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Bribing to escape poverty in Africa

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Abstract

This study assesses the nexus between bribery and poverty, contingent on the macroeconomic environment within the remit of inflation in Africa. The Afrobarometer survey is used. Our data cover 38 countries consisting of three rounds of survey and a sample of 151,345 individuals. The empirical strategy is based on multi-level mixed-effects ordered logit regression. The results reveal that while poverty has a positive effect on the spread of bribery, inflation can mitigate the impact. The impact is stronger for people living without basic necessities such as food, water and medical care. In other words, the attendant results indicate that the impact of poverty on bribery becomes negative when inflation increases. The findings are robust to *inter alia*: (i) multi-level mixed effects ordered logistic models for fragile and conflict-affected countries with the food price index at a market level as the mitigating variable and (ii) estimations with the continuous indicator of bribery and experienced poverty at the country level. Policy implications are discussed.

1. Introduction

The motivation of the present exposition is founded on two fundamental elements in the relevant scholarly and policy literature on the subject, notably: (i) the importance of mitigating poverty in Africa in the light of it representing a challenging policy syndrome especially as it pertains to the achievement of the United Nations' sustainable development goals (SDGs) for the year 2030 and (ii) identified gaps in the extant literature. These two fundamentals are expanded in the same order as highlighted in what follows.

First, poverty still represents a significant policy syndrome in Africa. Moreover, it is clearly articulated in the first SDG (i.e. SDG1) of the United Nations SDGs because in terms of priority, it is one of the issues that are standing on the way to the achievement of other SDGs in the continent. It is important to highlight that, before the turn of 2015 concerning the achievement of millennium development goals (MDGs), there was a consensus in both scholarly and policy circles that most African countries did not achieve the 2015 target of poverty reduction because most of the attendant countries did not leverage on the recent period of economic growth resurgence in order to mitigate poverty by means of a more equitable distribution of the fruits of economic prosperity (Tchamyou *et al.*, 2019, 2021).

In order to put the above perspective in greater emphasis, it is important to clarify that the concern of poverty is neither African-centric or nor in the African DNA as established provocatively by Asongu and Kodila-Tedika (2017). In essence, while the concern of poverty is relevant to almost every country around the globe, the corresponding issue in Africa is particularly relevant because according to Nwani and Osuji (2020), in 2019, the continent outpaced Asia to become the continent in the world hosting the highest number of people living in extreme poverty. According to the narrative, the concern of extreme poverty has left many citizens in the continent without worthwhile living standards, especially as it pertains to, *inter alia*, households having three square meals a day, hospitals delivering efficient services and citizens living beyond 50 years in terms of life expectancy (Asongu & Nwachukwu, 2016; Tchamyou, 2019).

It follows that, as documented in the extant contemporary literature on the subject (Asongu & le Roux, 2019; Nwani & Osuji, 2020), the policy syndrome of extreme poverty in Africa is particularly relevant both at continental and world stages because most of those living below the extreme poverty line of 1.9 USD/day are living in the African continent. The positioning of the present exposition is therefore premised as contributing to assessing how the policy

syndrome can be addressed and/or understood in the light of understanding how it is related to bribery which has also been documented as another challenging concerns for the development of the continent in contemporary African-centric governance literature (Pelizzo *et al.*, 2016; Pelizzo & Nwokora, 2016, 2018; Ufere *et al.*, 2020; Saddiq & Abu Bakar, 2020). Furthermore, beyond the policy motivation articulated above, the present study is also motivated by an apparent gap in the extant literature on the subject.

Second, while previous studies have focused on the nexus between poverty and corruption or bribery (Mogens & Bjørnskov, 2014; Bjørnskov, 2011; Treisman, 2007; Svensson, 2005, *inter alia*) or on the relationship between bribery and remittances (Konte & Ndubuisi, 2020), to the best of our knowledge, there is no study assessing the nexus between bribery and poverty with contingency on the macroeconomic context (e.g. inflation) in African countries. This attendant contribution to the extant literature is expanded towards the end of the introduction.

In another stream of this strand, it can be argued that the nexus between poverty and bribery can be contradictory, especially as it pertains to achieving a sustainable middle class before the nexus is not controversial or unexpected. In other words, consistent with the contemporary middle class literature which is articulated below, just like a sustainable and/or burgeoning middle class may be a prerequisite to a sustainable demand of liberal democracy and by extension, effective governance standards (Asongu & Le Roux, 2019), it can also be argued that as long as people are poor, they are constrained to bribe their way out of poverty, especially as it pertains to meeting basic needs such as food, shelter, education and health services (Asongu & Odhiambo, 2021). This is consistent with the contemporary middle class literature in the perspective that, in accordance with the underlying literature, unless a middle class is achieved in most African countries, good governance standards cannot be achieved, not least, because the corresponding middle class would be less concerned with basic human needs that are associated with vote-buying during political elections (Kodila-Tedika *et al.*, 2016).

In the light of the above, the extant middle class literature upon which this study is also positioned has largely been concerned with *inter alia*, (i) historical perspectives of how higher levels of income were a fundamental factor in driving economic development in Europe and North America in the 19th century (Adelman & Morris, 1997; Landes, 1998) and (ii) more recent evidence on how higher income levels are associated with climbing the social ladder (Sridharan, 2004), engaging reforms of institutional nature (Loyza *et al.*, 2012),

promoting democratic standards (Kodila-Tedika *et al*., 2016), boosting sound institutions (Birdsall, 2007a), mitigating poverty (Easterly, 2001), enhancing innovation and the doing of business (Banerjee &Duflo, 2009; Asongu, 2022) and driving inclusive development outcomes (Birdsall, 2010; Asongu & Odhiambo, 2021).

