of Table 5. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively.

^a The dependent variable takes a value of 1 if respondent answers ‘always’ or ‘many times’ to the question ‘In the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?’ and 0 if the answer was ‘never’ or ‘just once or twice.’

For the most part, the reason these variables must be regarded as endogenous is that they are perceptions based. Others require judgments that could be influenced by mental state. The most obvious variable in this category is physical health.¹⁰ The first columns of tables 6 and 7 show that individuals who report poor physical health are roughly 50% more likely to be in poor mental health. While the inclusion of this variable reduces the magnitude of the corruption effect, experiencing corruption remains a significant determinant of mental health.

The next two variables relate to material well-being, are common to both tables and one would have prior cause to believe that they are harmful in terms of mental health. The first captures whether the individual perceives that their living standards have declined since the previous year. Unsurprisingly, declining living standards are associated with worse mental health. As is the second of these variables. Having worse living standards than others, or

¹⁰The physical health dummy is created from the question ‘in the last month, how much of the time has your physical health reduced the amount of work you normally do inside or outside your home?’ The dummy takes a value of one if the respondent answers ‘many times’ or ‘always’ and zero otherwise.

at least a perception that this is the case, has a very similar effect to a decline in living standards. The size and significance of the corruption effect remains unchanged in the face of both of these. As it does when one controls for an individual's fear of crime, which is significant, and whether or not the individual is an active member of a religious group, which is not.

Column 6 of Table 6 suggests that having the perception that the corruption problem is worsening does not matter in terms of mental health. One conclusion that could be drawn from this is that it is the level of experienced corruption that matters as opposed to a perceived growth rate. Even if one runs the model of Column 6 again without the experience of corruption index, this perception is insignificant. The final variables to be included in Table 6 control for the person's experience of violence in various settings. Violent confrontations in the family and between different ethnic groups are detrimental to mental health, which will be no surprise to those with a family and to those who are familiar with inter-ethnic conflict in Sub-Saharan Africa. Once again, the corruption index emerges as significant, as it does when all of these variables are included at the same time (Column 8).

Column 6 of Table 7 controls for a common measure of social capital, trust in others, and finds no effect. The final likely endogenous variable to be considered is the perception that the individual's ethnic group is often or always treated unfairly. This variable too is significant and economically meaningful, though the lack of a concrete measure of persecution warrants caution in interpretation. Including all of these simultaneously does not eliminate the corruption effect. As mentioned above, these variables are, to varying degrees, likely to be endogenous. However, the fact that even huge effects such as that of physical health do not destroy the significance of the experience of corruption index reinforces the confidence we can have in the robustness of the result.

6 Disaggregated Corruption Results

So far, excepting those instances where a dummy variable has been used, the implicit restriction has been that corruption has the same impact no matter what the situation and that each level of frequency matters equally. This is obviously a questionable, even unrealistic, assumption. This section relaxes these restrictions and examines whether being asked for a bribe in some arenas is more detrimental to mental health than in others and whether all levels of intensity matter to the same extent. As each round has a unique bribery question, and given that the results have been shown to be consistent across the pooled and un-pooled data, this exercise is undertaken on each round of the data separately. One caveat with the second part of this analysis is that there is no guarantee that people have a common scale in their minds when answering questions such as these. Tables 8 and 9 show the results.

Table 8: Disaggregated Corruption Results: Round 2 Data

Dependent Variable: Bad Mental Health ^a					
	Bribe for Document or Permit	Bribe for School Placement	Bribe for Household Service	Bribe to Avoid Problem with Police	Bribe for Anything Else
(1) Separate Category Indices (0-3 Scale)	0.0205** (0.0084)	0.0160* (0.0092)	-0.0019 (0.0101)	0.0194** (0.0086)	0.0174 (0.0132)
	Pseudo R ² 0.0853	Predicted Probability 0.2983		Observed Probability 0.3134	
(2) Separate Category Frequency Dummies: (Relative to Never)					
Once or Twice	-0.0170 (0.0150)	0.0107 (0.0211)	0.0098 (0.0248)	0.0044 (0.0178)	0.0286 (0.0309)
A Few Times	0.0485* (0.0270)	0.0146 (0.0256)	0.0152 (0.0259)	0.0673*** (0.0267)	0.0666 (0.0505)
Often	0.0900*** (0.0312)	0.0769** (0.0363)	-0.0326 (0.0332)	0.0506* (0.0274)	0.0069 (0.0587)
	Pseudo R ² 0.0860	Predicted Probability 0.2982		Observed Probability 0.3134	

