Does corruption cause tax evasion? Evidence from an emerging economy

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Abstract
Purpose – The purpose of this study is to examine the corruption-tax evasion nexus and to establish the strength of relationships among corrupting activities.

Design/methodology/approach – The research applied structural equation modelling on selected data from the World Economic Forum Executive Opinion Survey on corruption activities and data on tax evasion triggering factors from the World Development Indicators and the Bank of Ghana to test two hypotheses.

Findings – The test of the first hypothesis suggests that corrupting activities significantly cause tax-evading activities in Ghana; hence, there is at least one corrupting activity triggering tax evasion. Testing the second hypothesis revealed that corruption in Ghana exhibits all of the five dimensions of corruption that were examined. Hence, there is correlation among the corrupting activities.

Research limitations/implications – The research is limited by the availability of data; hence, only data for selected variables for the period were examined.

Practical implications – The results are indicative that most emerging economies tend to have more than one type of dominating corruption dimension, which are tax-evading triggers.

Originality/value – The study extends the literature by examining the various dimensions of corruption, analysing the strength of their relationships and how they impact tax evasion in an emerging economy. By identifying and employing specific corrupting activities, there is a better understanding and appreciation of the corruption-tax evasion nexus in the revenue generation process. This may aid emerging economies in the drafting of tax evasion and corruption reduction policies/programmes to ensure the achievement of sustainable development goals.

Keywords Ghana, Economy, Tax evasion, Corruption, Structural, Modelling, Emerging, Sustainable development

Paper type Research paper

1. Introduction
The discussion of the relevance of tax revenues to emerging economies is pivotal to the realisation of their dreams of achieving accelerated economic progress (Kaldor, 1963). Consequently, Kaldor asked, “Will under-developed countries learn to tax?” Generating adequate tax revenues is thus critical to the realisation of sustainable development goals (SDGs).

In sub-Saharan Africa, although tax revenues account for the bulk of their public revenues, the majority of African countries do not generate enough to cover actual government expenditure. In 2016, Ghana’s tax revenue was 76.27 per cent of government’s
total revenue. Tax revenue/GDP ratio was 15.2 per cent, which was about half of the total government expenditure/GDP ratio of 30.3 per cent for the same period (Bank of Ghana, 2016). Moreover, the discovery of oil in Ghana in 2007, which raised many hopes, has not yet had a significant impact on domestic revenues[1]. Therefore, there is the urgent need in many emerging economies to relook at their tax revenue generation strategies, revenue leakage reduction strategies and other policies if their SDGs would ever be achieved.

Currently, there is an awareness in domestic revenue mobilisation in many emerging economies (AfDB, 2010; IMF, 2011; Drummond et al., 2012), which was foremost on the list of action areas in the outcome document that emerged from the third Financing for Development conference held in Addis Ababa in July 2015 (UN, 2015). However, tax evasion is a major concern that seems to undermine these efforts and initiatives. Benk et al. (2015) defined tax evasion as, “an illegal act or practice of failing to pay taxes which are owed to the state”. Alleyne and Terry (2017) noted that tax evasion is a major challenge for governments the world over, with innovative and ever-changing schemes, which makes it increasingly difficult to regulate.

In 2017, the Global Financial Integrity (GFI)[2] estimated that every year, about $1tn flows illegally out of developing and emerging economies because of crime, corruption and tax evasion, which is more than what these countries receive via both foreign direct investment (FDI) and foreign aid.

Consequently, this has left many emerging economies in fiscal deficits and is the main reason why they borrow money that puts further pressure on their already fragile developing economies (Alleyne and Terry, 2017).

Hence, addressing tax evasion is vital to emerging economies if public services are to be well preserved and economic goals are to be realised. Extant literature has identified several factors that trigger tax evasion, such as high tax burden, unemployment, urbanisation, trade openness and inflation (Vousinas, 2017; Tabandeh et al., 2012).

