



# Mobile Money Payment: An Antidote to Petty Corruption?

*Laura Barasa*

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## Abstract

Using a two-period panel comprising firm-level data from the 2007 and 2013 World Bank Enterprise Surveys, this paper investigates the impact of mobile money use on bribe payments in Kenya. Results based on a matched difference-in-differences estimator demonstrate that adopting mobile money for financial transactions leads to a 3.1 percentage point reduction in bribe payments. This can be explained considering that mobile money transactions leave behind a detailed trail of digital records and accounts, which may curb acts of bribery. Our findings suggest that official mobile money payments can be a practical and effective anti-corruption intervention.

# Introduction

Petty corruption at the firm-level encompasses corruption that takes place on a small scale in the private sector and the public sector. Petty corruption in the private sector may include bribery, corporate fraud, kickbacks, insider trading and collusion. In the public sector, petty corruption involves informal payments including bribes and gifts made to government officials. Most bribe payments are made to facilitate non-compliance with government rules and regulations. Bribes are also paid to facilitate speedy fulfilment of government services with regards to licenses, taxes, customs, regulations and securing government contracts. Bribery is generally viewed as an unethical practice. Yet, it is a predominant form of petty corruption that is practiced in many regions across the world, and more so in sub-Saharan Africa.<sup>1</sup>

The 2006/07 World Bank Enterprise Survey (WBES) revealed that firms in sub-Saharan Africa reported bribe payments ranging between 2.5% and 4.5% of sales. Petty corruption cost the average manufacturing firm about 30%-80% of the cost of fuel and power, and about 10%-20% of the cost of labour. These amounts are not immaterial since they are likely to suffer from downwards bias due to the self-reporting nature of the survey measures (Clarke, 2011). Hence, the burden of petty corruption on firms is relatively high (Azfar & Murrell, 2009).

Theoretical and empirical evidence regarding the effects of petty corruption remains inconclusive. One argument cites bribery as a major impediment to firm growth in Africa (Faruq et al., 2013; Kimuyu, 2007; McArthur & Teal, 2002). Another opposite argument views bribe payments as a viable option for reducing bureaucratic inefficiencies associated with the procurement of government services in developing countries in Africa. In line with this argument, Williams et al. (2016) show that petty corruption significantly enhances, rather than harms, firm performance in developing countries.

Nevertheless, petty corruption has been found to undermine national growth and development (Mauro, 1995; Mogens & Bjørnskov, 2014). Accordingly, anti-corruption interventions have traditionally focused on initiatives aimed at strengthening government transparency and accountability. In view of this, anti-corruption interventions that are amenable to implementation by firms have remained sparse with perhaps the most common involving reporting of complaints to an official anti-corruption ombudsman.

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1 This paper concerns itself with petty corruption, as opposed to other forms of corruption (i.e., grand corruption involving the abuse of high-level power) that is also problematic.

The focal argument of this paper lies in the fact that petty corruption is more prevalent in cash-based economies. Government officials and firm managers are more likely to engage in acts of bribery where transactions involve the exchange of cash. Cash payments can easily be concealed and remain undocumented and anonymous whether intentionally or unintentionally. Accordingly, monitoring, detection and prevention of petty corruption based on accurate transactional records poses a challenge. However, this challenge should not arise when firms use mobile money payment systems. Hence, digital financial innovations such as mobile money payment systems offer a practical and effective anti-corruption intervention.

Mobile money is a digital financial innovation that enables electronic payment transactions using mobile phones. Mobile money transactions are usually backed by a trail of digitized transaction records including comprehensive details of account holders. This increases transparency, accountability, and traceability. In addition, mobile money payments are likely to reduce the frequency of meetings or potentially eliminate physical contact between government officials and managers. This may diminish incidental corruption involving opportunistic individuals.