Narrowing down the above perspective to African-centric literature, consistent with Asongu and Odhiambo (2021), the attendant literature can be discussed in four main strands as articulated in Section 2, notably: (i) issues surrounding the measuring of income levels or level of poverty (Resnick, 2015a; Tschirley *et al*., 2015; Mattes, 2015; Cheeseman, 2015; Thurlow *et al*., 2015; Resnick, 2015b); (ii) linkages between income and/or poverty levels and economic prosperity (Tschirley *et al*., 2015; Handley, 2015); (iii) nexuses between existing institutions and poverty levels (Cheeseman, 2015; Resnick , 2015b; Mattes, 2015) and (iv) the importance of the middle class and associated poverty levels in the understanding of contemporary economic development paradigms in the African continent (Asongu &Ssozi, 2016; Asongu, 2016).

In the light of the coverage of the extant literature as well as the corresponding stylized facts and policy concerns, the present study aims to examine whether the macroeconomic context affects the nexus between poverty (measured by lack of basic necessities in Africa) and bribery. More specifically, its aim is to: (i) evaluate whether the lack of basic necessities increases or decreases the probability of paying bribes; (ii) examine how consumer price at country level affects bribery and (iii) tests if inflation matters in the relationship between experienced poverty and bribing government officials or bureaucrats.

The rest of the study is organised in the following manner. The relevant theoretical underpinnings and extant literature are covered in Section 2 while Section 3 discusses the data and methodology used for the empirical analysis. The presentation and discussion of results are covered in Section 4 while the study concludes in Section 5 with implications and future research directions.

2. Theoretical underpinnings and the extant literature
2.1Theoretical underpinnings

The theoretical underpinnings on the nexus between poverty and bribery are consistent with the theoretical underpinnings on the relationship between income levels and the quality of institutions, granting that poverty and bribery are theoretically associated with income levels and institutional quality, respectively (Asongu & Odhiambo, 2021; Asongu & le Roux, 2019). In accordance with the attendant literature (Boushey & Hersh, 2012; Asongu & Odhiambo,

2021), the implications of wealth or absence of poverty have been incorporated in theories of economic growth. According to the theoretical underpinnings, because poverty is associated with human development outcomes such as education and health services (Kharas, 2010; Tsang, 2013), the poor pay can buy/bribe their way out of poverty.

In the light of the above, poverty levels are linked to the levels of institutions as documented by, *inter alia*, Boushey and Hersh (2012) with respect to institutional governance, Tebaldi and Mohan (2010) and Asongu and Kodila-Tedika (2018) in relation to general governance as well as broader African-centric literature on the quality of institutions (Oluwatobi *et al*., 2015; Ajide & Raheem, 2016a, 2016b; Amavilah *et al*., 2017). The argument for the nexus between poverty and bribery is premised on the perspective that when people are poor, they are more likely to contribute to poor quality of institutions, by bribing their way out of poverty especially as it pertains to bribing for access to basic socio-economic amenities.

2.2. Poverty, the middle class and economic development in Africa

In accordance with Asongu and Odhiambo (2021), the extant literature on the nexus between income levels or poverty and economic development can be discussed in four mains strands, notably: (i) measuring poverty in terms of income levels; (ii) the nexus between income levels and economic prosperity; (iii) linkages between institutions and poverty levels and (iv) the importance of wealth in contemporary paradigms of economic development.

First, with respect to the middle class or a threshold from escaping poverty in Africa, according to Resnick (2015a), the conception and measurement is contingent on the problem statement being examined. To be more specific, the concerns surrounding this first strand relate to *inter alia*: (i) if income indicators and absolute expenditure are fundamental in the examination of consumption tendencies (Tschirley *et al*., 2015) and (ii) whether the examination of values of democracy as well as a combination of poverty metrics result from the levels of education and rate of employment (Cheeseman, 2015; Mattes, 2015; Resnick, 2015b). Propositions have also made on how poverty and income levels should be conceptualised and measured in Africa (Thurlow *et al*., 2015). For instance, in line with the study, the middle class in Africa should be sustained for the march towards more economic development, not least, because low living cost is characteristic of the continent. Moreover, the authors posit that there should be a universal view on the conception of poverty and the middle class, especially in the light of establishing some consensus on what constitutes a hedge against economic vulnerability and promotion of social mobility.

Second, in the light of the second strand, some research has examined the nexus between poverty levels and economic prosperity. In this strand, it has been argued by Handley (2015) that the relevance of a middle income bracket on economic prosperity is highly dependent on a substantial nexus between the underlying bracket and the private sector as opposed to the public sector. Moreover, the relevance of the private sector also rests on the premise that the corresponding sector is important in some positive externalities that are related to higher income status, *inter alia*, innovation, employment and contingencies on demand for commodities. Tschirley *et al*. (2015) have examined the incidence of poverty on food consumption patterns and found that the poor and the middle class do allocate a significant part of their food allowance to food that is processed while still depending in the long term on food that is processed locally.

Third, the nexus between middle income status, poverty and institutions has been examined by Cheeseman (2015) within the remit of the relationship between democracy and the middle class to find that while education is the most significant diver of democracy, such a significant drive is largely traceable to tertiary and secondary educational levels. To complete this strand, Resnick (2015b) has investigated the nexus between income class values, governmental trust and active participation in the Zambian policy life and established that, relative to the poor, those in a higher income status in the country trust the government less and thus, are less likely to exercise their voting rights.

