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Assessing the Determinants of Trust in Public Institutions in Botswana: A Multilevel Linear Model Approach

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Abstract. This article examines factors that explain trust in public institutions in Botswana and factors that explain trust in public institutions. The Afrobarometer surveys from 2008 to 2014 show a decline in public institutional trust in Botswana even though the country is considered a hub for good governance in Africa. Using Afrobarometer survey data, the article employs multilevel analysis to assess factors that explain trust in public institutions. The findings indicate that education, satisfaction with democracy and perceptions of corruption are significant factors in explaining trust in public institutions. The article argues that while Botswana's democratic credentials are undisputed, citizens are increasingly becoming too critical of public institutions.

Key words: multilevel model, trust, public institutions, hierarchical data.

AMS 2010 Mathematics Subject Classification : 62J05; 62J12; 62D05

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Résumé. (Abstract in French) Cet article étudie les facteurs qui expliquent la confiance envers les institutions publiques au Botswana et les facteurs qui expliquent la confiance à l'égard des institutions publiques. Les enquêtes Afrobaromètres de 2008 à 2014 montrent une baisse de confiance dans les établissements publics au Botswana bien que le pays soit considéré comme une plaque tournante de la bonne gouvernance en Afrique. En utilisant les données du sondage de Afrobaromètre, l'article utilise des analyses à plusieurs niveaux pour évaluer les facteurs qui expliquent la confiance dans les institutions publiques. Les résultats indiquent que l'éducation, la satisfaction vis à vis de la démocratie et les perceptions de la corruption sont des facteurs importants pour expliquer la confiance dans les institutions publiques. L'article affirme que si les légitimités démocratiques du Botswana sont indiscutables, les citoyens deviennent de plus en plus trop critique à l'égard des institutions publiques.

1. Introduction

Public trust is globally seen as a vital factor that promotes good governance in any political system. Democratic governments which enjoy a huge degree of trust tend to have greater degrees of legitimacy and policy efficacy (Rabe-Hesketh and Skronka , 2014). Over the last three decades, scholars have documented a decline in the degree of trust in most developed countries (Drakos, Kallandranis and Karidis , 2016). Eurobarometer, Asian Barometer, Afrobarometer, Gallup International, Transparency International and many other research organizations have conducted surveys confirming the decline in trust in various parts of the world (Blind , 2006). Afrobarometer surveys (2008 to 2014) show that trust in institutions has been experiencing a decline over the years in Africa since people express a low level of trust in their political institutions. For instance, a study by Sall (2015) indicated that almost 73% of Senegalese said they trusted the president “a lot” or “somewhat” in 2005 and by 2008 trust for the president declined by 27%. At the same time, the percentage of Senegalese who expressed trust in parliament declined from 56% to 37% while trust in local government decreased from 56% to 40%.

In South Africa, a study by Chingwete (2016) showed that citizens' trust in the president had dropped by almost half since 2011, from 62% to 34%. Trust in members of parliament dropped from 56% to 41% and local government council from 43% to 35%. In the case of Botswana, in 2014 68% of Botswana had trust on the president. This represents a 10% decline from 2008. There was a 15% decline in people's trust on the ruling party, that is, from 74% in 2008 to 59% in 2014. Further declines are notable for other institutions as well (Afrobarometer , 2016). This study focusses on all the twelve institutions studied by Afrobarometer because scholars (Kuenzi , 2008; Slomczynski and Janicka , 2009; Van der Meer and Dekker , 2011; Landmark , 2016; Seabo and Molefe , 2016) indicated that public confidence is crucial for the strengthening of democracy in a country.

Although Botswana has experienced a decline in public trust in institutions, the country has maintained high overall ranking in Africa on most development indices. The country was classified as one of the ten poorest countries at the time of independence in 1966 and since then it has become one of the most economically successful countries in the continent, see (Magang , 2015; Good , 2016; Manatsha and Maharjan , 2009). Botswana has long been known for its political and economic success and it was ranked 3rd in Sub-Saharan Africa on the UNDP Human Development Index (HDI) in 2015 (UNDP , 2015).

According to the World Bank (2016), Botswana is among the top ranked African countries on the World Bank Worldwide Governance Indicators with a 72.34 percentile rank. This implies that Botswana has relatively good governance. The Mo Ibrahim Foundation ranked Botswana third in its Index of African Governance in 2014 and in 2016 it moved to second place with 73.7 points.

Botswana has maintained a lofty position in corruption ratings among African countries with a score of 60 out of 100 despite declining by seven points. Despite the positive ratings, Botswana was ranked among the top ten most deteriorating countries in Africa in terms of the quality of their governance since 2011 (Mo Ibrahim Foundation , 2016) and the country experiences declining levels of public trust in institutions. This trend does not occur in a vacuum, but could be a result of citizens' disaffection with performance of institutions. The present article examines factors that explain trust in public institutions in Botswana. The objective of the article is threefold; first it discusses the theoretical basis of trust and identifies the micro-level determinants of trust in public institutions. Secondly, the article examines the macro-level factors. Then the paper compares models that seek to account for variability due to the micro-level and macro-level factors that explain trust in public institutions.

2. Theory and literature review

Trust is an essential component of any democracy. Newton (2001) writes that trust is essential for democratic and stable political life. Democratic countries have been concerned about the "trust crisis" since the 1960s to (Yang and Tang , 2010). Scholars have advanced cultural (Newton , 2001; Mishler and Rose , 2001; Delhey and Newton , 2003; Inglehart and Welzel , 2003) and institutional; (Mishler and Rose , 2001; Seligson and Carrión , 2002; Jamil and Askvik , 2015) theories of trust. Cultural theories see trust as exogenous to institutions, starting early in life through socialization and later projected into political institutions. Institutional trust or political trust is the judgement of the citizenry that the system and the political institutions are responsive and will do what is right even in the absence of constant scrutiny (Blind , 2006). We adopt the institutional approach to study trust in public institutions.

According to [Hetherington \(1999\)](#), public trust refers to a basic evaluation orientation towards the government founded on how well it is operating according to people's normative expectations. Political trust refers to the citizens' evaluation of the performance of the overall political system and the regime ([Thomas , 1998](#)). Likewise, [Shoon and Cheng \(2011\)](#) define political trust as the confidence that people have in their institutions and government. Using the personality theory [Delhey and Newton \(2003\)](#) argue that trust can be based on individual personality characteristics which will evenly spread amongst all ages, tribes, genders, different living standards and level of education. The theory of success and well-being, states that people who have less will also trust less as they have relatively more to lose ([Mishler and Rose , 2001](#)). This theory can be related to people's trust in public institutions. According to the performance-based theory, the success of a country and good performance by the government would lead to more trust from citizens [Christensen and Læg Reid \(2005\)](#). Studies ([Kuenzi , 2008](#); [Słomczynski and Janicka , 2009](#); [Van der Meer and Dekker , 2011](#); [Landmark , 2016](#)) have proved that citizens' satisfaction with democracy; perception of corruption; perception of government performance; living standard; age; gender; occupation; education and location have different effects on trust in public institutions. [Blind \(2006\)](#) argues that people trust governments that can bring about economic growth, provide access to education, create jobs and deliver services in a simple and transparent manner.