Mobile money payments are therefore likely to eliminate conditions under which petty corruption thrives including, but not limited to, anonymity, limited transparency and accountability, and the frequency of meetings with government officials. Although anecdotal reports suggest that mobile money use discourages petty corruption, there are virtually no empirical studies investigating this pertinent issue in the context of firms in sub-Saharan Africa (Blumenstock et al., 2015; Krolikowski, 2014).

This paper aims to narrow this knowledge gap by using non-experimental methods to examine the causal impact of mobile money use on petty corruption in firms. Specifically, the main objective of this study is to investigate the impact of mobile money use on bribe payments in manufacturing, service, and retail firms in Kenya. Mobile money services—used for person-to-person transactions—were first launched in Kenya in East Africa. Mobile money has experienced much success in Kenya relative to other countries in sub-Saharan Africa (Aker & Mbiti, 2010; Donovan, 2012; Etim, 2014; Johnson, 2016; Mas & Morawczynski, 2009; Maurer, 2012). Furthermore, Kenya has one of the highest rates of mobile money payment penetration for government to business services (e.g., licenses, tax administration, customs, etc.). This is attributed to the relatively advanced mobile money ecosystem (Heyer & Mas, 2011).

This study analyses the impact of mobile money use on bribe payments using the newly available WBES two-period panel data of nationally representative firms from the private sector in Kenya. The first wave of data is from the 2007 WBES. The second wave of data comes from the 2013 WBES. This study utilizes the launch of mobile money services in 2007 as a means of identifying the impact of mobile money use

on bribe payments.<sup>2</sup> The first wave—the baseline—represents data collected before the introduction of mobile money. The second wave constitutes data collected after the introduction of mobile money.

This study estimated the impact of mobile money use on bribe payments by means of four estimators: ordinary least squares (OLS), difference-in-differences (DID), inverse probability weighting (IPW) and matched difference-in-differences (MDID). This was done to show how the estimated impact change as selection bias is addressed. Thus, the estimations were carried out using the simple OLS estimator to the more complex MDID estimator that has the advantage of increasing the robustness of the estimated counterfactuals. Based on the results of the MDID estimator, this study found that firms that adopted mobile money experienced a 3.1 percentage point reduction in bribe payments. This economically meaningful result suggests that mobile money use diminishes petty corruption.

This study makes several contributions. First, it provides fresh insights to the existing body of literature on fighting corruption by focusing on mobile money adoption as an anti-corruption intervention at the firm-level. This is important as economic literature generally concentrated on the adverse effects of corruption on firm growth, and economic growth and development. Second, anti-corruption interventions typically target strengthening institutions at the macro-level as opposed to the micro-level. This study departs from previous studies by investigating the impact of mobile money use as an intervention against petty corruption at the firm-level. Third, this study demonstrates how various methods may tackle selection bias by moving from the simple OLS to the more complex MDID estimator.

The findings of this study demonstrate that mobile money use can effectively mitigate petty corruption at the firm-level. Accordingly, policy makers should place emphasis on enforcing digitization of payments with focus on mobile money, which is widespread in Kenya and sub-Saharan Africa.

## Overview of petty-corruption interventions

Petty corruption interventions can be classified into three categories: top-down interventions, social accountability interventions and behavioural interventions (Stahl et al., 2017). Top-down interventions enhance the mechanism by which management holds government officials accountable. These types of interventions are aimed at

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2 Vodafone Group launched Kenya's M-PESA mobile money service by Safaricom Ltd. in March 2007. ZAP mobile money services by Zain Ltd. (now Airtel Money by Airtel Ltd.), being the primary competitor against M-PESA in Kenya, was launched in February 2009.

combating incidental corruption by reducing the opportunity space in which petty corruption thrives. They also address incentives of government officials through changes in contractual stipulations, and by enhancing internal workplace controls. Social accountability interventions, on the other hand, relate to direct citizen engagement. This involves awareness campaigns and capacity building activities pertaining to rights and entitlements of citizens. These activities strengthen citizenry efforts in denouncing corruption and holding government officials and the state accountable.