From the GFI 2017 report, the other issue of equal debilitating importance is corruption. Corruption is said to be legally wrong, morally wrong and economically indecent (Ertimi and Saeh, 2013). Corruption has been around since the dawn of civilisation, and the commencement of commerce and its negative impact on economies cannot be over-emphasised. Unarguably, the dimension of corrupting activities to be included in an overall classification of corruption is quite large.

Anderson (2015) used five dimensions of corruption, i.e. diversion of public funds, ethical behaviour of firms, favouritism in decisions by government officials, organised crime and irregular payments and bribes, in his study on corrupting activities and economic development.

Owing to the above phenomena of tax evasion and corrupting activities, emerging economies are confronted with limited public revenues. This has forced some of them to explore novel tax evasion reduction strategies without decisively dealing with the corruption issue, which seems to be a trigger of tax evading activities in the revenue generation process.

Most prior literature has examined tax evasion as a crime or corrupting activity (Rosenmerkel, 2001; Saracoglu, 2008; Bergman, 2009; Benk et al., 2015); however, the impact of corruption on taxation and hence economic development was not considered in the historical development of economic theories because according to Volejníková (2009), corruption was not perceived as an economic problem.

Although some researchers studying corruption are of the view that corruption can be an efficiency-enhancing force in tax revenue collection by motivating tax officers to work harder and dis-incentivising tax evasion, other researchers have posited that the presence of corruption reduces tax revenues in the long run (Fjeldstad and Tungodden, 2001).
Furthermore, literature in various fields has examined the perception of individuals towards crimes including tax evasion (Cullen et al., 1982; Rosenmerkel, 2001), without isolating tax evasion and examining it from the perspective of the tax revenue agencies.

This exploratory research will examine whether corrupting activities trigger tax evasion and to establish the nature of relationships among corrupting activities. From the foregoing discussion, we hypothesized that the following:

**H1.** Corrupting activities do not cause tax-evading activities.

**H2.** There is no correlation among corrupting activities.

In testing the hypotheses, the paper adopts structural equation modelling (SEM) empirical strategy. SEM techniques can be considered as the second generation of multivariate analysis (Fornell, 1987). In contrast to first-generation techniques, such as factor analysis, discriminant analysis or multiple regression, SEM allows researchers to simultaneously consider relationships among multiple exogenous and endogenous variables.

The justification for the use of SEM over the other traditional research strategies has been extensively chronicled in methodological literature (Hair et al., 2016). As a result of its specific characteristics, it provides a useful tool for research because of the high degree of flexibility it offers for the interplay between theory and data (Hair et al., 2016), which seems urgently necessary given the current state of research, particularly with regard to developing a more holistic map of causes and effects (Luft and Shields, 2014). It also provides an all-inclusive approach instead of relying on familiar methods, where regression analysis has been the prevailing method so far (Oler et al., 2010). Furthermore, SEM is not constrained by identification and other technical aspects. It is possible to test complex models with many different constructs and indicators (Rigdon, 2014) for archival data, with the possibility of revising and refining construct measurements, which more often does not exist. Finally, it is most appropriate for small observations and where the level of statistical power is paramount (Reinartz et al., 2009).

This study extends literature by examining the impact of corrupting activities on tax evasion and analysing the relationships among corrupting activities.

The rest of the paper is organised as follows. In Section 2, a brief review of related literature is presented. In Section 3, the data sources, empirical strategy and estimation techniques are presented. In Section 4, the empirical findings of the study are discussed. Finally, in Section 5, the conclusion is provided.

### 2. Literature review

A brief discussion of literature of tax evasion and corruption is provided below.

#### 2.1 Corruption-tax evasion nexus

Primarily, economists within the scope of both microeconomic individual economic behaviour and macroeconomic public finance have extensively studied the subject of tax evasion (Ritsatos, 2014). This is because, according to Benk et al. (2015), tax evasion is one phenomenon that causes loss of revenue and reduces the effectiveness of the tax system.