Fourth, on the relevance of income status in contemporary paradigms of economic development, the middle class that is rising in Africa has been employed to reconcile two principal paradigms of contemporary economic development, namely: the Beijing Model and the Washington Consensus. Accordingly, Asongu and Ssozi (2016) have disclosed solutions and strategies that African policy makers can adopt in the light of asymmetric Sino-African relations while Asongu (2016) has surveyed and reconciled schools of thought that are dominant in Sino-African relations. The authors have posited that in order for the middle class in Africa to drive lasting political governance, such a middle class should also be sustainable, contingent on policies designed to fight poverty. In the light of the narrative which has more recently been supported by Asongu and Acha-Anyi (2020), building on other development paradigms such as the Liberal Institutional Pluralism (LIP) and New Structural Economics (NSE) schools, it is recommended that when countries in the continent are at early stages of industrialisation, policies that prioritise economic governance should be pursued in the light of the Beijing Model. Conversely, with economic development, alleviation of extreme

poverty and improvement in income levels, a Washington Consensus that puts emphasis on political governance should be prioritised.

3. Data and model specifications

In this section, we present the data that are used in our estimations and the methodology to evaluate the effect of inflation on the nexus between bribery and poverty in African countries.

3.1 Data presentation

In order to assess the unexpected effects of inflation on the relationship between bribery and poverty in Africa, the Afrobarometer survey is used. Our data cover 38 countries and three rounds (5, 6 and 7). We append the three rounds and obtain a sample of 151, 345 individuals. The surveys are oriented towards the attitude of citizens in relation dimensions such as; *inter alia*, civil society, democracy, markets and governance. The Afrobarometer embodies the Institute for Justice and Reconciliation in South Africa (IJR), the Centre for Democratic Development (CDD-Ghana), the Institute for Development Studies (IDS) at the University of Nairobi (Kenya) and the Institute for Empirical Research and Political Economy (IREEP) in Benin. Some additional support of technical nature is provided by some universities to the program namely, the University of Cape Town and the Michigan State University. In Table 1, we provide a description of the different variables included in the different estimations in the paper.

3.1.1 Measuring bribery

It is our dependent variable and is measured from the following question:

"How often, if ever, did you have to pay a bribe, give a gift, or do a favour for a teacher or school official/a health worker or clinic or hospital staff/ a government official/a police officer/ in order to get the services the schools/the medical care/the document/the assistance/avoid problem during one of these encounters/ you needed?"

For each of these items, the possible responses are on a four-step Likert-scale ("Never", "Once or twice", "A few times" or "often"). For every item, we create a binary variable (1 if the respondent answers "Once or twice", "A few times" or "often" and 0 for the response "Never"). Other responses such as "No contact", "don't know" or "refused to answer" are coded as missing values.

Then we obtain six binary variables (bribe for school officials, bribe for health worker, bribe for household services, bribe for identity documents, bribe for police assistance and bribe to avoid problems with the police). To capture the spread of the bribery, we construct an ordinal variable coded from 0 (no experience with paying bribes) to 6 (experience with all types of bribery). In the previous literature indexes of corruption have already been created. For example, Mogens and Bjørnskov (2014) created an ordinal variable from the Afrobarometer Round 3 divided into four (4) categories. People who have no experience with paying bribes are coded as zero(0), respondents who answer that they have paid a bribe once or twice in just one area are coded by one (1), individuals who have paid bribes once or a few times in one area are given the value 2, while people whose experience with paying bribes exceeds these levels are coded by three (3). In our paper we are interested in the spread of the bribery. For example, if an individual is coded by six (6), this means that he/she has experience with paying bribes for all government officials defined in the survey (school, health, bureaucrats, government officials and police officers).

3.1.2 Measuring poverty

There are different ways to define poverty. At a macroeconomic level, GDP (gross domestic product) per capita or Gross National Income is usually used even though these indicators have been criticised. Accordingly, poverty should not only be expressed in monetary terms but should also linked to a lack of basic necessities (Sen, 1999). To measure poverty at an individual level, we use the Lived Poverty Index (LPI). This index is calculated from the Afrobarometer data based on the response to the following question:

"Over the past year, how often, if ever, have you or anyone in your family: gone without enoughfood to eat/enough clean water for home use/medicine or medical treatment/enough fuel to cook your food/a cash income?"

For each item, the possible responses are: "Never", "Just once or twice", "Several times", "Many times", "Always". We also code missing values for the answers. "Don't know" or "Refused to answer" are coded as missing value. We then obtain 5 (five) binary variables based on the five items that we combined to create the ordinal indicator of poverty. The value of zero (0) indicates that the individual is not poor while the value of five (5) reflects that the person lives in total deprivation and in severe poverty because he/she is living in materially worse conditions in the sense that he/she is in lack of basic necessities. The same indicator has been used in previous studies based on Afrobarometer survey, notably, Mogens and Bjørnskov (2014) and Justesen (2011).

In Table 2 we present the score calculated as the proportion, and the variation between Round 5 and Round 7 at a country level. According to the Lived Poverty Index, on average, more than 80% of Africans experienced at least one shortage of basic necessities. Based on Round 7, the following shortages of basic necessities were apparent: Mauritius (30.5%), Tunisia (66%), Ghana (68.3%), Namibia (79.2%) and South Africa (79.8%). Indeed, it is worthwhile to note that West and Central African countries earn the worst Lived Poverty Index (Togo and Guinea (98.7%), Gabon (98.5%), Niger (98.1%)). The results also reveal that the experienced poverty decrease only in 12 countries out of 38. According to the spread of corruption, of the 38 countries included in the sample, 4 exhibit decreases in the spread of corruption between Round 5 (2011/2013) and Round 7 (2016/2018). In West African countries, the spread of corruption increased significantly while it decreased highly in Burundi. Mauritius is the top performer among African countries (00.00%) reflecting the country's position in good policies and institutions. Mauritius is followed by another island (Cape Verde (7.10%)). On the other hand, it is apparent that bribery appears to be widespread in Nigeria, Liberia and Morocco where more than 90% have had to pay a kind of bribe to government officials.

