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<http://dx.doi.org/10.1016/j.worlddev.2017.05.022>

The Mobile Phone Revolution: Have Mobile Phones and the Internet Reduced Corruption in Sub-Saharan Africa?

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Summary. — There is a growing consensus that information and communication technology (ICT) systems (here mobile phones and the internet) offer remarkable opportunities for promoting good governance, increasing transparency, and reducing corruption. Thus, many development practitioners, policy makers, and various international organizations who are committed to promoting transparency and good governance have embraced the view that mobile phones can be used as a social accountability tool in the fight against corruption. This study empirically investigates the impact of mobile phone penetration, internet adoption, and the interaction effect between the two on corruption, by focusing specifically on Sub-Saharan Africa (SSA). The results reveal that cell phones are powerful tools for reducing corruption. Results of panel Granger causality tests show that there is unidirectional causality from mobile phone penetration to corruption, and from internet adoption to corruption. To deal with the problem of endogeneity, a dynamic panel data (DPD) model is employed.

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Key words — corruption, Sub-Saharan Africa, mobile phone, internet adoption

1. INTRODUCTION

There is a growing body of evidence showing how information communication technologies (ICTs) in general and mobile phones, in particular, can be instrumental in empowering citizens, upholding good governance, bringing openness and transparency, increasing accountability, and fighting corruption. For example, in July 2014, the United Nations Development Programme (UNDP) launched the “phones against corruption” initiative in Papua New Guinea, which allows citizens to report cases of corruption through mobile messaging to the appropriate state authorities for criminal investigations and prosecution at no cost. Since its implementation, 1,500 text messages reporting cases of corruption have been received, two public officials have been arrested for fund mismanagement of more than US\$2 million, and approximately other 250 cases of alleged corruption are being investigated (UNDP, 2014). In Tanzania, Krolikowski, Fu, and Hope (2013) examined the methods used to pay bills for public water since the introduction of mobile banking. They found that mobile payment methods reduce opportunities for petty corruption, improve revenue collection per customer, and enhance the quality of data generated by the billing and payment process. They also found that when the use of cash decreases and mobile banking increases it creates more transparency, accountability, and limits the opportunistic environment that breeds corruption as well as bribery activities. Thus, many development practitioners, policy makers, and international organizations committed to promoting transparency and good governance have embraced the view that mobile phones can be used as a social accountability tool in the fight against corruption.

In recent years, considerable research attention has focused on the linkage between ICTs and corruption, and the potential of ICTs to improve transparency and rid the public sector of corrupt practices. Using a sample of 42 countries, spanning from 2003 to 2007, Charoensukmongkol and Moqbel (2014) found that a country’s investment in ICT can have both negative and positive effects on corruption. Andersen (2009)

estimated the impact of ICTs (measured by e-government) on the “control of corruption” using a panel of 149 countries with two time observations ($t = 1996, 2006$) and found that different countries’ e-government maturity development significantly reduces corruption, even after controlling for any propensity for corrupt governments to be more or less aggressive in adopting e-government initiatives. Shim and Eom (2009) examined the correlation between the usage of ICTs (measured by the United Nations (UN) e-government readiness index, the UN e-participation index and internet penetration) and the level of corruption and found that the three ICT variables accounted for 77% of the total variation of corruption and were more influential in terms of reducing corruption than traditional anti-corruption factors. Using data from a six-year panel for 208 countries, Garcia-Murillo (2013) analyzed the correlations between the implementation of e-government innovations (measured by the UN e-government readiness index and the UN Telecommunications Infrastructure Index) and the level of corruption and drew similar conclusions, that governments’ web presence reduces the perception of corruption around the world.

Despite the growing interest in the linkage between corruption and ICTs in general, the empirical evidence of the impact of mobile phones and internet use on corruption is scarce. The majority of studies in this area focus on e-government and corruption. Among the few studies that have attempted to empirically examine the impact of internet use on corruption, Elbahnasawy (2014) found that greater internet adoption strengthens e-government’s role in reducing corruption. Similarly, Goel, Nelson, and Naretta (2012) argued that internet use is negatively correlated with corruption perception and

* We are grateful for the many comments from Bill Gaffigan, Dr. Kweku Opoku-Agyeman, Anthony Baffoe-Bonnie, Dr. Chris Opoku-Agyeman, and two anonymous referees. All remaining errors are our own and any opinions expressed are only those of the authors and not those of the institutions with which the authors are affiliated. Final revision accepted: May 16, 2017.

corruption incidence by enhancing access to information. Lio, Liu, and Ou (2011) also found that the causality between internet adoption and corruption runs in both directions, which suggests that internet adoption in the past lowers current corruption and past corruption also impedes current internet adoption.

To the best of our knowledge, there are currently two studies (Asongu & Nwachukwu, 2016; Bailard, 2009) that have empirically investigated the linkage between mobile phone penetration and the perception of corruption in Africa. Using data from 46 African countries, spanning from 1999 to 2006, Bailard (2009) found that higher mobile phone penetration is significantly correlated with lower levels of perceived corruption. Asongu and Nwachukwu (2016) using data from 2000 to 2012 in Sub-Saharan Africa (SSA) examined the link between mobile phone use and its complementarity with innovation, education, and internet penetration and their effects on 10 government indicators (one of them being corruption perception). Their study suggested an overall net positive effect of mobile phone use on corruption perception. However, they do not control for some important and potentially confounding factors such as population size, macroeconomic forces like inflation, or common global trends (e.g., improvements in the technological capacity or increased affordability of ICTs globally).