Undoubtedly, the theoretical literature on tax evasion was established on the revolutionary research of Allingham and Sandmo (1972), which was also modelled on Becker’s (1968) economic approach to crime. This study investigated an individual’s evasion decision as a choice under uncertainty and the subsequent effect of the tax rate, taxpayer’s income and enforcement parameters on the level of tax evasion under certain assumptions.
The inability of Allingham and Sandmo’s research to address issues of variations in the tax rate was a major weakness in their paper. However, Yitzhaki (1974) addressed some of the weaknesses in the Allingham and Sandmo’s model by assuming that the penalty rate is levied on the evaded tax rather than the unreported income. Though Yitzhaki’s model addressed the ambiguity in respect of the effects of the tax rate on the extent of tax evasion, its conclusion is inconsistent with the common view that a higher tax rate promotes tax evasion.

Thereafter, Pencavel (1979) and Sandmo (1981) extended the Allingham and Sandmo’s tax evasion model by including labour supply decision in the tax evasion decision to make income endogenous. Andreoni et al. (1998) also made an extension by looking at the interplay between taxpayers and tax authority by making the probability of audit endogenous and concluding that taxpayers report more than a single piece of information.

According to Ertimi and Saeh (2013), corruption is legally wrong, morally wrong and economically indecent. However, the impact of corruption on taxation and hence economic development was not considered in the historical development of economic theories because according to Volejníková (2009) it was not perceived as an economic problem. This issue was examined in the 1960s when Leff (1964) established the corruption-economic development relationship.

Consequently, literature in the various fields of psychology, sociology and criminology has examined the perception of individuals towards crimes and the enormity they attribute to crimes including tax evasion (Song and Yarbrough, 1978; Cullen et al., 1982; Rosenmerkel, 2001).

Song and Yarbrough (1978) compared the gravity of tax evasion crime with offences such as kidnapping, drunken driving, hit and run, smuggling, arson, embezzlement, bribery and bicycle theft. They reported that tax evasion is perceived as a low-ranking crime by 287 individuals surveyed. Cullen et al. (1982) found that crimes such as the production of counterfeit medicine and selling contaminated food are perceived to be more serious than the crime of tax evasion.

Wentworth and Rickel (1985) and Jackson and Milliron (1986) stated that tax evasion is a white-collar crime[3]. This includes embezzlement, false advertising, bribery, unfair competition, tax evasion and unfair labour. In agreement, Bergman (2009) opined that tax evasion is a white-collar crime because the victim in this case is the state.

Similarly, Rosenmerkel (2001) stated that individuals perceive tax evasion as the least level of seriousness of economic and other crimes.

Comparing crimes of homicide, sexual assault, robbery, arson, corruption, theft, property crime, blackmailing and tax evasion with regard to their levels of perception in society, Herzog and Rattner (2003) identified tax evasion as having the lowest level of seriousness while Burton et al. (2005) concluded that people do not perceive tax evasion to be a serious crime.

In Turkey, Saracoglu (2008) concluded among 494 respondents that tax evasion is a minor crime than offences such as arson, embezzlement and bribery.

More recently, Benk et al. (2015) compared tax evasion with five economic crimes such as accounting fraud, violation of minimum wage laws, insider trading, welfare fraud and violation of child labour laws. They reported that tax evasion is perceived as a less heinous crime. However, the study reported that tax evasion causes loss of tax revenues to the state.

From the above discussions, individuals perceive tax evasion as a crime albeit comparatively less heinous. In whichever way it is perceived, tax evasion leads to financial bleeding, which denies emerging economies of the much required tax revenues to achieve SDGs (Benk et al., 2015).
Moreover, most of the respondents, cited in the aforementioned studies, perceive tax evasion as a lesser crime based on their perceptions as taxpayers or individuals. However, from the government or taxing authorities’ perspective, tax evasion would be perceived as a gargantuan economic crime that is capable of crippling an economy.

The paper extends the literature by examining the impact of corruption in triggering tax-evading activities from the perspective of the revenue agencies in the revenue generation process. Furthermore, we analyse various dimensions of corruption and how they impact tax evasion in an emerging economy. Finally, this study uses SEM to examine the impact of corrupting activities on tax-evading activities methodologically as well as the strength of relationships among corrupting activities.