[Rabe-Hesketh and Skronda \(2014\)](#) used the Eurobarometer data to investigate trust in institutions of the European Union (EU) and found that the key determinants of trust were the utilities people perceive to gain from membership in the EU, their ideological stance, their general satisfaction with life and with how democracy functions. The results also indicated the importance of people's socio-economic status, corruption, public expenses on welfare, decision making power, interest in politics, occupation and education. [Zhao and Hu \(2015\)](#) found that satisfaction with the quality of public services, democratic participation and transparency in government were positively associated with public trust in government in contemporary urban China. They also revealed that citizens who were younger, more highly educated and well paid had lower probability of trust.

Other studies ([Cho and Kirwin , 2007](#); [Kuenzi , 2008](#); [Hutchison and Johnson , 2011](#); [Sulemana and Issifu , 2015](#)) reached similar conclusions that overall assessment in government performance, democratic and economic satisfaction as well as political efficacy were strongly and positively associated with political trust. [Haagensen \(2016\)](#) used multilevel models to examine how government performance affects institutional trust in Sub-Saharan Africa. The study showed that countries with democratic setbacks have lower levels of institutional trust and that perceived economic performance had a significant negative effect on levels of institutional trust. A comparative study between Botswana and Tanzania by [Landmark \(2016\)](#) tested determinants of individuals' trust in institutions using regression analysis. The study found that levels of institutional trust were higher in Tanzania than in Botswana. Factors which were identified to have a significant

effect in trust included tribe, living standard, satisfaction with democracy and policy performance. It was further observed that perceived corruption had a strong negative effect on institutional trust in the two countries.

Seabo and Molefe (2016) explained trust in political institutions (president, parliament, local government and ruling party) in Botswana using a binary logistic regression model. They concluded that the level of education was an important factor since people of lower education trusted political institutions more than the highly educated. The authors further found out that perception on government performance, corruption and satisfaction with democracy are important factors that explain why people trust in political institutions. This paper is an extension of Seabo and Molefe (2016) and it uses hierarchical linear models to explain trust in all institutions covered by the Afrobarometer survey.

The following hypotheses are tested:

H_1 : Citizens who are satisfied with democracy are more likely to trust public institutions than citizens who are dissatisfied.

H_2 : The lower the perception of corruption, the more individuals are likely to trust public institutions.

H_3 : Females are more likely to trust public institutions more than males.

H_4 : Older people are more likely to have high levels of trust in public institutions than younger people.

H_5 : The higher the level of education an individual has, the lower the individual's trust in public institutions.

H_6 : Having good living conditions and being employed may be positively related to trust as success and well-being can lead to more trust.

H_7 : Rural dwellers are more likely to have high levels of trust in public institutions than urban dwellers

There are a number of surveys undertaken by government and non-governmental organizations in order to measure levels of trust worldwide. The measurements and scales used often differ between countries and regions. Several scholars (Tolbert and Mossberger , 2006) used "1=Strongly disagree" to "5=Strongly agree"; (Kim , 2010) uses "1=Trust a lot" to "4=Don't trust at all"; (Haagensen , 2016; Landmark , 2016) used "0=Not at all" to "3=A lot"; (Cho and Kirwin , 2007) used "1=Not at all" to "4=A lot"; and (Kuenzi , 2008) used "1=Do not trust at all" to "4=I trust them a lot".

The Afrobarometer surveys use the measurement; "How much do you trust each of the following, or haven't you heard enough about them to say?" The scale for this measurement is the likert scale; "0=Not at all", "1=Just a little", "2=somewhat", "3=A lot", "4=don't know/ haven't heard". This is the measurement scale which is used in this paper.

2.1. Multilevel analysis

Most social-economic surveys employ multistage sampling designs where clusters are sampled in stage one, sub-clusters in stage two until the elementary are sampled in the final stage. This results in a multilevel data and hence the analysis of such data set is called multilevel analysis (Rabe-Hesketh and Skronda , 2014). It is known by various names such as mixed effects, random effects, hierarchical linear modelling and mixed linear (Raudenburt and Bryk , 2002). Hierarchical linear modelling is the statistical technique used to analyse hierarchical data as it accounts for the hierarchy. HLM is an intricate form of ordinary least squares (OLS) regression that is used to analyse variance in the response variables when the explanatory variables are at varying hierarchical levels (Gill , 2003). Simple linear regression techniques were used to analyse hierarchical data before the establishment of HLM in the early 1980's. These conventional regression techniques resulted in the incorrect partitioning of variance to variables, dependencies in the data and increased chances of making Type I error since they usually ignored nesting of data (Osborne , 2000). Buxton (2008) stated that multilevel modelling is an appropriate approach that can be used to handle clustered or grouped data.

Bryan and Jenkins (2013) further stated that the hierarchical regression is the most popular approach for multilevel country case as it accounts for the shared variance in hierarchically structured data. Furthermore, they state that HLM simultaneously assesses relationships within and between hierarchical levels of grouped data hence making it more efficient in accounting for variance among variables at different levels than other existing analyses.

A general two-level linear multilevel model as indicated by Hox (2010), is given by :

$$y_{ij} = \beta_{0j} + \sum_{p=1}^P \beta_{pj} X_{pij} + \varepsilon_{ij} \tag{1}$$

where y_{ij} = outcome variable measured for the i th level-1 nested within the j th level 2; X_{pij} = value on the level-1 predictor; β_{0j} = intercept for the level-2 predictor; β_{pj} = regression coefficient associated with X_{ij} for the level-2 unit; and $\varepsilon_{ij} \sim N(0, \sigma_{e0}^2)$ is the random error associated with the individual unit nested with the level-2 unit.