The principal-agent problem arising from divergent interests and asymmetric information underlies both the top-down and social accountability interventions. These two interventions are non-behavioural since they assume that individuals are rational decision makers. Maximization of self-interests results in rational responses to changes in incentive structures.

Contrastingly, behavioural interventions are usually determined by non-rational and quasi rational factors. These include mental shortcuts, environmental, and social and cultural norms that individuals rely on for decision making. Behavioural interventions, including education and media campaigns, therefore, target changes in the wider environment. These work by influencing mental modes, social and cultural norms, and the ways in which information is communicated to elicit decision maker's response to cues (Stahl et al., 2017).

Increased awareness of the deleterious effects of corruption has led to the formulation and implementation of anti-corruption interventions in Africa. These have generally involved the creation of anti-corruption agencies with emphasis on promoting transparency and accountability. Narrowing the scope further, anti-corruption legislation in Kenya began with the 1956 Prevention of Corruption Act which was amended in 1997 to pave way for the establishment of the Kenya Anti-Corruption Authority. In 2003, the anti-corruption authority was replaced by the Kenya Anti-Corruption Commission that was subsequently replaced by the Ethics and Anti-Corruption Commission (EACC) in 2011. The EACC is charged with educating the public and raising awareness of ethical issues, law enforcement, and establishing preventive measures for any acts of corruption, bribery, and economic crimes.

Notwithstanding, conventional anti-corruption reforms and interventions have had limited success in sub-Saharan Africa and more so in Kenya (Camargo & Faustine, 2016; Persson et al., 2013). Various authors suggest that anti-corruption reforms and interventions often fail to take into account the local operational context for which they are prescribed (Hope Sr, 2014; Persson et al., 2013).

Furthermore, it has been argued that anti-corruption intervention strategies are usually unsuccessful because corruption is a collective action problem. For example,

petty corruption involving bribe payments “to get things done” presents a sensible choice for most individuals because it is simply a means to an end. Such individuals also expect everyone to engage in bribery (Mungiu-Pippidi, 2013; Persson et al., 2013).

In summary, petty corruption interventions offer strategies that foster transparency and accountability. However, their limited success in the context of developing countries implies that exploring alternative mechanisms that enhance monitoring, detection and the likelihood of punishment may effectively deter petty corruption.

## **Mobile money as an anti-corruption mechanism**

Existing literature demonstrates that individuals engaging in corruption systematically underestimate the likelihood of getting caught. This is particularly reinforced in an environment characterized by the culture of corruption impunity (Basu et al., 2016; Navot & Cohen, 2015).

This phenomenon suggests that transactional information plays a vital role in deterring corruption. Accordingly, transactional information that increases the likelihood of detection and punishment is critical for the success of anti-corruption interventions. Moreover, credible information relating to improved monitoring and detection mechanisms is associated with this success. Such information has been found to be crucial in altering perceptions of individuals even where oversight mechanisms have showed no improvement (Navot & Cohen, 2015; Stahl et al., 2017). Essentially, credible transactional information increases transparency and accountability which is likely to deter opportunistic petty corruption.

Theoretical and empirical evidence reveals that mobile money payment systems inhibit corrupt practices. A pilot project involving the adoption of mobile money for payment of police officers’ salaries in Afghanistan demonstrates that mobile money is instrumental in uncovering corrupt practices. Transitioning from cash-based to mobile money-based payment of salaries resulted in the police officers receiving their actual salary entitlement. The cash-based system was riddled with corrupt practices that saw high ranking police officers take pay outs from junior police officers’ salaries without their knowledge (Blumenstock et al., 2015). The authors posit that in the short run, mobile money payment systems accrue significantly larger benefits to those making payments relative to those receiving the payments.

Similarly, Krolkowski (2014) employed qualitative techniques to examine whether mobile money payment systems curb petty corruption in urban water systems in Tanzania. Mobile money payments were found to mitigate petty corruption

by increasing transparency and accountability and eliminating the corruption opportunity space. The author concluded that mobile money payment systems reduce information asymmetries.