2.2 Factors promoting tax evasion
In this section, we discuss the factors which are most influential in the Ghanaian economy for promoting tax evasion.

Tax burden is one major cause of tax evasion. Savasan (2003) and Dell’Anno (2007) reported that an increase in tax burden would trigger tax evasion. In the European economies, Bayer (2006) found that higher tax rates promoted tax evasion. Similarly, Cebula and Saadatmand (2005) showed that higher tax rates on income led to a corresponding increase in tax evasion for the US economy.

Caballe and Panade (2004) postulated that inflation rate and tax evasion are positively related.

Trade openness is another factor that promotes tax evasion (Tabandeh et al., 2012). When trade regulations become complicated, the size of trade increases. Consequently, some traders tend to legally avoid doing trade. This then escalates smuggling and hence induces tax evasion as difficult laws and more restrictions are imposed on trade.

Unemployment is also a factor that promotes tax evasion. Dell’Anno et al. (2007) reported that unemployment and self-employment are important factors that have triggered tax evasion in France, Spain and Greece.

Cagan (1958) observed that the degree of urbanization caused tax evasion. He posited dual impact of the degree of urbanization. He stated that the usage of cheques in business transactions is lower in rural areas than the urban areas. Therefore, cash transactions could cause tax evasion.

Tabandeh et al. (2012) identified tax burden, income, the size of the government, the inflation rate and trade openness as factors that promote tax evasion in Malaysia.

Finally, Vousinas (2017) observed that tax evasion is caused by several factors such as the educational level of the population, the level of tax burden in comparison to the aggregate income, the distribution way of tax burdens, the structure of the taxation system, the level of development and organization of the economy and the structure of the national income.

3. Methodology
In this section, we present the data sources and discuss the justification for the use of the empirical strategy and estimation method.

3.1 Data and data sources
The study relied on annual secondary data from 2007 to 2016, primarily collected by the World Economic Forum (WEF), the World Development Indicators (WDI) and the Bank of Ghana (BOG). These organisations are recognised for gathering and publishing relatively valid and reliable information. While not perfect, WEF and WDI appear to be the best sources of corruption and tax evasion triggering (economic) data currently available to researchers (Anderson, 2015).
For the endogenous variables, data for tax/GDP ratio\[4\] (TGDP) were extracted from the BOG annual reports, while inflation, GDP deflator annual per cent (INFL), trade per cent of GDP (TRAD), unemployment, per cent of total labour force (UNEM) and urban population per cent of total (URBN) were extracted from the WDI.

With the exogenous variables data, diversion of public funds (DIPF), ethical behaviour of firms (EBFM), favouritism in decisions of government officials (FDGO), organised crime (OGCM) and irregular payments and bribes (IRRB) were extracted from the WEF.

In general, the data features that most researchers have used in the SEM model are from primary data. Nevertheless, it is equally important to use secondary data (Latan and Ghozali, 2013). This is because it is well known that SEM can handle all data types and scales (Garson, 2012; Latan and Ghozali, 2013).

Literature on sample sizes recommends lower sample sizes for models with no latent variables or model for which there is an upper limit such as using countries or years as a unit. Some of the most recent simulation studies recommend rather small sample sizes as being enough (Wolf et al. (2013)).

Wold (1989) illustrates the low sample size requirement by analysing a SEM path model based on a data set consisting of ten observations and 27 manifest variables.

3.2 Corruption indicators

The study relied on the corruption measures adopted by Anderson (2015). The WEF collects survey data on different dimensions of corruption via its Executive Opinion Survey (World Economic Forum, 2014, pp. 83-92). Anderson (2015) argued that the justification for the choice of these data is their responses from almost 14,000 members of business communities from around the world including Ghana. WEF also provides data on several aspects of corruption unlike the Transparency International’s Corruption Perception Index (CPI), the World Bank Corruption Index and International Country Risk Guide (ICRG). Following Anderson (2015), this study selected the following five dimensions of corruption and the kind of questions posed for analysis:

1. **Diversion of public funds**: Question: In your country, how common is diversion of public funds to companies, individuals or groups because of corruption? (1 = very commonly occurs; 7 = never occurs).