The most important assumption of HLM is that any level-1 errors (ε_{ij}) are normally distributed with mean 0 and variance σ^2 . That is; $E[\varepsilon_{ij}] = 0$; $Var[\varepsilon_{ij}] = \sigma^2$. For the case of a Q level-2 predictors $Z_{qj} (q = 1, \dots, Q)$:

$$\beta_{0j} = \beta_0 + \sum_{q=1}^Q \beta_{0q} Z_{qj} + U_{0j} \tag{2}$$

$$\beta_{pj} = \beta_{p0} + \sum_{q=1}^Q \beta_{pq} Z_{pq} + U_{pj} \tag{3}$$

where β_{0j} = intercept for the j th level-2 unit; β_{pj} = effect for the j th level-2 unit; Z_{qj} = value on the level-2 predictor; β_0 = intercept; β_{p0} = effect of level-2 predictor; β_{0q} = effect of the level-1 predictor; β_{pq} = effect of the cross-level interaction between level-2 and level-1 predictors; U_{0j} = random effect of the j th level-2 variation in the level-1 intercepts that remains after controlling for Z_{ij} ; U_{pj} = random effect of the j th level-2 variation in the level-1 slope for X_{ij} after controlling for Z_{ij} . As indicated by Hox (2010), when substituting equation (2) and (3) into equation (1) produces the single-equation version of the multilevel regression model;

$$y_{ij} = \beta_0 + \sum_{p=1}^P \beta_{p0} X_{pij} + \sum_{q=1}^Q \beta_{0q} Z_{qj} + \sum_{q=1}^Q \sum_{p=1}^P \beta_{pq} Z_{qj} X_{pij} + \sum_{p=1}^P U_{pj} X_{pij} + U_{0j} + \varepsilon_{ij} \quad (4)$$

where y_{ij} = outcome variable measured for the level-1 nested within the level 2; β_{0j} = intercept for the j th level-2 unit; β_{pj} = effect for the j th level-2 unit; Z_{qj} = value on the level-2 predictor; β_0 = intercept; β_{p0} = effect of level-2 predictor; β_{0q} = effect of the level-1 predictor; β_{pq} = effect of the cross-level interaction between level-2 and level-1 predictors; $U_{0j} \sim N(0, \sigma_{u0}^2)$ is the random effect of the j th level-2 variation in the level-1 intercept that remains after controlling for Z_{ij} ; $U_{pj} \sim N(0, \sigma_{u0}^2)$ is the random effect of the j th level-2 variation in the level-1 slope for after controlling for Z_{ij} ; $\varepsilon_{ij} \sim N(0, \sigma_{e0}^2)$ is the random error associated with the i th level-1 unit nested within the j th level-2 unit.

The most important assumption of HLM is that any level-1 error (ε_{ij}) are normally distributed with mean 0 and variance σ^2 . That is; $E[\varepsilon_{ij}] = 0$; $Var[\varepsilon_{ij}] = \sigma^2$.

The assumption of level-2 model as stated by Sullivan, Dukes and Losina (1999), (when errors are homogeneous at both levels) is that β_{0j} and β_{pj} have a normal multivariate distribution with mean β_0 and β_{p0} , and variance σ_{u0}^2 and σ_{u1}^2 respectively. The covariance between β_{0j} and β_{pj} (defined as σ_{u01}) is equal to the covariance between U_{0j} and U_{pj} . Lastly, covariance between U_{0j} and ε_{ij} , and the covariance between U_{pj} and ε_{ij} are both zero. In summary, the assumptions are as follows (Sullivan, Dukes and Losina , 1999): $E[U_{0j}] = 0$; $E[U_{1j}] = 0$; $Var[\beta_{0j}] = Var[U_{0j}] = \sigma_{u0}^2$; $Var[\beta_{1j}] = Var[U_{pj}] = \sigma_{u1}^2$; $Cov[\beta_{0j}, \beta_{pj}] = Cov[U_{0j}, U_{pj}] = \sigma_{u01}$; $Cov[U_{0j}, \varepsilon_{ij}] = Cov[U_{pj}, \varepsilon_{ij}] = 0$.

Multilevel models can be extended to data structures with more than two levels. Steenbergen and Bradford (2002) show that such an extension is straightforward since the lower levels may differ over units at higher levels in the hierarchical data structure. They further highlighted that interpretation of these models can be complex due to the rapid increase in possible interaction terms including the higher-level interactions. This method of analysis is appropriate as indicated by (Gill , 2003) that multilevel modeling is most suitable in cases where the observations are not independent. Hence, for this study, a two-level HLM was employed to carry out the desired adjustments.

3. Methods

3.1. Data

Data used for this study was derived from the 2014 Botswana Afrobarometer Round 6 survey. The fieldwork was carried out from 28th June, 2014 to 14th July, 2014. The survey is a comparative series that gathers information on public attitude on democracy, governance, civil society, economic condition and related issues. Afrobarometer surveys have been undertaken at periodic intervals since 1999 and its coverage has progressively increased over time (Afrobarometer , 2016).

Afrobarometer measured the social, political and economic atmosphere by conducting face to face interviews from a standard questionnaire with a randomly selected sample of 1200 people in Botswana. Probability sampling was used to generate a sample which is a representative cross-section of all voting age (18 years and older) Batswana. They used random selections for the sampling, and also applying probability proportional to size of populations (PPS) when sampling (Afrobarometer , 2016). This method seeks to give every adult an equal and known chance to be selected. It makes sure that people living in geographical areas with a dense population have a proportionally higher chance of being selected.

3.2. Variables

3.2.1. Independent Variables

The variable corruption is measured by the question: “In your opinion, over the past year, has the level of corruption in this country increased, decreased, or stayed the same?”. The scale of measurement is from 1=Increased a lot, to 5=Decreased a lot. The variable was transformed three groups; 1=Increased (comprised of “increased a lot” and “increased somewhat” responses), 2=Stayed the same and 3=Decreased (comprised of “decrease” and “decreased a lot” responses). This was done in order to arrange the variable in a manner that is simple to interpret.

Satisfaction with democracy was measured by the question “Overall, how satisfied are you with the democracy works in Botswana?” The likert scale is from 1=very satisfied to 4= Not at all satisfied. The variable was transformed into a dichotomous variable for simple interpretation of the results. That is, 1=Not satisfied (comprised of “not very satisfied” and “not at all satisfied” responses) and 2=Satisfied (is the response of “fairly satisfied” and “very satisfied” responses).

Living conditions was measured by “In general, how would you describe you present living condition?” The possible responses were; 1=very bad, 2=fairly bad, 3=neither good nor bad, 4=fairly good, 5=very good. The variable was recoded into three groups; 1=Bad (comprised of “very bad” and “fairly bad” responses), 2=neutral (is the response “neither good nor bad”) and 3=Good (comprised of “fairly good” and “very good responses”). This was done in order to arrange the variable in a manner that is simple to interpret.

The demographic characteristics of citizens were part of the independent variables for the study. These include age, education, employment status and gender. The age of the respondents was recoded into three groups, 18-35, 36-52 and 53 and above. The level of education of respondents had; “primary and lower”, “secondary” (junior and senior secondary) and “tertiary and higher”. Employment status was transformed into employed and not employed. The reason for this grouping was for simple and easy interpretation of the variable?