3.2 Empirical strategy

In order to evaluate the effects of the macroeconomic context on the nexus between bribery and poverty, our empirical methodology is based on a multi-level mixed-effect ordered logit regression. The use of this methodology is justified by the fact that respondents are nested in countries and country level context could matter in the analysis.

Our objective is to estimate the probability that the individual i living in country j interviewed at date t, $(t = 1,2,3)$ pays a bribe, a gift or does a favour (school services/ medical care services/ identity document/ household services/ police assistant) in order to get the services he needs conditionally on the individual's characteristics and the macroeconomic context of the country. We consider a two-model level for J independent countries $j = 1,2,\cdots,J$ with a set of fixed effects x_{ijt} including the employment, internet access, education level and the agreement to pay tax. The model includes a set of cut points and random effects.

Thus, the cumulative probability of an individual's choice corresponds to a category higher than k is defined as:

$$Pr(y_{ijt} > k | x_{ijt}, \kappa, u_j) = H(x_{ijt}\beta + t + z_{ijt}u_j - \kappa_k) \quad (1)$$

Every country j consists of $i = 1,2,\cdots, n_j$ individuals, $\kappa = \kappa_1, \kappa_2, \cdots, \kappa_{K-1}$ cutpoints with K represents the possible outcomes. $H(\cdot)$ is the logistic cumulative distribution function corresponding to the cumulative probability.

From equation (1), we can derive the probability that an individual chooses option k as:

$$Pr\big(y_{ijt} = k \big| x_{ijt}, \kappa, u_j\big) = Pr\big(\kappa_{k-1} < x_{ijt}\beta + t + z_{ijt}u_j + \varepsilon_{ijt} \leq \kappa_k\big) \quad (2)$$

$$= Pr\big(\kappa_{k-1} - x_{ijt}\beta - t - z_{ijt}u_j < \varepsilon_{ijt} \leq \kappa_k - x_{ijt}\beta - t - z_{ijt}u_j\big)$$

$$= H\big(\kappa_k - x_{ijt}\beta - t - z_{ijt}u_j\big) - H\big(\kappa_{k-1} - x_{ijt}\beta - t - z_{ijt}u_j\big)$$

The error term ε_{ijt}, independent on u_j, are distributed as logistic with mean 0 and variance $\frac{\pi^2}{3}$ and κ_0 is taken as $-\infty$ while κ_k is taken as $+\infty$.

Here, we consider a random-intercept model, so we have $z_{ijt} = 1$ and the constant u_j from the level 1 equation is decomposed into an intercept common to all countries (β_{00}), a part explained by country level parameters (c_j) and a country specific random term (v_j):

$$u_j = \beta_{00} + \alpha c_j + v_j, \quad v_j \sim \mathcal{N}(0, \sigma_v^2)$$

The global random term of our model is composed by a random country specific error term (v_j) and an individual-level error term (ε_{ijt}). We use inflation and GDP per capita as a country-specific regressor.

4. Empirical results

In this section, we first present the baseline results of the relationship between poverty and bribery and the effect of the macroeconomic context. Secondly, we proceed to the robustness and the sensitivity analysis of the estimates.

4.1. Baseline results

Table 3 reports the fixed effects, the estimated cut points and the estimated variance components. We can interpret the fixed effects as we have an ordered logit model. The reported likelihood-ratio test indicates that there is enough variability between countries to prefer a mixed-effects ordered logistic estimation than a standard ordered logistic regression.

In Column 1, we introduce only the LPI as an independent variable. In Models 2-3, we run the same regression with inflation and its squared term to depict the eventual non-linear relationship between inflation and the spread of bribery. In Model 4, we integrate the interactive form between LPI and inflation without controlling other variables while in

Models 5-8, we regress the same model by controlling sequentially the employment, internet access, education level and willingness to pay tax. In Model 9, we finally introduce the GDP per capita to take into account another variable defined at a macro-level.

The estimated coefficient of LPI is positive and highly significant (at the 1% level of significance). This result indicates that people with more lack of basic necessities are more likely to pay bribes to school officers, health workers, government officials, bureaucrats and police officers in order to get public services. More specifically, a change from the lowest to highest level of experienced poverty will increase the odds of paying bribes by a factor of 1.2 $(odds = e^\beta)$. This positive and significant evidence has been founded by Mogens and Bjørnskov (2014). Using Round 3 of the Afrobarometer survey, the authors found that poor people are much more prone to paying bribes to government officials than rich people.

To take into account the macroeconomic context, we first introduce the Consumer Price Index (CPI) and its squared term. Overall, the estimated coefficients of inflation are positive and significant (in Models 4, 6, 7 and 8) while the squared value is negative and significant at the 1% significant level in all regressions suggesting a non-linear form of the relationship. More precisely, there exists an optimum level of inflation where the relationship between inflation and the spread of bribery changes its sign. For example, the optimal value of CPI in Model 8 is 21.00%. It indicates that the effect of inflation on bribery is positive when inflation is below the threshold of 21.00%. Contrary to the first regime, the relationship becomes negative in the second regime where CPI is higher than this threshold. When we look more closely the different quantiles of the data, it is worthwhile to note that this optimal value is located between the 90th and the 95th percentiles of the distribution. This position suggests that at extremely high levels of inflation, people are less likely to pay bribes.