Theoretically, mobile money use is expected to have a negative impact on bribe payments. Nevertheless, related empirical evidence is scant since this is a relatively new area of research. Existing literature commonly focuses on mobile money and financial inclusion (Aker & Mbiti, 2010; Donovan, 2012; Etim, 2014; Johnson, 2016; Mas & Morawczynski, 2009; Maurer, 2012). Essentially, firms may adopt mobile money payment systems because they lower transaction costs and risks associated with doing business (Clarke, 2011; Islam et al., 2018).

Distinctive features of mobile money payment systems that increase transparency, accountability, and traceability include digital real-time records and stringent identification documentation that is required for authentication when carrying out mobile money transactions.

Additionally, the maturity of the mobile money ecosystem determines the success of mobile money payment systems. Mobile money financial services have evolved over time in Kenya. While original mobile money applications entailed person to person transactions only, mobile money is now used for person-to-business transactions. Individuals can use mobile money to pay utility bills and perform mobile banking transactions. Similarly, firms use mobile money services to pay utility bills, salaries, and suppliers, and to receive money from clients (Heyer & Mas, 2011). Firms adopting mobile money in Kenya do so to satisfy customers' requests and to reduce the costs and risks of transactions. Conversely, non-adopters cite large payments that are beyond the daily mobile money limit, and non-adoption by customers and suppliers as major reasons for not using mobile money (Islam et al., 2018).

The application of mobile money payments by firms in Kenya is relatively advanced (Heyer & Mas, 2011). Kenya is among the first countries in the world to adopt mobile money services. Thus, firms adopting mobile money payment services benefit from the transparency and traceability features that are instrumental in curbing petty corruption.

## Theory of change

The foregoing discussion is instrumental for developing a theory of change outlining how mobile money use impacts petty corruption. This provides a basis for determining the anticipated outcome relating to a decrease in bribe payments. The theory of change attempts to clarify the causal logic underlying the rationale of this study. With the aid of a results chain shown in Figure 1, this study sets out

a theory of change outlining the sequence of implementation involving the use of mobile money payment systems and outcomes relating to lowering the incidence of petty corruption.

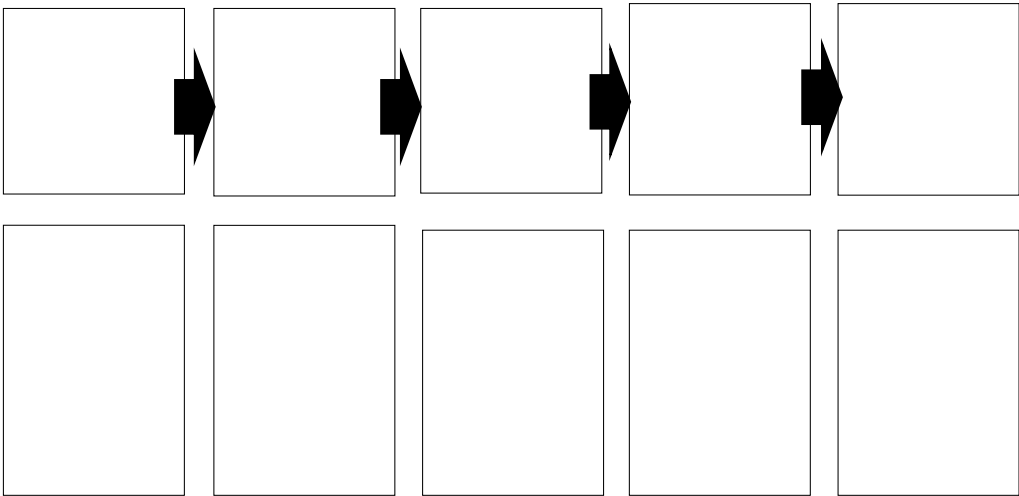
Figure 1 illustrates that firms may use financial and human resources, and mobile money technology as inputs for implementing mobile money use as an activity. The expected output of mobile money use includes increased real-time accurate digital transactional records and authenticated transactions. Hence, improved transparency, accountability and traceability of transactions, and reduced corruption opportunity space are immediate outcomes of the expected output. Similarly, enhanced monitoring and detection is likely to occur at this stage. This increases the likelihood of punishment. A reduction in bribe payments constitutes the outcome of using mobile money as an intervention to petty corruption. The main assumption underlying the theory of change is that firms might have been predominantly using cash payments for informal payments prior to the introduction of mobile money services.