3.2.2. Dependent Variable

The question asked was “How much do you trust each of the following, or haven’t you heard enough about them to say?” The possible answers were in a likert scale; 1=Not at all, 2=Just a little, 3=somewhat and 4=A lot. A composite indicator of trust, which is equal to the average of the evaluations given for each institution, was created. The variable was transformed by

$$\alpha = \frac{100}{n-1}(x-1); \quad 0 \leq \alpha \leq 100 \quad (5)$$

where x is the likert scale values 1-4; n is the total number of the possible answers of the likert scale given; $n = 4$. Values close to 0 imply low levels of trust and values close to 100 imply high levels of trust.

3.3. Underlying Equations in HLM

In two level hierarchical models, separate level 1 models are developed for each level-2 unit. Gill (2003) indicated that these models explain the effect in the context of a single group and they are called within-unit models. They take the form of simple regressions developed for each individual.

3.3.1. Model 1

In this model, no explanatory variable is included in the model. The model is given by;

$$y_{ij} = \beta_0 + \varepsilon_{ij} \quad (6)$$

The main purpose of this model is to get some sense of what needs to be explained. The intercept only model contains only one fixed term which is the mean and then variance at each level.

3.3.2. Model 2

In this model, only the individual level predictors are fitted. It is given by:

$$y_{ij} = \beta_0 + \sum_{p=1}^P \beta_{p0} Z_{pij} + U_{0j} + \varepsilon_{ij} \quad (7)$$

The objective of fitting model 2 is to assess how well the individual-level predictors account for the variation in institutional trust levels across the level-2 units. This

Table 1. Hierarchical Structure of the Data

Level	Hierarchical level	Independent Variable
2	EA	<i>EA- Location:</i> Rural, Urban, Semi-urban <i>EA-SVC; presence of service (Yes=1, No=0):</i> Electricity grid that most houses could access, Piped water system that most houses could access, Sewage system that mosthouses could access, Cell phone service <i>EA-FAC; services present in the primary sampling unit/EA or in easy walking distance (Yes=1, No=0)</i> Post office, School, Police Station, Health Clinic, Market Stalls (selling groceries and/or clothing), Bank, Is there any kind of paid transport, such as a bus, taxi, moped, or other form available on a daily basis? <i>EA-SEC In the PSU / EA, did you (or any of your colleagues) see: (Yes=1, No=0)</i> Any policemen or police vehicles? Any soldiers or army vehicles? Any roadblocks set up by police or army?, Any customs checkpoints Any roadblocks or booms set up by private security providers or by the local community?
1	Individual	Age, Gender, Education, Employment status, Living condition, Corruption index, Satisfaction with Democracy

model is estimated without any EA-level predictors. It gives the individual factors that explain trust in institutions.

3.3.3. Model 3

In this model, only the EA level predictors are included in the model. The model is given by:

$$y_{ij} = \beta_0 + \sum_{q=1}^Q \beta_{0q} Z_{qj} + U_{0j} + \varepsilon_{ij} \tag{8}$$

The objective of fitting model 3 is to assess how well the EA-level predictors account for the variation in institutional trust levels. This model is estimated without any individual-level predictors. Hence this model will give the EA-level factors that explain trust in institutions.

3.3.4. Model 4

In the fourth model, both EA level and individual level predictors are fitted in the model. The model is given by equation (1) as:

$$y_{ij} = \beta_{0j} + \sum_{p=1}^P \beta_{pj} X_{pij} + \varepsilon_{ij} \tag{9}$$

The main purpose of this model is to get some sense of what needs to be explained. The intercept only model contains just one fixed term which is the mean and then a variance at each level.

For the case of a Q level-2 predictor, Z_{qj} ($q = 1, \dots, Q$) that were modelled are:

$$\beta_{0j} = \beta_0 + \sum_{q=1}^Q \beta_{0q} Z_{qj} + U_{0j} \tag{10}$$

$$\beta_{pj} = \beta_{p0} + \sum_{q=1}^Q \beta_{pq} Z_{qj} + U_{pj} \tag{11}$$

see equations (2) and (3) as well as model assumptions.

The combined model is given by equation (4) as:

$$y_{ij} = \beta_0 + \sum_{p=1}^P \beta_{p0} X_{pij} + \sum_{q=1}^Q \beta_{0q} Z_{qj} + \sum_{q=1}^Q \sum_{p=1}^P \beta_{pq} Z_{qj} X_{pij} + \sum_{p=1}^P U_{pj} X_{pij} + U_{0j} + \varepsilon_{ij} \tag{12}$$

This combined model incorporates the individual level and EA level predictors, a cross level terms as well as the composite error. This is the mixed model since it incorporates both fixed and random effects.

The objective of the combined model is to assess how well the individual level and EA-level predictors account for the variation in trust levels across the EA units. This model gives the both the individual level and EA- level factors that explains trust in institutions.

3.3.5. Model 5

In the fifth model, the hierarchical nature of the data is ignored. The model is given by;

$$y_i = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p + \varepsilon_i \quad (i = 1, \dots, n) \tag{13}$$

where; Y_i is trust variable measured for the i th individual; β_0 = intercept; β_1 is measurement of the change in y with respect to X_1 holding other factors fixed; X = value of the individual predictor; ε_i is the measurement error in y_i .

The purpose of fitting this model is to find the importance of the grouping. This will enable to make conclusions about the best model for the data.

3.4. Intra-class correlation

The inter-class correlation (ICC) is the ratio of the between-cluster variance to the total variance which tells the proportion of the total variance in Y that is accounted for by the clustering. In a simple 2-level random intercept model, ICC gives the correlation among observations within the same second level cluster (Hox, 2010). The ICC also helps determine whether or not a linear mixed model is even necessary. If the correlation is zero, then that means the observations within clusters are no more similar than observations from different clusters. It can be theoretically meaningful to understand how much of the overall variation in the response is

explained simply by clustering. ICC is defined as $\rho = \sigma_{u_0}^2 / (\sigma_{u_0}^2 + \sigma_{e_0}^2)$ where $\sigma_{u_0}^2$ and $\sigma_{e_0}^2$ are respectively the EA and individual level variances. The intercept only model does not explain any variance in y . The ICC can also be interpreted as the expected correlation between two units that are in the same group. In this study ICC was calculated to explain the total variance in y .

3.5. Estimation and Testing of Parameters

The most powerful approach to estimating the fixed effects and variance components is maximum likelihood estimation (MLE). MLE has certain desirable statistical properties; it is consistent and asymptotically efficient when the normality assumption holds (Goldstein , 2003). The maximum likelihood estimation requires the specification of a density for the level-1 and level-2 disturbances (Steenbergen and Bradford , 2002).