2. **Ethical behaviour of firms**: Question: In your country, how would you rate the corporate ethics of companies (ethical behaviour in interactions with public officials, politicians and other firms)? (1 = extremely poor – among the worst in the world; 7 = excellent – among the best in the world).

3. **Favouritism in decisions by government officials**: Question: In your country, to what extent do government officials show favouritism to well-connected firms and individuals when deciding upon policies and contracts? (1 = always show favouritism; 7 = never shows favouritism).

4. **Organised crime**: Question: In your country, to what extent does organised crime (mafia-oriented racketeering, extortion) impose costs on businesses? (1 = to a great extent; 7 = not at all).

5. **Irregular payments and bribes**: Question: In your country, how common is it for firms to make undocumented extra payments or bribes connected with imports and exports; public utilities; annual tax payments; awarding of public contracts and licenses and obtaining favourable judicial decisions? (1 = very common; 7 = never occurs).
In the above corruption indicators, a lower score indicates the existence of a greater perceived degree of corruption.

3.3 Tax evasion indicators
The WDI economic indicators that trigger tax evasion selected for the analysis are tax burden, unemployment per cent of total labour, trade as a percentage of GDP and urban population per cent of total population. The measures of tax burden data were extracted from BOG annual reports over the period. These indicators have been selected based on extant literature (Tabandeh et al., 2012; Cagan, 1958).

3.4 Model specification and estimation method
This study employed SEM to test the hypotheses. SEM techniques can be considered as the second generation of multivariate analysis (Fornell, 1987). Unlike first-generation techniques, such as factor analysis, discriminant analysis or multiple regression, SEM allows researchers to simultaneously consider relationships among multiple independent and dependent constructs.

Several justifications for the use of SEM over the other traditional research strategies have been extensively espoused in methodological literature (Hair et al., 2016).

According to Blanthorne et al. (2006) and Hair et al. (2016), SEM provides flexibility for testing models, thereby allowing the researcher to employ a multiplicity of predictors and criterion variables, construct latent (unobservable) variables, model errors in measurement for observed variables and test mediation and moderation relationships in a single model.

Second, researchers such as Shields and Shields (1998) advocate the importance of SEM to test research models in an all-inclusive approach instead of relying on familiar methods, where regression analysis has been the prevailing method so far (Oler et al., 2010). According to Wilcox (1998, p. 311), the domination of OLS is somewhat surprising because he argues that the “OLS estimator is one of the modest choices researchers could make”.

Third, Rigdon (2013) cautions academics against making mediocre empirical strategy choices based on limited knowledge of methodological strategy alternatives. SEM is a methodological alternative that researchers have limited knowledge about. However, dispelling any difficulty with its use, Bisbe et al. (2007), and Smith (2011) argue that SEM is a variant of the covariance-based structure equation model (CB-SEM), which was originally developed by Wold (1982).

Fourth, because SEM is not constrained by identification and other technical aspects, it is possible to test complex models with many different constructs and indicators (Rigdon, 2014) for secondary data, and with the possibility of revising and refining construct measurements, which more often does not exist.

Fifth, Reinartz et al. (2009) posit that SEM realises the required level of statistical power with smaller sample sizes.

Although several recommendations on how to properly conduct SEM studies have been published, such as Chin (2010), Marcoulides and Chin (2013) and Peng and Lai (2012), as is typical with most statistical tools, SEM demands substantial knowledge about the tool because several choices have to be made and, if not made properly, can lead to spurious conclusions.

After justifying the empirical strategy, Hoyle (2000) posits that the most common estimation method of SEM is maximum likelihood (ML). Kline (2011) states that ML attempts to minimize the differences between observed data and an imposed model, thereby maximizing the likelihood that the observed data come from a population consistent with the implied model. The adopted STATA software uses ML.
According to Bollen (1989), ML is the preferred estimation method within the SEM because it produces unbiased, consistent and efficient parameter estimators when its assumptions are satisfied. ML works under certain assumptions, which includes multivariate normality (Bollen, 1989; Kline, 2011).