In line with this, the rationale behind the results chain is that petty corruption is prevalent in cash-based economies. Bribe payments are likely to occur when transactions between firms and government officials involve the exchange of cash. Such transactions may be concealed, anonymous, or undocumented. Hence, an intervention mechanism that generates and stores accurate real-time digital records offers a solution where lack of records is a challenge. Mobile money use also offers a potential solution to this challenge by providing transaction authentication information. This enhances monitoring, detection, and the likelihood of punishment. Mobile money use is therefore likely to reduce bribe payments (Blumenstock et al., 2015; Krolkowski, 2014) and deters petty corruption by increasing the probability of getting caught (Basu et al., 2016; Navot & Cohen, 2015). In view of the results chain, the main hypothesis this study seeks to investigate is:

H1: Mobile money use has a negative impact on bribe payments.



**Figure 1: Results chain for mobile money payment services**



Source: Adapted from Impact Evaluation in Practice, 2nd ed., p. 35, by P.J. Gertler, S. Martinez, P. Premand, B.L. Rawlings and C.M J. Vermeersch, 2016, Washington, D.C.: Inter-American Development Bank and The World Bank. Copyright 2016, by The World Bank. Adapted with permission.

## Data source

The analysis of this study is based on the WBES two-period panel data for Kenya. The first wave of data is from the 2007 WBES. It represents the pre-treatment period. The second wave of data is from the 2013 WBES. The second wave represents the post-treatment period. The surveyed firms are a national representative sample of the country’s private sector. The WBES applies the stratified random sampling technique. The firms are stratified by sector, firm size, and geographical location. The survey instruments collect data on firm characteristics, mobile money use, business-government relations, performance measures and the business environment. The primary survey respondents include business owners and top managers (<https://www.enterprisesurveys.org>).

The sample used for the analysis includes a panel of 104 firms surveyed in both time periods. Hence, the data was set up as a two-period panel. The first wave of data covering 2005-2006 was collected before the launch of mobile money services in Kenya. The second wave of data was collected after the launch and covers 2010-

2012.<sup>3</sup> This study utilized the launch of mobile money services in 2007 as a means of identifying the impact of mobile money use on petty corruption in Kenya.<sup>4</sup>

## Conclusions and policy implications

The key objective of this study was to examine the impact of mobile money use on petty corruption in firms in Kenya. The launch of mobile money services in the country in 2007 was utilized as a means of identifying the impact of mobile money use on bribe payments using non-experimental methods. The results from the analysis of the two-period firm-level data demonstrated that the use of mobile money for financial transactions reduced bribe payments.

Mobile money use is linked to increased transparency, accountability, and traceability of transactions. Furthermore, stringent identification documentation eliminates anonymity. Hence, mobile money use limits the opportunity space under which petty corruption thrives. Also, the availability of digital financial records fosters stronger monitoring and detection mechanisms that enhance detection and the likelihood of punishment of corrupt individuals. Firms can leverage mobile money technology to circumvent acts of bribery. Mobile money use can, therefore, effectively decrease a firm's vulnerability to petty corruption.

Considering the widespread nature of petty corruption in sub-Saharan Africa, a commonplace solution such as the adoption of mobile money for financial transactions by firms is likely to present an effective anti-corruption intervention in the context of Africa. The dominance of mobile money in Africa makes it a practical anti-corruption intervention since the information and communications technology infrastructure relating to mobile network operators is already in place. Furthermore, mobile money use in Africa has generally outpaced that of the rest of the world.