The testing procedure is as follows: the hypothesis being tested is $H_0 : \beta = 0$ Vs $H_1 : \beta \neq 0$, using the test statistic, $Z = \hat{\beta} / se(\hat{\beta})$ where $\hat{\beta}$ is the estimate of the regression coefficient; $se(\hat{\beta})$ is the standard error of the regression coefficient. The decision rule is reject H_0 if p-value $< \alpha$ at $\alpha\%$ level of significance. A p-value is established for the null hypothesis that the population value of the parameter is zero. This indicates how well the model fits the data. Models with a lower deviance fit better as compared to models with higher deviance (Hox , 2010). For this study the procedure of MLE was used to estimate parameters of multilevel regression model, the coefficients and the variance components.

3.6. Deviance statistics for comparing models

In hierarchical linear models, the deviance test is commonly used for multi-parameter tests and for tests about the random effects of the model. Hox (2010) states that this approach is based on estimating two models and it is defined as: Deviance = $2 * \ln L$, where $L = likelihood$. The deviance can be regarded as a measure of lack of fit between model and data. When the deviance is larger the deviance it means there is a poor the fit to the data (Snijders and Bosker , 1999). A small deviance implies a good fit. The deviance has an exact chi-squared distribution (Hox , 2010). Deviance was used to select the best model in this study.

3.7. Data Analysis

R software was used to analyse the data in this study. The packages in R which were used include; lme4 and lmerTest. The lme4 package was installed to fit the hierarchical models whereas the lmerTest package was installed in order to test the significance of the coefficients estimated.

Table 2. Descriptive statistics for demographic and independent variables

Variables	Categories	Percentage (%)	Frequency (<i>n</i> = 1200)
AGE	18-35	52.6	631
	36-52	26.3	316
	53+	21.1	253
Education	Primary and lower	34.3	411
	Secondary	53.0	636
	Tertiary and higher	12.8	153
Employment Status	Not employed	68.6	822
	Employed	31.4	376
Gender	Male	50.0	600
	Female	50.0	600
Location	Urban	20.7	248
	Rural	36.7	440
	Semi-Urban	42.7	512
Living Conditions	Bad	56.0	671
	Neutral	23.4	280
	Good	20.6	247
Level of Corruption	Increased	50.8	609
	Stayed the same	14.6	175
	Decreased	23.4	281
Satisfaction with Democracy	Not Satisfied	28.2	324
	Satisfied	71.8	825

4. Results

4.1. Overview of independent variables

Table 2 gives a description of the sample. The study included a total of 1200 Batswana of voting age (18 years and above). The mean age was 39 years. More than half of surveyed respondents were between 18 and 35 years of age. Hence this implies the sample was considerably young, a common occurrence since Botswana’s general population comprises of more young people. A relatively small proportion (21.1%) of the respondents were aged 35 years and above. Secondary education was reported as the highest education level attained by most respondents (53%) and only 12.8% of the respondents had tertiary and higher education level.

The level of unemployment was fairly high, with 68.6% of the respondents reporting not being employed and only 31.4% of the respondents having formal employment. As for gender, there was an equal number of males and females in the sample. One third of the respondents in the study resided in rural areas while slightly less than one third (20.7%) resided in urban areas. About 42.7% of the respondents resided in semi-urban locations. Of the 1200 respondents in the sample, about 56% of them described their present living conditions as bad while only 20.6% of the respondents described their living conditions as

good. Half (50.8%) of the respondents perceived that the level of corruption has increased over the years and only 14.6% of the respondents perceived that the level of corruption has stayed the same. A significant number of the respondents were satisfied with the functioning of democracy in Botswana. The rest of the respondents expressed not being satisfied with the functioning of democracy in the country.

4.2. Overview of Institutional Trust

Descriptive accounts of the dependent variable suggested the levels of institutional trust were high. This is evident from the histogram of trust in figure 1.

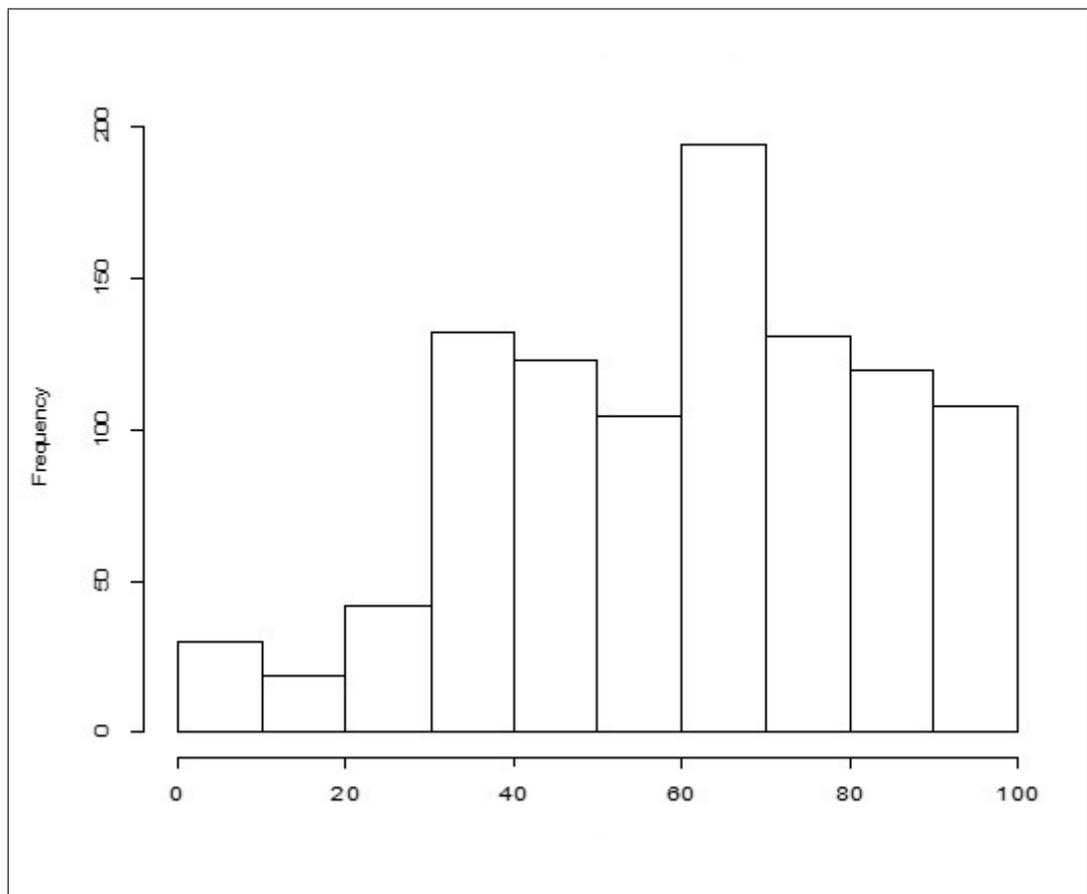


Fig. 1: Histogram of trust in public institutions

The histogram displays that most Batswana had high levels of trust in institutions. This means that most respondents indicated that they trust institutions just a

lot or somewhat. Figure 1 shows that institutional trust levels between 60 and 70 were more frequent among respondents in the study. The mean of trust in institutions was 60.3. Figure 1 also shows that there does not appear to be low levels of trust in public institutions in Botswana, which are contrary to the study expectations. Worth mentioning is that the results are based on only one round of the Afrobarometer survey therefore when comparing different rounds declining levels of trust in institutions would be evident. Moreover this conclusion is not complete, as the EAs included in the analysis are not a representation for Botswana as a whole.