SEM is a combination of two statistical techniques, namely, confirmatory factor analysis and path analysis. Path analysis is SEM without latent or unobserved variables. Confirmatory factor analysis uses both latent and observed variables. Path analysis permits researchers to concurrently study direct and indirect effects with multiple exogenous and endogenous variables and allows the researcher to develop a set of hypothesized relationships that can be directly translated into equations needed for the analysis.

This study is exploratory in nature and relies on observed secondary data, which necessitates the use of path analysis within the SEM.

4. Discussion of results and findings
4.1 Path analysis of models
The path coefficients of the five models, which produced Figure 1, are as follows:

DIPF, EBFM, FDGO, OGCM, IRRB –> TGDP

DIPF, EBFM, FDGO, OGCM, IRRB –> INFL

DIPF, EBFM, FDGO, OGCM, IRRB –> TRAD

DIPF, EBFM, FDGO, OGCM, IRRB –> UNEM

DIPF, EBFM, FDGO, OGCM, IRRB –> URBN

The five equations produced the path analysis in Figure 1.

The path analysis highlights the coefficients, means, variances and co-variances among exogenous variables derived from the five models.

Figure 1.
Path analysis showing multivariate relationships
4.2 The model fitness and stability path analysis
Fit refers to the ability of a model to reproduce data usually the variance-covariance matrix. Hence, a good fitting model is the one that is reasonably consistent with the data. Path analysis provides no straightforward tests to determine model fit. Instead, the best strategy for evaluating model fit is to examine multiple tests such as Bentler–Raykov index, root mean squared error of approximation (RMSEA), standard root mean squared residual (SRMR) and coefficient of determination (CD).

According to Jiang and Yuan (2017), if all of them indicate an adequate fit, then a researcher may safely proceed to interpret the parameter estimates or to test specific hypotheses (Table I).

The SRMR is defined as the average discrepancy between the covariances in the input matrix and the model-implied matrix. Thus, it is derived from a residual covariance matrix. The SRMR takes values between 0 and 1. The lower the SRMR, the better the model fit (Brown, 2006). In a simulation study, Hu and Bentler (1999) provided cut-off-values for some fit-indices under different simulation conditions. They propose model fit if SRMR < 0.11. Therefore, our model fit score of 0.0870 suggests a good model.

The RMSEA informs us how well the model, with unknown but optimally chosen parameter estimates, would fit the population’s covariance matrix (Byrne, 1998). In recent years, it has been regarded as one of the most informative fit indices (Diamantopoulos and Siguaw, 2000) because of its sensitivity to the number of estimated parameters in the model. In other words, the RMSEA favours parsimony. The lower the RMSEA, the better the model fit. A value of 0 indicates perfect fit (Brown, 2006; Steiger and Lind, 1980), an indication that our model is good.

The $R^2$ measures predictive accuracy and is the central criterion for judging the quality of SEM. Malmi and Granlund (2009) and Merchant (2012) suggests that the focus of theory development in accounting should also be on prediction. The overall $R^2$ of 99.67 per cent indicates that the models jointly and significantly explain the corruption-tax evasion nexus. Individually, the exogenous variables of Models 1, 2, 3 and 5 explain 80.73, 50.87, 91.96 and 75.19 per cent of the endogenous variables of those models, respectively. However, 43.28 per cent of the exogenous variables of Model 4 account for a variation in the endogenous variable.

4.3 Model stability
The models recorded a stability index of zero with all the eigenvalues (zero) lying inside the unit circle. Therefore, SEM path analysis satisfies stability condition for further discussion.