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3 Data from the WBES generally suffers from missing observations. This compromises the representativeness of the sample (Williams et al., 2016). There were several missing observations on bribe payments. About 48 firms chose not to answer the question on informal payments: 16 firms outrightly refused to answer questions on informal payments; 19 firms opted for the "don't know" option, while 13 firms had missing data. These firms were excluded from the sample.

4 An investigation of the recent 2018 WBES revealed that only 60 firms could be matched over the three existing waves of data: 2007 WBES, 2013 WBES and 2018 WBES. After discarding observations with missing information on bribe payments, the sample further reduced to 54 firms. Due to this small sample size, we decided to use only the 2007 WBES (the baseline survey, before treatment) and 2013 WBES (post-treatment survey) in our analysis. This panel resulted in fact in a larger sample of 104 firms.

Policy implications arising from the findings of this study relate to the adoption of financial digital innovations for enhancing transparency and accountability mechanisms. Mobile money enhances payment data transparency. This limits economic rents that may be gained by manipulating billing and payment processes. Mobile money also reduces the bureaucratic red tape, which diminishes incentives arising from physical proximity of enterprise managers and public officials. Policy makers have shown immense interest in fighting petty corruption at all levels; hence, adopting mobile money use as an anti-corruption intervention provides a practical solution that can be embedded in public policy.

An important managerial implication arising from the findings of this study pertains to the adoption of financial digital innovations for payment processes. Enterprise managers adopting mobile money payment systems are likely to see reduction in bribe payments. Another possible benefit could be a reduction in the amount of time spent on dealing with public officials when handling government regulations with numerous payment processes. Similarly, mobile money use may decrease transaction costs involved in seeking government services. Furthermore, the use of mobile money payment systems may be useful in monitoring financial transactions carried out by employees. This in turn improves transparency and accountability that is driven by the authentication procedures required for carrying out mobile money transactions.

Nevertheless, this study suffers some limitations. First, the small sample size may be decreasingly representative of the entire population. However, policy interventions targeting enterprises within a randomized experimental design are very rare. As such, the launch of mobile money can be regarded as a natural experiment that provided a unique opportunity to investigate the impact of mobile money using quasi-experimental techniques.

Second, while an attempt was made to assess the parallel trends assumption, this study relied on falsification tests to establish the validity of the comparison group. Lack of two pre-intervention observations constrained the assessment of the parallel trends assumption. However, pre-treatment background characteristics were used for matching, and to account for initial conditions that may have affected the treatment status and the outcome.

Third, this study used the propensity score-matching to create a valid comparison group. This is a nonparametric technique that may adversely affect statistical inference in the case of a small sample size. Thus, it is recommended that the estimated treatment effects be interpreted with caution (Autio & Rannikko, 2016). Nevertheless, this study tested the sensitivity of the estimated treatment effect to using different estimators: OLS, DID and IPW. The quantitative results remained robust to using these estimators. Hence, the qualitative conclusions remain unchanged.

Despite the limitations of the study, rigorous impact evaluation of anti-corruption interventions has been lacking. This study provides robust evidence that supports the hypothesis that mobile money use delivers a negative impact on petty corruption. The findings of this study contribute towards policy debate surrounding practical and effective anti-corruption measures in Africa.

Some of the issues not addressed in this paper that form interesting areas of future research include establishing external validity of the results for other regions in Africa. Furthermore, examining the mechanisms by which mobile money payment systems affect bribe payments may uncover the underlying mechanisms by which mobile money impacts petty corruption. Also, investigating how mobile money adoption affects different forms of petty corruption, such as securing government contracts, can provide deeper insights into fighting petty corruption. Finally, subject to availability of data, using fine-grained measures of mobile money use that explicitly capture the use of mobile money for government to business transactions is likely to yield superior estimates of the impact of mobile money on bribe payments.

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