Our study focuses specifically on the effect of mobile phone penetration on corruption in SSA and differs from Bailard (2009) and Asongu and Nwachukwu (2016) in several ways. First, it employs the generalized method of moments (GMM) estimator developed by Arellano and Bover (1995) to test the causality between mobile phone penetration and corruption and between internet adoption and corruption. Second, it considers the inertia and persistence of corruption and the potential endogeneity of the regressors, by utilizing a dynamic panel data model to estimate the effects of mobile phone use and internet adoption on corruption as well as additional control variables and interaction terms not used in prior studies. Third, it uses an updated dataset spanning until 2014 which, even though adding just two more years (2013 and 2014) of recent data compared to the study by Asongu and Nwachukwu (2016), it covers an increase in mobile phone use of about 16% from 2012 to 2014.

In addition to addressing the above gaps in the literature, our study is motivated by two important strands in recent literature. First, the mobile industry in SSA continues to grow rapidly, having reached 347 million unique subscribers in 2014, equivalent to a penetration rate of 39%, and this is forecasted to increase to 504 million, equivalent to a penetration rate of 49%, by 2020 (Global System for Mobile Communications Association (GSMA), 2014).¹ According to a survey by Gallup (2014),² in 2013, nearly two-thirds (65%) of households in 23 countries in SSA had, at least, one mobile phone. Eighty percent of urban households had, at least, one mobile phone and 63% of rural households had, at least, one mobile phone. Considering this fact, there is a growing request in scholarly circles and among development practitioners and policy makers for more scholarly research on the development outcomes of mobile phones (Asongu & Nwachukwu, 2016). Second, among all Africa's social malaises corruption is the most endemic (Mekonnen, 2015), a factor contributing to stunted development and impoverishment of many African countries (Falola & Achberger, 2013). According to Transparency International, of the ten countries considered most corrupt in the world, six are in SSA (Transparency International, n.d.). Although there is an extensive literature explaining the entrenchment of this pandemic and the mitigating strategies, for the most part, the engaged literature has focused on limited dimensions of ICTs. Thus, we contribute to this line of literature by empirically

investigating the impact of ICT systems (mobile phone and internet) on corruption and providing insights on the links between government effectiveness, the rule of law, internet adoption and mobile phone use.

The paper proceeds as follows. We begin by reviewing the literature on the impact of mobile phones on African economies and corruption in Section 2. In Section 2, we also explore the definition, classification, measurement, costs and consequences of corruption, and its prevalence in Africa. Section 3 describes the data and the methodology used in the empirical analysis. Empirical results are discussed in Section 4, and Section 5 concludes and discusses the policy implications of the results.

2. THE MOBILE INDUSTRY AND CORRUPTION IN AFRICA

(a) *Mobile industry powering African economies*

Mobile phone access and usage in Africa, especially in SSA, have witnessed a dramatic increase in the last decade. SSA has been the world's fastest growing mobile region in terms of subscribers and mobile connections (i.e., subscriber identity module (SIM) cards) during the 2008–15 period. The unique subscriber base is growing at a compound annual growth rate of 17% over the period and is forecasted to remain the fastest growing region going forward (GSMA, 2014).

Across the region, mobile phones are revolutionizing the lives of millions of people and also bringing unprecedented levels of social and economic development. In 2013, the mobile industry contributed 5.4% to the overall Gross Domestic Product (GDP) of Sub-Saharan economies, equivalent to US\$75 billion, employed nearly 2.4 million people and indirectly supported a further 3.7 million jobs (GSMA, 2014). It is estimated that the mobile industry will contribute US\$104 billion to the region's economy (representing at that point 6.2% of the region's projected GDP) by 2020 (GSMA, 2014).

The use of mobile phones to send and receive remittances, make payments, and access financial services has also impacted the lives of millions of people who have never had access to traditional banking services. Mobile money services are available in 38 out of 48 countries in SSA. Nine of these countries—Cameroon, the Democratic Republic of Congo, Gabon, Kenya, Madagascar, Tanzania, Uganda, Zambia, and Zimbabwe—have more mobile money accounts than bank accounts (Cable News Network (CNN), 2014). In Kenya, for example, mobile money transfer provides services to 15 million Kenyans (more than a third of the population) and serves as a conduit for a fifth of the country's GDP (CNN, 2012).

Mobile phones also provide additional valuable services. In Nigeria, customers can easily check fake drugs with their phones before they leave the pharmacy without direct contact with the manufacturer. In Malawi, people living with HIV and AIDs can receive text messages, daily, reminding them to take their medicines on schedule (Aker & Mbiti, 2010). In Uganda, people can send and receive text messages to find out the weather forecast for their region. In Rwanda, farmers can access prices of agricultural commodities in different markets on their mobile phones (Hellström, 2008).

(b) *Mobile phones and the fight against corruption*

There are several ways in which mobile phone use can help combat corruption. First, mobile phones provide effective channels for reporting concerns of fraud or corruption, and facilitate the lodging of complaints. Reporting can be done

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