<table>
<thead>
<tr>
<th>Endogenous variable</th>
<th>Exogenous variables: DIPF, EBFM, FDGO, OGCM, IRRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGDP</td>
<td>Fitted 4.1325, Variance predicted 3.3361, Residual 0.7963, $R^2$ 0.8073, MC² 0.8073</td>
</tr>
<tr>
<td>INFL</td>
<td>Fitted 15.5364, Variance predicted 7.9029, Residual 7.6334, $R^2$ 0.5087, MC² 0.5087</td>
</tr>
<tr>
<td>TRAD</td>
<td>Fitted 97.0432, Variance predicted 89.2406, Residual 7.8025, $R^2$ 0.9196, MC² 0.9196</td>
</tr>
<tr>
<td>UNEM</td>
<td>Fitted 1.4321, Variance predicted 0.61977, Residual 0.8123, $R^2$ 0.4328, MC² 0.4328</td>
</tr>
<tr>
<td>URBN</td>
<td>Fitted 130.7407, Variance predicted 98.9957, Residual 31.7449, $R^2$ 0.7519, MC² 0.7519</td>
</tr>
<tr>
<td>Overall (coefficient of determination)</td>
<td>0.9967</td>
</tr>
<tr>
<td>Root mean squared error of approximation (RMSEA)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Standard root mean squared residual (SRMR)</td>
<td>0.0870</td>
</tr>
<tr>
<td>MC is the correlation between dependent variable and its prediction</td>
<td>0.0870</td>
</tr>
<tr>
<td>MC² is the Bentler–Raykov squared multiple correlation coefficient</td>
<td>0.0870</td>
</tr>
</tbody>
</table>

Table I. Equation-level, RMSEA and SRMR goodness of fit
4.4 Wald joint significance test
The Wald test examines the joint significance of the exogenous variables in affecting the endogenous variable jointly. A *p*-value of less than 5 per cent indicates the acceptance of the null hypothesis that exogenous variables jointly affect the endogenous variable. From Table II, all the exogenous variables (DIPF, EBFM, FDGO, OGCM, IRRB) jointly and significantly affect the endogenous variable in equation (1) (TGDP), equation (3) (TRAD) and equation (5) (URBN).

4.5 Correlation analyses
Data were analysed using STATA structural equation modelling. The correlation analyses were designed to show the strength of relationships among the aspects of corruption: DIPF, EBFM, FDGO, OGCM and IRRB. The correlation matrix produced the results in Table III.

Apart from DIPF and EBFM relationship, which is not significant, Table III shows very strong positive and negative relationships among the individual aspects of corruption observed. This suggests that corruption in Ghana, as an emerging economy, tends to exhibit all five dimensions of corruption to one degree or another. Furthermore, it is indicative that countries tend to have more than one type of dominating corruption dimension.

4.6 Regression analyses
In addition to assessing the predictive quality of SEM with $R^2$, evaluating the unstandardized path coefficients is important when deciding whether the hypothesized relationship can be found in the data.

In the five models of the path analysis, corruption variables (DIPF, EBFM, FDGO, OGCM and IRRB) were identified as the exogenous variables, with tax evasion indicators (TGDP, INFL, TRAD, UNEM AND URBN) as endogenous variables. The results are displayed in Table IV.

Model 1 considered the relationship between corrupting activities and tax burden. Two of the five dimensions of corruption (DIPF and OGCM) were found to be significant triggers of tax evasion (TGDP). With Model 2, it is only EBFM as a corrupting activity, which significantly predicts tax evasion (INFL). Corrupting activities (FDGO and IRRB) also trigger tax-evading activities (TRAD) in Model 3. Finally, two exogenous variables (DIPF, UNEM and URBN) jointly significantly affect the endogenous variable (URBN).