Notes: Probit marginal effects reported for corruption variables only. Both specifications include the controls from Column 2 of Table 3. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively. N = 20096.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

Table 9: Disaggregated Corruption Results: Round 3 Data

Dependent Variable: Bad Mental Health ^a					
	Bribe for Document or Permit	Bribe for School Placement	Bribe for Household Service	Bribe to Avoid Problem with Police	Bribe for Medicine or Medical Attention
(1) Separate Category Indices (0-3 Scale)	0.0131** (0.0062)	0.0059 (0.0099)	-0.0092 (0.0091)	0.0147** (0.0070)	0.0302*** (0.0071)
	Pseudo R ² 0.0709	Predicted Probability 0.2925		Observed Probability 0.3071	
(2) Separate Category Frequency Dummies: (Relative to Never)					
Once or Twice	-0.0081 (0.0138)	0.0188 (0.0180)	-0.0092 (0.0199)	0.0199 (0.0165)	0.0287* (0.0175)
A Few Times	0.0205 (0.0165)	0.0251 (0.0274)	-0.0121 (0.0246)	0.0253 (0.0216)	0.0768*** (0.0190)
Often	0.0687*** (0.0277)	-0.0151 (0.0375)	-0.0337 (0.0321)	0.0483** (0.0254)	0.0776*** (0.0253)
	Pseudo R ² 0.0711	Predicted Probability 0.2925		Observed Probability 0.3071	

Notes: Probit marginal effects reported for corruption variables only. Both specifications include the controls from Column 1 of Table 5. The corresponding standard errors are clustered by country and region and reported in parentheses. *, **, *** indicates significance at the 10%, 5% and 1% levels respectively. N = 22761.

^a The dependent variable takes a value of 1 if respondent answers 'always' or 'many times' to the question 'in the last month, how much of the time have you been so worried or anxious that you have felt tired, worn out, or exhausted?' and 0 if the answer was 'never' or 'just once or twice.'

Each row of the tables represents a separate specification. Looking at Row 1 of Table 8, we can see that having to pay a bribe for a document or permit and to avoid a problem with the police are both associated with worse mental health. The effects are rather large with an increase in either increasing the probability of being in the bad mental health state by 2%. The corresponding row in Table 9 tells a similar story. The same two are significant in the Round 3 data as is having to pay a bribe for medicine or medical attention. These categories are arguably the ones that best represent what people expect a state to provide for them; beurocracy, protection and care. A tentative conclusion that one could reach is that a sense of entitlement to the service is required for a demand for a bribe to have a damagind effect on mental health. The second rows of each table examine the issue of intensity. Once again the same corruption catergories emerge as significant (with the exception of the ‘often’ level for school placements which is significant at 5% in Table 8). The general pattern suggests that people need to experience corruption more than once or twice to experience its negative effect on mental health.

7 Conclusions

This paper has presented evidence that experiencing corruption has a considerable negative effect on the mental health of people in Sub-Saharan Africa. This finding is robust to changes in specification, different estimation methodologies and across different subsamples of the data. Corruption is a major problem in this part of the world and there are many ideas on how to solve it and programs that use up resources in an attempt to do so. Therefore, this work can be justified on the grounds that it adds to our understanding of exactly how people experience corruption and the effect that this experience has on them.

That said, two results in particular may be of interest to policymakers. The first policy relevant finding was that depending on how one measures well-being, corruption may be found to have serious effects on the people who experience or to have no effects. This has implications for how an organisation should design their evaluations and indeed how their resources should be targeted to best improve well-being. The second is that the evidence suggests that the negative impacts of experiencing corruption only become apparent when the victim is exposed more than once or twice. If this is the case (and for conclusive evidence a method such as anchoring vignettes may be needed) imperfect anti-corruption interventions could stop people suffering a mental health cost from corruption.

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