In order to deepen our analysis of the impact of the macroeconomic context (notably inflation on the nexus between experienced poverty and the probability to pay bribes), we now introduce an interactive term between CPI and the level of poverty. Interestingly, the estimated parameter of the interaction term is negative and significant in almost all of the equations. This result reveals that even if poverty has a positive effect on the spread of bribery, inflation can mitigate the impact. The impact is stronger for people with the third outcome (people living without basic necessities such as food, water and medical care). In the equation with all control variables, the magnitude of the estimated coefficient of the interaction term is -0.021. These results indicate that the impact of poverty on bribery becomes negative when inflation increases. In fact, if we consider two countries with similar levels of experienced poverty, individuals living in countries with higher consumer prices are

less prone to pay a bribe to government officials than people living in countries with lower consumer prices. We can therefore validate the hypothesis that the macroeconomic context and especially inflation matters in the relation between poverty and bribery in Africa.

The findings can be discussed as follows. In effect, a rise in consumer prices reduces the purchasing power. In such a depressed macroeconomic context, poor people suffer from an erosion of their real income and therefore a severe contraction in consumer purchasing power. Thus, instead of paying bribes to bureaucrats or government officials, they are more likely to satisfy their basic needs such as accessing clean water, food or medical treatment. We can conclude therefore that consumer price has a significant effect on poor consumer behaviour. Despite the individual preferences, the price level dictates the equilibrium and consequently the choice of people who are in lack of basic necessities.

When we turn out to other control variables, the results reveal some patterns. Individuals in full- or partial-time employment are significantly more prone to pay bribes than people who have no employment. The same result is noted for people who get news from the internet and educated people. In effect, educated people (secondary level) are more likely to pay bribes than uneducated ones are. This finding is consistent with previous studies such as Konte and Ndubuisi (2020). Contrarily, individuals who agree that the tax authorities always have the right to make people pay taxes are less likely to pay bribes to government officials than the other ones are. Indeed, the coefficient of GDP per capita is negative and significantly negative at the 1% level significance. This means that individuals living in more developed countries (in term of GDP per capita) are less prone to pay bribes than people living in countries with lower GDP per capita. This last finding could be explained by the fact that in more developed countries, people can easily access public goods infrastructures and services and they do not need to pay bribes for the needs.

4.2 Robustness checks

After presenting and discussing our baseline estimations, we now conduct some sensitivity analysis to evaluate the robustness of the main results. Firstly, we test our model on a sample of fragile and conflict-affected countries for which real-time monthly food price data are collected from a machine learning approach (Andrée, 2012). The data are provided by the World Bank and cover more than 1200 markets and 43 food types. We limit the estimations to African countries which are included in the Afrobarometer Rounds 5, 6 and 7 surveys. The countries included are: Burkina Faso, Burundi, Cameroun, the Gambia, Liberia, Mali, Mozambique, Niger and Sudan. We merge these data on food prices by the Afrobarometer.

Secondly, we estimate a linear model with the continuous bribery index and the continuous lived poverty index. The continuous indicators are calculated as the proportion of individuals who have paid bribes at least one time and the proportion of individuals gone without at least one of the basic needs (food, clean water, medical care, cooking fuel or cash income, *inter alia*).

Table 4 provides the estimated results for the multi-level mixed effects ordered logistic model for fragile and conflict-affected countries with food price index at a market level as the mitigating variable. The main results found previously are still strongly held. In effect, poor people are more exposed to bribery than wealthier people while the food price index mitigates the nexus. More precisely, the findings reveal that even if poverty promotes bribery, food prices may lead poor individuals to change their preferences by decreasing the probability of paying bribes to government officials.

Table 5 presents the results for the regressions with the continuous indicator of bribery and lived poverty as proportion at country level. Once again, the results are robust. The findings confirm the positive effect of poverty and bribery and the mitigating role of consumer prices.

We have established from the findings that relative to low income status, higher income status pay less bribes. This is consistent with the stream of literature documenting the positive relevance of higher income status is driving development outcomes; *inter alia*, good governance standards (Birdsall, 2007a; Easterly, 2001; Resnick, 2015a). The findings also broadly run counter to Rodrik (2015) who is pessimistic on how industrialisation and the resulting higher income status can improve institutions in Africa. Therefore, as opposed to Rodrik (2015), when the population of a country is less poor, such lower levels of poverty can be associated with reduced forms for bribery and by extension, better standards of governance. The findings are also consistent with Sklar (1963) who show that growing income levels or reduction of poverty levels contributed to better governance standards and by extension, the wave of independence in the 1960s across Africa. Accordingly, the findings in this study run counter to Rodrik (2015) who does not see contemporary higher income levels in Africa as fundamental in driving political transformation.

5. Concluding implications and future research directions

This study assesses the nexus between bribery and poverty, contingent on the macroeconomic environment within the remit of inflation in Africa. The Afrobarometer survey is used. Our data cover 38 countries consisting of three rounds of survey and a sample of 151,345

individuals. The empirical strategy is based on multi-level mixed-effects ordered logit regression. The results reveal that while poverty has a positive effect on the spread of bribery, inflation can mitigate the impact. The impact is stronger for people living without basic necessities such as food, water and medical care. In other words, the attendant results indicate that the impact of poverty on bribery becomes negative when inflation increases. The findings are robust to *inter alia*: (i) multi-level mixed effects ordered logistic models for fragile and conflict-affected countries with the food price index at a market level as the mitigating variable and (ii) estimations with the continuous indicator of bribery and experienced poverty at the country level.

The findings in this study contribute to understanding two contemporary shifts in economic development. First, the need for reforms at the macroeconomic level that promote the middle class and higher income status in prospects of escaping poverty as opposed to policies of uniform economic prosperity (Birdsall, 2007b). Second, the imperative to adopt 'soft economics' (human-focused policies) and depart from 'strong economies' (structural adjustment oriented measures) in order to understand poverty issues in Africa (Kuada, 2015).