Figure 2 shows different association of trust in institutions and some demographic variables. The results show that older respondents have higher level of trust in institutions as compared to younger respondents. There is a positive relationship between age and trust. That is, as age increase so does trust.

This may lend support to Christensen and Læg Reid (2005) argument that older people have later-life experiences and tend to have more trust in institutions. The figure indicates that females appear to have slightly more trust in institutions as compared to males. This is in line with various cultural theories that suggest that trust appears randomly amongst men and women (Landmark, 2016).

From the box-plot of trust by education it is evident that respondents with primary and lower level of education have higher trust in institutions as compared to those with higher level of education. Hence education is negatively related to trust. That is, trust decreases as the level of education increases. This corresponds to the claim made by Haagensen (2016) that people with an education have developed a more critical mind-set. Therefore, they have more knowledge about what they should expect from government and from a democracy in addition to their rights.

The plot of trust by employment shows that on average, trust in institutions is slightly higher for respondents who are unemployed. Sulemana and Issifu (2015) also found out that the unemployed express high levels of trust in institutions. It is evident from the box-plot of trust by location that people who reside in rural areas have a higher median of trust as compared to those who reside in urban and semi-urban areas. Hence rural dwellers trust institutions more than urban and semi-urban dwellers. This was also the case in the study by Cho and Kirwin (2007).

4.3. Relationship of Trust and Demographic variables

In Tables 3 and 4 we present the five multilevel models of institutional trust. In Table 3, Model 1 is the null model or the intercept-only model. It estimates the intercept at 60.267, which is the average of institutional trust across all EA's and individuals on a scale of 0-100.

The variance of the individual level residuals is estimated at 521.88. The variance component of the EA-level residuals is estimated as 15.6. The inter-class correla-

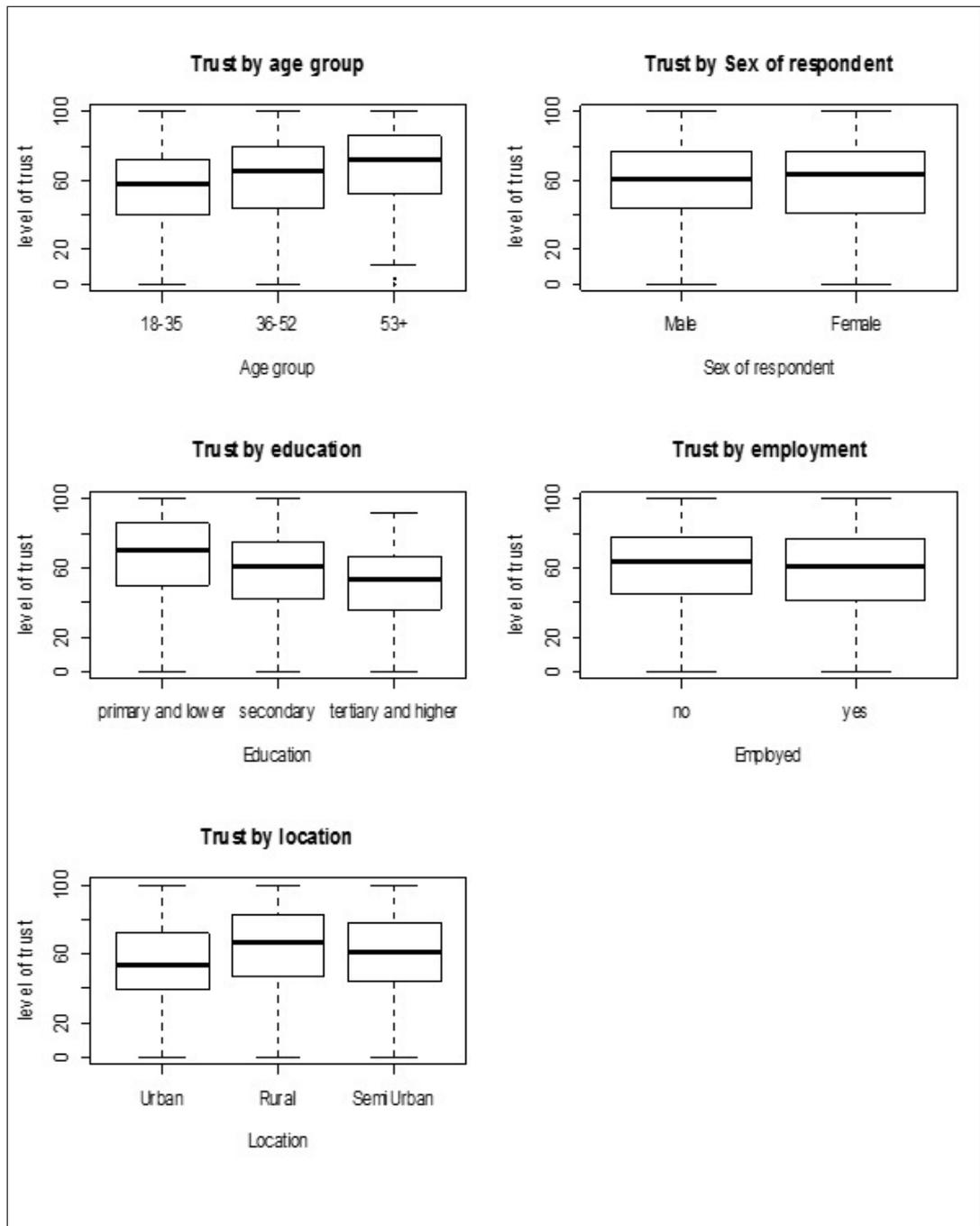


Fig. 2: Box-plots of trust by demographic variables

tion is 0.029. Thus 2.9% of the variance in trust levels is at the EA-level, which is small. That is, ICC suggests that individuals within an EA contribute more variability in institutional trust than when EA grouping are considered alone. The deviance of this model was found to be 9147.128 which is very large.