<table>
<thead>
<tr>
<th>Observed variable</th>
<th>Chi²</th>
<th>df</th>
<th><em>p</em>-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGDP</td>
<td>41.89</td>
<td>5</td>
<td>0.0000</td>
</tr>
<tr>
<td>INFL</td>
<td>10.35</td>
<td>5</td>
<td>0.0658</td>
</tr>
<tr>
<td>TRAD</td>
<td>114.37</td>
<td>5</td>
<td>0.0000</td>
</tr>
<tr>
<td>UNEM</td>
<td>7.63</td>
<td>5</td>
<td>0.1779</td>
</tr>
<tr>
<td>URBN</td>
<td>31.18</td>
<td>5</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Table II.
Wald tests for equations

<table>
<thead>
<tr>
<th>Exogenous variable</th>
<th>DIPF</th>
<th>EBFM</th>
<th>FDGO</th>
<th>OGCM</th>
<th>IRRB</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIPF</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBFM</td>
<td></td>
<td>-0.3224</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDGO</td>
<td>0.6646***</td>
<td>-0.6537***</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OGCM</td>
<td>-0.4765*</td>
<td>0.4685*</td>
<td>-0.7864***</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>IRRB</td>
<td>0.6953**</td>
<td>-0.6221***</td>
<td>0.9234***</td>
<td>-0.6576***</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table III.
Correlation matrix

Note: **,***Correlation is significant at 0.001 and 0.1 levels, respectively
<table>
<thead>
<tr>
<th>Endogenous variable</th>
<th>Exogenous variables</th>
<th>Unstandardized path coefficient</th>
<th>Standard error</th>
<th>p-value</th>
<th>Standardized path coefficient</th>
<th>p-value</th>
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EBFM) that entered Model 5 were deemed statistically significant for influencing tax-evading activities (URBN).

From Table IV, the unstandardized path coefficients of all the exogenous variables and their constants are significant for all the five models (except IRRB in Model 1 and OGCM and IRRB in Model 4).

In summary, the fitted models in Table I show an overall $R^2$ of 99.67 per cent, an indicator that all the five models jointly and significantly explain the corruption-tax evasion nexus.

5. Conclusions and policy implications
This study used data from WEF Executive Opinion Survey, WDI and BOG to examine the relationship between corruption and tax evasion and to establish the nature of relationships among corrupting activities. One major contribution of the paper was the adoption of SEM methodology to test two related hypotheses:

(1) Corrupting activities do not cause tax-evading activities.

(2) There is no correlation among corrupting activities.

The following empirical results emerged. The test for $H1$ suggests that corrupting activities significantly cause tax-evading activities in Ghana. For all the five models, there is at least one corrupting activity triggering tax evasion.

When testing $H2$, it was revealed that corruption in Ghana exhibits all of the five dimensions of corruption (DIPF, EBFM, FDGO, OGCM and IRRB). Hence, there is correlation among the corrupting activities. This is indicative that most emerging economies tend to have more than one type of dominating corruption dimension.

We conclude that corrupting activities and tax evasion activities move in lockstep and should be tackled together. Most tax evasion reduction strategies and policies seem to tackle the menace from the taxpayer’s perspective, thus ignoring the influence of corrupt activities from government and government officials or drafters of those tax evasion reduction strategies.

Based on these empirical findings and implications, we recommend that a comprehensive and effective tax evasion reduction strategy/policy should deal with tax-evasion triggered corruption from the triad perspectives of taxpayer, tax officials and government officials. This is because according to the WEF Executive Opinion Survey, corruption is perpetrated by both tax and government officials (diversion of public funds, favouritism in decisions by government officials and irregular payments and bribes) as well as individuals and firms (unethical behaviour of firms and organised crime).

The study extends the literature by examining the various dimensions of corruption, analysing the strength of their relationships and how they impact tax evasion in an emerging economy. By identifying and employing specific corrupting activities, there is a better understanding and appreciation of the corruption–tax evasion nexus.

Notes
1. Tax revenue in 2016 excluding oil was GHS25, 686.6M compared with GHS25,728.7M tax revenue inclusive of oil revenue (Bank of Ghana, 2016).
2. See www.gfintegrity.org/about/
3. Bergman (2009) defined white-collar crime as non-violent crimes committed by corporations or individuals such as office workers or sales personnel of their business activities.
4. A proxy for tax burden (Baer and Galvao, 2005).
References


Bergman, M. (2009), Tax Evasion and the Rule of Law in Latin America: The Culture of Cheating and Compliance in Argentina and Chile, Penn State University Press, University Park, PA.


**Further reading**


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