In terms of policy implications, the underlying two contemporary shifts are consistent with the findings of the present study in the perspective that, as long as people are poor, they are constrained to bribe their way out of poverty, especially as it pertains to meeting basic needs such as food, shelter, education and health services. It follows that poverty can be fought in order to reduce bribery and by extension poor governance, by improving factors responsible for poverty mitigation such as education, health and housing (Kharas, 2010; Tsang, 2013).

Moreover, the findings are also relevant in the design of policies for International Development Assistance (IDA) such that more foreign aid should be allocated to poorer countries, compared to wealthier countries in view of fighting bribery. This is thus contrary to the stream of literature supporting the perspective that more aid should be allocated to countries with better institutions, compared to those with poorer institutions in view of achieving favorable economic development outcomes (Asongu, 2015).

Ultimately, granting that bribery is a key element in limiting income generated from taxes in African countries, the findings in this study speak to governments on the need to fight poverty as a measure of increasing potential tax income by means of reduced bribery. This policy recommendation is consistent with Ferreira *et al*. (2013) from a study by the World Bank

which concluded that the fight against poverty and higher income levels have substantially contributed to increase tax income in Latin America, an experience that would be relevant to African countries in their quest to increase tax income for the funding of socio-economic activities and delivery of public commodities.

The findings obviously allow space for further research; especially as it pertains to assessing the established findings within different macroeconomic contexts. Moreover, it is worthwhile to improve understanding of the findings by employing alternative measures of poverty and bribery in order to assess how the findings withstand empirical scrutiny when alternative dependent and independent variables of interest are used.

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Table 1: Definitions of variables and summary statistics

Variables	Definitions	Mean	Std. Dev.	Min	Max	Source
Bribery	Pay bribes for public school, medical care, identity document, household services, police assistance or avoid problem with police (ordinal variable)	0.981	1.545	0.000	6.000	Afrobarometer (R5-R6-R7)
LPI	Lived poverty index, ordinal variable defined from the lack access of basic necessities (food, water, medical care, cooking fuel, cash income)	2.608	1.719	0.000	5.000	Afrobarometer (R5-R6-R7)
Employment	Employment status (1 if full or partial time)	0.360	0.480	0.000	1.000	Afrobarometer (R5-R6-R7)
Internet	How often use internet (1 if few times every week or every day)	0.144	0.351	0.000	1.000	Afrobarometer (R5-R6-R7)
Education	Level of education (1 if Secondary)	0.377	0.484	0.000	1.000	Afrobarometer (R5-R6-R7)
Male	Gender of respondent (1 if male)	0.767	0.423	0.000	1.000	Afrobarometer (R5-R6-R7)
Pay_tax	People must pay tax (1 if agree or strongly agree)	0.707	0.455	0.000	1.000	Afrobarometer (R5-R6-R7)
CPI	Inflation, Consumer Prices (annual %)	6.539	7.881	-2.430	63.290	World Development Indicators
GDP_pc (log)	GDP per capita in current dollars US	7.373	0.926	5.549	9.563	World Development Indicators
Remit_GDP	Personal remittance received (% GDP)	3.861	4.517	0.000	23.140	World Development Indicators
Natural_rent	Total natural resources rents (% GDP)	7.770	5.329	0.001	28.170	World Development Indicators

Source: Authors

Table 2: Proportions of Lived Poverty and Bribery in Africa

Countries	LPI				Bribery			
	R5	R6	R7	Δ(*LPI*)	R5	R6	R7	Δ(*Brib*)
Algeria	0.512	0.420	---	-0.092	0.217	0.148	---	-0.069
Benin	0.937	0.910	0.962	0.025	0.505	0.369	0.833	0.328
Botswana	0.855	0.800	0.817	-0.038	0.048	0.030	0.333	0.285
Burkina Faso	0.976	0.969	0.858	-0.118	0.287	0.417	0.176	-0.111
Burundi	0.980	0.964	---	-0.016	0.415	0.222	---	-0.415
Cameroon	0.947	0.933	0.965	0.018	0.605	0.660	0.750	0.145
Cape Verde	0.774	0.947	0.947	0.173	0.049	0.094	0.071	0.022
Cote d'Ivoire	0.957	0.944	0.965	0.008	0.409	0.286	0.500	0.091
Egypt	0.662	0.597	---	-0.065	0.657	0.691	---	0.034
Gabon	---	---	0.985	---	---	---	1.000	---
Gambia. The	---	---	0.846	---	---	---	0.375	---
Ghana	0.641	0.667	0.683	0.042	0.305	0.827	1.000	0.695
Guinea	0.975	0.946	0.987	0.012	0.729	0.417	1.000	0.271
Kenya	0.870	0.812	0.889	0.019	0.582	0.650	0.755	0.173
Lesotho	0.951	0.947	0.935	-0.016	0.188	0.094	0.286	0.098
Liberia	0.915	0.917	0.907	-0.008	0.529	0.733	0.923	0.394
Madagascar	0.922	0.923	0.970	0.048	0.290	0.424	0.714	0.424
Malawi	0.943	0.936	0.968	0.025	0.133	0.400	0.500	0.367
Mali	0.902	0.866	0.917	0.015	0.328	0.312	0.500	0.172
Mauritius	0.337	0.209	0.305	-0.032	0.064	0.000	0.000	-0.064
Morocco	0.609	0.638	0.634	0.025	0.682	0.521	0.909	0.227
Mozambique	0.878	0.897	0.887	0.009	0.427	0.672	0.803	0.376
Namibia	0.841	0.726	0.792	-0.049	0.090	0.122	0.412	0.322
Niger	0.966	0.945	0.981	0.015	0.317	0.190	0.875	0.558
Nigeria	0.832	0.709	0.841	0.009	0.409	0.623	0.933	0.524
Sao T Principe	---	0.917	0.837	-0.080	---	0.509	0.636	0.127
Senegal	0.957	0.930	0.962	0.005	0.265	0.157	0.333	0.068
Sierra Leone	0.860	0.849	0.897	0.037	0.742	0.783	0.750	0.008
South Africa	0.641	0.615	0.798	0.157	0.126	0.158	0.667	0.541
Sudan	0.797	0.771	0.837	0.04	0.357	0.623	0.789	0.432
Swaziland	0.912	0.774	0.916	0.004	0.208	0.120	0.428	0.22
Tanzania	0.938	0.858	0.899	-0.039	0.430	0.441	0.583	0.153
Togo	0.974	0.968	0.987	0.013	0.426	0.600	0.510	0.084
Tunisia	0.542	0.593	0.660	0.118	0.176	0.133	0.500	0.324
Uganda	0.939	0.914	0.942	0.003	0.575	0.521	0.643	0.068
Zambia	0.909	0.901	0.905	-0.004	0.255	0.352	0.300	0.045
Zimbabwe	0.924	0.954	0.957	0.033	0.440	0.397	0.667	0.227
Average	0.840	0.819	0.871	0.029	0.360	0.391	0.612	0.231