The second model contains only the individual level variables. The individual unit variance in the model is estimated to be 424.015. The estimated between EA effect variance is only 10.51 with an estimated inter-class correlation of 0.024. Despite the low proportion of explained variance, the fixed effects variables were essential in this model as evidenced by the change of 1262.058 in the model deviance (difference between model 1 and model 2 deviances).

Model 2 in Table 3 shows that females had a negative coefficient, which implies that females had low levels of trust in institutions. It was found out that trust increases with age and a person's perceived living conditions. Respondents who perceived their living condition as neither good nor bad also expressed low levels of trust in institutions.

The results show that the higher the level of education one has, the lower the trust in institutions. In Table 3, we find that in model 2, respondents who were employed had low levels of trust in institutions. This is evident from the negative coefficient under employed respondents in regards to the employment status. The model displayed a few individual variables that have significant effect on the institutional trust. The findings show that gender is not a statistically significant variable in explaining trust. Model 2 also shows that there is a highly statistically significant (p -value=0.00342) positive relationship between trust and satisfaction with democracy. Thus the hypothesis that citizens who are satisfied with the democracy are more likely to trust institutions than citizens who are dissatisfied was supported. Education had a negative significant and strong effect on trust in institutions in Botswana. Employment status is not a statistically significant variable in explaining trust.

In model 3, only EA-level variables were used to estimate the influence of EA variables on the levels of institutional trust. The results show that institutional trust increases when one resides in either rural or semi-urban areas. The presence of services in an EA (such as; electricity grid, piped water, sewage system and cell-phone services that most houses could access) had a negative coefficient. This implies that respondents who stayed in EA with services expressed low levels of trust in institutions. The presence of service in a walking distance variable has a significant effect on institutional trust.

In Table 4, Model 4 shows that females, the employed, respondents with higher levels of education, respondents in EAs with present services being in a walking distance and those residing in semi-urban areas expressed low levels of trust in institutions. It was found out that trust increases with age and with one's perceived living conditions. This is evident from the model that the level of institu-

tional trust was high when the respondent perceived corruption to have decreased as compared to when corruption was perceived to have stayed the same. Thus the hypotheses that lower the perception of corruption, the more individuals are likely to trust institutions, is supported.

The results also show that gender, employment status, location, living conditions and age are not statistically significant variables in explaining trust. The variable EA(FAC) was found to not be a statistically significant variable in explaining trust as model 3 proves.

Similar to model 2 results, model 4 shows that there is a significant (p -value=0.0487) positive relationship between trust and satisfaction with democracy. The large coefficient indicated that satisfaction with democracy was very important in terms of explaining institutional trust. Model 4 also shows that education has a negative significant and strong effect on trust in public institutions in Botswana.

The results from model 4 show that one's perception on corruption had a significant influence on trust in public institutions. The estimated individual estimated variance was 417.378. The EA-level variables explained trust in institutions was approximately 44.8%. Thus the intra-class correlation was 1.06%. The deviance of model 4 was 7489.744 which was the lowest among the fitted model deviances.

Hence presence of services in an EA within a walking distance variable EA(FAC) is a statistically significant (p -value=0.02842) variable in explaining trust. The explained individual level proportion variance component was estimated as 504.647 and the EA-level variables explained trust in institutions was 10.5. The ICC of this model was 0.0018 and the model had a deviance of 8629.558 which was the second highest among all the fitted models.

Model 5 in Table 4, which ignores grouping of the data, show similar results to model 2 and model 4. That is, satisfaction with democracy, corruption and education had a strong effect on public institutional trust. The estimated individual variance was 421.481 and the deviance of the model was 7504.998.

When comparing the deviances of the models in order to select the best one, model 4 was selected since it had the minimum deviance of all the models fitted. Hence the combined model of both individual level and EA level variables was the best model in explaining institutional trust in Botswana. The study proceeded to check whether model 4 is a best fit to the data.

4.4. Overview of Results

Overall, the the results of the analysis illustrates that most of the hypotheses are supported. Only a few of the hypotheses were not significant in the chosen model (model 4) which best explains trust in institutions in Botswana. The hypotheses were supported based on the p -value being statistically significant. For example

Table 3. Multilevel models

Variables		Model 1	Model 2	Model 3
Constant		60.267(0.803)	53.483 ^a (2.449)	70.270 ^a (4.858)
Gender	Female		-0.099(1.398)	
Age	36-52		0.110(1.799)	
	53+		-0.376(2.486)	
Living condition	Neutral		-0.878(1.748)	
	Good		0.277(1.859)	
Satisfaction with Democracy	Satisfied		14.052 ^a (1.550)	
Corruption	Stayed the same		4.268 ^c (2.012)	
	Decreased		10.735 ^a (1.684)	
Employment Status	Employed		-1.519(1.537)	
Education	Secondary		-8.254 ^a (2.050)	
	Tertiary and higher		-11.464 ^a (2.740)	
Location	Rural			3.330(2.742)
	Semi Urban			1.579(2.180)
EA Numb				-0.005 ^b (0.002)
EA(SVC)				-0.026(0.051)
EA(FAC)				-0.087 ^c (0.039)
EA(SEC)				-0.006(0.056)
Variance component	EA	15.6	10.51	0.9411
	Residual	521.889	424.015	504.647
ICC		0.029	0.024	0.0018
Deviance		9147.128	7885.070	8629.558

^a $p < 0.01$, ^b $p < 0.05$ ^c $p < 0.1$

taking hypothesis 5, that is, the higher the level of education an individual has, the lower the individual's trust in institutions, the p-value is 0.015. Hence this provides evidence that the hypothesis is supported.

The hypothesis that females are more likely to trust public institutions more than males, was supported (p-value=0.0035). Hence it is concluded that females trust public institutions more than males. The hypothesis that having a good living condition and being employed may be positively related to trust as success and well-being can lead to a more trusting attitude, was not supported (p-value=0.867). Hence it is concluded that living condition and employment were not statistically significant variables that contribute in explaining trust.