Source: authors, Δ(·) represents the variation of the indicator between Round 5 (2011/2013) and Round 7 (2016/2018), (---) represents missing values.

Table 3: Poverty and bribery in Africa: the role of inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fixed effects									
LPI	0.192*** (0.007)	0.191*** (0.007)	0.192*** (0.007)	0.181*** (0.010)	0.193*** (0.010)	0.218*** (0.011)	0.214*** (0.011)	0.211*** (0.011)	0.193*** (0.011)
CPI		-0.029*** (0.002)	0.003 (0.006)	0.013* (0.007)	0.010 (0.008)	0.020*** (0.008)	0.019** (0.008)	0.021*** (0.008)	-0.011 (0.008)
CPI2			-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
LPI_1#CPI				-0.010*** (0.005)	-0.008* (0.005)	-0.006 (0.005)	-0.007 (0.005)	-0.007 (0.005)	-0.015*** (0.005)
LPI_2#CPI				-0.016*** (0.005)	-0.013*** (0.005)	-0.011** (0.005)	-0.012** (0.005)	-0.013** (0.005)	-0.022*** (0.005)
LPI_3#CPI				-0.021*** (0.005)	-0.019*** (0.005)	-0.016*** (0.005)	-0.017*** (0.005)	-0.017*** (0.005)	-0.027*** (0.005)
LPI_4#CPI				-0.012** (0.005)	-0.011** (0.005)	-0.011** (0.006)	-0.010* (0.006)	-0.010* (0.006)	-0.017*** (0.006)
LPI_5#CPI				0.007 (0.005)	0.008 (0.006)	0.004 (0.006)	0.005 (0.006)	0.005 (0.006)	0.004 (0.006)
Employ					0.332*** (0.025)	0.282*** (0.026)	0.298*** (0.026)	0.288*** (0.026)	0.305*** (0.026)
Internet						0.455*** (0.032)	0.387*** (0.034)	0.375*** (0.035)	0.459*** (0.035)
Education (second)							0.031 (0.025)	0.035 (0.026)	0.081*** (0.026)
Pay_tax								-0.235*** (0.027)	-0.247*** (0.027)
GDP									-0.356*** (0.016)
/Cut1	0.860***	0.613***	0.751***	0.732***	0.890***	1.003***	0.984***	0.797***	-2.115***

	(0.025)	(0.029)	(0.039)	(0.045)	(0.047)	(0.049)	(0.050)	(0.054)	(0.142)
/Cut2	1.499***	1.257***	1.396***	1.378***	1.540***	1.664***	1.644***	1.460***	-1.440***
	(0.026)	(0.030)	(0.040)	(0.045)	(0.047)	(0.049)	(0.051)	(0.055)	(0.142)
/Cut3	2.042***	1.804***	1.943***	1.926***	2.090***	2.221***	2.199***	2.017***	-0.874***
	(0.028)	(0.031)	(0.041)	(0.046)	(0.048)	(0.050)	(0.052)	(0.056)	(0.141)
/Cut4	2.609***	2.373***	2.513***	2.498***	2.663***	2.804***	2.776***	2.597***	-0.287**
	(0.030)	(0.033)	(0.043)	(0.048)	(0.050)	(0.052)	(0.053)	(0.057)	(0.142)
/Cut5	3.275***	3.040***	3.180***	3.166***	3.334***	3.487***	3.452***	3.286***	0.407***
	(0.034)	(0.037)	(0.046)	(0.051)	(0.053)	(0.055)	(0.056)	(0.060)	(0.142)
/Cut6	6.560***	6.323***	6.464***	6.462***	6.623***	6.747***	6.719***	6.536***	3.663***
	(0.118)	(0.119)	(0.122)	(0.051)	(0.125)	(0.125)	(0.126)	(0.128)	(0.182)
Random effect									
Var (_cons)	1.724	2.328	3.113	3.000	2.967	3.422	3.402	3.409	3.131
	(0.578)	(0.780)	(1.066)	(1.023)	(1.016)	(1.140)	(1.133)	(1.137)	(1.044)
Rho (ICC)	0.344	0.414	0.486	0.477	0.474	0.510	0.508	0.509	0.488
Diagnostics									
Log likelihood	-35632.409	-35502.516	-35488.649	-35456.000	-35164.693	-34336.729	-34262.945	-33451.905	-33203.98
Wald Chi2	1516.61***	1726.70***	1732.74***	1794.50***	1939.30***	2055.23***	1998.83***	2005.29***	2445.63***
LR test vs ologit model	1688.50***	1933.97***	1923.12***	1899.58***	1847.03	2161.55***	2157.07***	2047.32***	1813.05***
# Observations	29511	29511	29511	29511	29398	28907	28837	27981	27981
# Countries	38	38	38	38	38	38	38	38	38