5. Discussion

The study has shown that the claim that citizens who are satisfied with democracy are more likely to trust public institutions than citizens who are dissatisfied, holds sway. This hypothesis was based on the performance-based theory which states

Table 4. Multilevel models

Variables		Model 4	Model 5
Constant		64.203 ^a (5.357)	64.409 ^a (5.245)
Gender	Female	-0.081(1.420)	-0.703(1.426)
Age	36-52	-0.693(1.817)	-0.715(1.812)
	53+	-0.786(2.489)	-0.752(2.484)
Living condition	Neutral	0.607(1.784)	0.537(1.784)
	Good	0.945(1.873)	0.936(1.872)
Satisfaction with Democracy	Satisfied	12.974 ^a (1.576)	12.942 ^a (1.575)
Corruption	Stayed the same	5.333 ^b (2.064)	5.408 ^b (2.062)
	Decreased	10.446 ^a (1.703)	10.448 ^a (1.704)
Employment Status	Employed	-0.963(1.601)	-0.919(1.601)
Education	Secondary	-7.549 ^a (2.116)	-7.572 ^a (2.115)
	Tertiary and higher	-9.252 ^a (2.835)	-0.919 ^b (2.830)
Location	Rural	-0.618(2.796)	-0.701(2.310)
	Semi Urban	-0.561(2.223)	-0.612(2.162)
EA Numb		-0.004 ^b (0.002)	-0.004 ^b (0.002)
EA(SVC)		-0.318(0.049)	-0.322(0.050)
EA(FAC)		-0.064(0.039)	-0.065(0.038)
EA(SEC)		-0.047(0.055)	-0.046(0.054)
Variance component	EA	4.486	
	Residual	417.378	421.481
ICC		0.0106	
Deviance		7489.744	7504.998

^a $p < 0.01$, ^b $p < 0.05$ ^c $p < 0.1$

that the success of a country and good performance by the government would lead to more trust from citizen (Christensen and Lægveid , 2005). This study shows that citizens' satisfaction with democracy has an effect on institutional trust. That is, how well democracy is functioning as perceived by the respondent plays a major role in how they trust institutions. This is consistent with Hutchison and Johnson (2011) study, which found out that the level of democracy influences citizens' institutional trust in Africa. A study by Seabo and Molefe (2016) also confirmed this result since they found out that satisfaction with democracy is an important factor in explaining trust in institutions in Botswana.

These findings confirm observations by others (Kuenzi , 2008; Hutchison and Johnson , 2011; Slomczynski and Janicka , 2009; Van der Meer and Dekker , 2011) that corruption has a negative effect on the levels of trust in public institutions. This means that respondents who express high levels of trust also express low levels of perceived corruption and those respondents who believe that corruption has increased expressed less trust in institutions. Thus, results appear to support Landmark (2016) argument that theories claiming that unaccepted and unlawful behaviour in government leads to less trust in public institutions were found to be correct in the study conducted. Armah-Atttoh, Gyimah-Boadi and Chikwanha (2007) also confirmed the results since they found out that

corruption had corrosive effect on popular trust and was the strongest factor in explaining institutional trust in Africa.

Consistent with [Haagensen \(2016\)](#) findings, the study showed that trust increases with age. That is, younger people express less trust as compared to older people. The reason may be that older people have gained experiences which enable them to trust institutions. According to the personality theory ([Delhey and Newton , 2003](#)) trust is something that one takes with them from their up-bringing and early socialization and therefore it is bound to change when one gets older. This is in support of [Landmark \(2016\)](#) argument that people seem to be more trusting as they grow older. The findings showed that age had no significant influence on levels of trust in institution. This finding arguably contradicts [Kuenzi \(2008\)](#) findings that showed that age had a significant effect on trust in institutions.

Evidence from this study and others ([Seabo and Molefe , 2016](#); [Lavallee, Razafindrakoto and Roubaud , 2008](#)) lend support to the finding that education has an effect on trust in institutions. The main reason is that educated people know quite a lot about political issues. This enables them to use their cognitive ability to make sense of how institutions are organized and function. Hence they tend to trust institutions less since they have knowledge on what to expect from those various institutions. [Landmark \(2016\)](#) argued that the experiences one gets from education had a negative relationship with trust. Hence it is natural to conclude that what one learns in school has a negative effect as opposed to what one learns and experiences outside school. Since educated people are questioning and do not just accept things, they have high expectations ([Mishler and Rose , 2001](#)). The results showed that the higher the level of education people have, the less they trust institutions. This correspond to research conducted in developed countries ([Cho and Kirwin , 2007](#); [Zhao and Hu , 2015](#)). For example [Yang and Tang \(2010\)](#) indicated that educated people are more independent and critical of what they hear and learn from the government hence they trust institutions less.

The study found out that people in rural areas had high levels of trust than as compared to people in other locations. [Seabo and Molefe \(2016\)](#) state that the president's walkabouts in rural areas and sitting around the fire with the elderly has ingratiated him to the rural people. Hence this may be one of the reasons why rural people expressed more trust in institutions. Consistent with finding of [Haagensen \(2016\)](#) study which suggested that people may trust certain political and administrative leaders because of their achievements and personal charisma but not the institutional features of the political administration system. This can be used to explain high levels among rural people. For example rural people may trust the ruling party because of the achievements and charisma of the president but not the party itself. Thus the high levels of trust in rural area. [Cho and Kirwin \(2007\)](#) found out that location had a significant effect on trust. This was not the case in the findings of this study since location had no significant effect on institutional trust.

The study revealed that the hypotheses that having good living conditions and being employed may be positively related to trust in institutions was not supported. The results showed that the unemployed had more trust in institutions as compared to the employed. The theory of success and well-being was the basis for trust in regards to living condition. Haagensen (2016) indicated that people with better living conditions trust institutions more and this findings are contradicting with this study results. The results showed that people who expressed their living conditions as bad had more trust in institutions. The reason may be that people with bad living conditions in Botswana are given financial assistance through poverty eradication programs such as Ipelegeng and Livestock Management Infrastructure Development (LMID). Hence they tend to trust institutions more than those with good living conditions. Gender was found not to have any significant effect on institutional trust in this study. Landmark (2016) also found out that gender had no significant effect on institutional trust. This supports the cultural theory that trust appear randomly amongst men and women.

6. Conclusion

6.1. Major Findings

This paper aimed to determine the individual and EA-level factors that explain trust in public institutions in Botswana. It found out that institutional trust increase with age, perceptions of satisfaction with democracy, one's perceived living conditions and perception of level of corruption. Trust was found to decrease with education. In general, the factors which were found to have an effect on trust were education, satisfaction with democracy and corruption. The important factor for explaining trust was perceptions of satisfaction with democracy. This paper overall finding is that citizens are not satisfied with public institutions.

6.2. Recommendations

Overall, this paper has demonstrated that public institutional trust is affected by lived poverty, perceptions of government performance in creating jobs, perceived satisfaction with democracy and perceived corruption. Future research should focus on how established democracies should model public institutions into organizations imbued with integrity. Since trust is important for democratic development, future study on public institutional trust should explore a time series analysis of levels of trust and the factors that affect institutional trust. A trend analysis may reveal whether there are variations overtime in the determinants of institutional trust and the implications such variations may hold for the future of Botswana's democracy. Even more important, policy based research is imperative to inform stakeholders in the policy making process and more in particular, the nexus between trust, government performance and lived poverty.

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