Source: authors. Standard errors are in parentheses. ***P<0.01, **P<0.05,**P<0.10, ICC is the Intra Class Correlation,/cut1-6 are the estimated cutpoints for the ordered logit regressions

Table 4: Poverty and bribery in fragile and conflict-affected countries: the role of food prices

	(1)	(2)	(3)	(4)	(5)	(6)
Fixed effects						
LPI	0.169***	0.163***	0.164***	0.290***	0.347***	0.300***
	(0.017)	(0.017)	(0.017)	(0.061)	(0.064)	(0.078)
FPI		-1.390***	-0.703	-0.204	0.888	2.448***
		(0.194)	(0.572)	(0.602)	(0.667)	(0.915)
FPI2			-0.281	-0.289	-0.449**	-0.729***
			(0.220)	(0.221)	(0.226)	(0.271)
LPI_1#FPI				-0.245**	-0.293**	-0.184
				(0.123)	(0.127)	(0.164)
LPI_2#FPI				-0.436***	-0.501***	-0.446**
				(0.154)	(0.159)	(0.199)
LPI_3#FPI				-0.743***	-0.826***	-0.760***
				(0.198)	(0.204)	(0.249)
LPI_4#FPI				-0.603**	0.739***	-0.579*
				(0.245)	(0.259)	(0.302)
LPI_5#FPI				-0.717**	-0.867***	-0.685*
				(0.298)	(0.307)	(0.365)
Employ					0.372***	0.333***
					(0.061)	(0.080)
Internet					0.612***	0.478***
					(0.081)	(0.105)
Education (second)						-0.049
						(0.081)
Pay_tax						-0.436***
						(0.086)
Male						-0.060
						(0.362)
Cut_1	0.693***	-0.740***	-0.341	0.007	1.119**	1.971**
	(0.061)	(0.207)	(0.375)	(0.416)	(0.469)	(0.800)
Cut_2	1.365***	-0.063	0.335	0.685*	1.820***	2.702***
	(0.063)	(0.207)	(0.375)	(0.416)	(0.469)	(0.801)
Cut_3	1.988***	0.567***	0.966**	1.318***	2.468***	3.374***
	(0.067)	(0.207)	(0.375)	(0.416)	(0.470)	(0.802)
Cut_4	2.615***	1.201***	1.600***	1.955***	3.120***	4.058***
	(0.073)	(0.208)	(0.376)	(0.417)	(0.471)	(0.803)
Cut_5	3.366***	1.959***	2.359***	2.718***	3.895***	4.821***
	(0.084)	(0.211)	(0.379)	(0.420)	(0.474)	(0.807)
Cut_6	5.924***	4.588***	5.037***	5.390***	6.518***	6.977***
	(0.206)	(0.278)	(0.452)	(0.486)	(0.532)	(0.848)
Random effect						
Var (_cons)	0.680	2.145	2.849	2.868	2.76	1.160
	(0.358)	(1.029)	(1.444)	(1.61)	(1.060)	(0.700)
Rho (ICC)	0.171	0.393	0.464	0.466	0.387	0.262
Diagnostics						

Log likelihood	-6894.673	-6867.221	-6866.408	-6855.621	-6562.593	-3708.352
Wald Chi2	133.88***	172.68***	173.33***	196.81***	254.54***	152.67
LR test vs ologit model	112.03***	132.60***	128.98***	118.06***	151.14***	78.04***
# Observations	5258	5258	5258	5258	5111	2685
# Countries	17	17	17	17	17	17

Source: authors. Standard errors are in parentheses. ***P<0.01, **P<0.05, **P<0.10, ICC is the Intra Class Correlation, /cut1-6 are the estimated cutpoints for the ordered logit regressions

Table 5: Poverty and bribery in Africa (continuous indicators)

	(1)	(2)	(3)	(4)	(5)	(6)	
LPI	0.386**	0.389***	0.389***	0.657***	0.483**	0.509**	0.510**
	(0.147)	(0.141)	(0.138)	(0.193)	(0.230)	(0.221)	(0.225)
CPI		0.006**	0.017***	0.076**	0.854***	0.083***	0.083**
		(0.003)	(0.006)	(0.031)	(0.042)	(0.031)	(0.032)
CPI2			-0.000**	-0.000***	-0.000***	0.000**	-0.000**
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LPI#CPI				-0.067*	-0.080**	-0.079**	-0.081**
				(0.036)	(0.037)	(0.035)	(0.036)
GDP_pc					-0.060	-0.036	-0.038
					(0.038)	(0.036)	(0.036)
Natural_rent						0.010**	0.010**
						(0.004)	(0.004)
Remit_GDP							-0.003
							(0.004)
Constant	0.037	-0.008	-0.060	-0.293	0.313	0.023	0.055
	(0.130)	(0.126)	(0.127)	(0.179)	(0.433)	(0.418)	(0.424)
F_stat	9.20***	10.61***	9.86***	8.58***	7.99***	8.00**	6.91***
R_squared	0.236	0.279	0.308	0.334	0.357	0.394	0.398
#Observations	101	101	101	101	101	101	101

Source: authors. Standard errors are in parentheses. ***P<0.01, **P<0.05,**P<0.10