

Bridge Contracts in Africa: A Case Study of Orange Mali

By

Jonathan Greenacre

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Abbreviations and Acronyms

ATM	Automated Teller Machine
CDR	Call Detail Records
GSMA	Groupe Speciale Mobile Association
IAD	Institutional Analysis and Development
MMU	Mobile Money of the Unbanked
RCTs	Random Control Trials

Abstract

People incur transaction costs fitting their organizational arrangements into their surrounding property rights system. This paper analyzes organizational adaption to surroundings by examining which tool(s) from mechanism design people will use to solve moral hazard problems. Broadly, the weaker people's surrounding property rights system, the more a principal will use tools from mechanism design, which provides greater autonomy to the agent. The paper finds support for this hypothesis by identifying 'bridge contracts', which Orange Mali uses to respond to weak property rights between urban and frontier communities in Mali. The paper proposes to use these findings to stimulate a 'context specific' approach to engineering economics. This involves developing mechanisms to encourage people to work towards social goals but also fit within specific communities. The paper applies this approach to random control trials.

Keywords: Mobile money, mobile money, agents, contracts, mechanism design, random control trials

1.0 Introduction

A growing range of research focuses on the so-called ‘engineering’ side of economics (Maskin, 2019). This involves helping people develop better organizational arrangements (Menard and Shirley, 2022). Such arrangements are contracts, firms, families, non-governmental organizations, and other types of collective action with little, if any, reliance on the price mechanism. Relevant fields include mechanism design, market design, strands of contract theory, and random control trials (RCTs).

How can scholars adapt insights from engineering economics to help firms and governments in Africa and other developing and middle-income regions? Engineering economics has delivered a range of economic and social benefits in developed countries, particularly the United States (USA).² Adapting engineering economics to international development could contribute to poverty alleviation (such as enabling governments and firms to develop new products to solve poverty problems such as lack of credit), greener societies (such as helping firms launch innovative green services such as micro-solar energy), and other goals.

1 Assistant Professor, Pardee School of Global Studies, Boston University. I am particularly indebted to Graham Epstein for our many interesting discussions on the interaction between contract theory and the work of Elinor Ostrom and her colleagues, and the material in this framework. The author would also like to thank the following people for their helpful comments and suggestions on ideas that underpin this paper: Douglas Allen, Dimitrios Tsagdis, Dani Rodrik, Silke Forbes, Mary Shirley, Claude Menard, Lee Benham, Katharina Pistor, Kameshnee Naidoo, Mark Ramseyer, Robert A Holahan, Njuguna Ndung’u, David Cracknell, participants in the Ronald Coase Institute Workshop held in Poland on 12-18 May, the African Economic Research Consortium Working Group calls held on 5 May 2021 and 28-29 October 2021, and presentations made to the Boston University African Studies Centre on 25 October 2021, the Pardee School of Global Studies, Boston University, on 8 November 2021, Northeastern Law School on 10 November 2021, and Boston University Law School on 15 February 2022. Thank you to Similoluwa Somuyiwa, Shashank Reddy Ramireddy, Amanda Pliszak, and Paula Torrez-Ortiz for their excellent research support. I gratefully acknowledge financial support received from the African Economic Research Consortium. All errors remain my own.

2 For example, auction theory contributed policies of the Federal Communications Commission which has generated an estimated over US\$ 120 billion for American taxpayers. Popular information. NobelPrize.org., see 8 Feb 2022 <<https://www.nobelprize.org/prizes/economic-sciences/2020/popular-information/>>.

Exploring how to apply engineering economics requires tailoring organizational arrangements to specific communities *before* designing solutions. Currently, engineering economics and international development programmes often behave like a doctor who prescribes medication without examining the patient.³ This involves largely ignoring local contextual factors and proposes cookie cutter solutions that work effectively in economics textbooks or in developed countries, but often have a range of damaging consequences in Africa and other developing regions.⁴ Making progress involves going the other way, studying the property rights system in local communities and *then* prescribing so-called solutions. This involves examining the patient to discover their symptoms and then prescribing medication. Such solutions could conceivably come from engineering economics, appropriately adapted.

The paper begins the process of linking engineering economics to specific communities by examining how a specific subset of this field – mechanism design tools used to solve moral hazard problems – applies in different surroundings across Mali. Doing so can enable scholars and policy makers to better understand the sources of transaction costs people face when designing organizational arrangements: they come from adapting to the surroundings and more standard sources, which focus on the nature of the good and the nature of the transaction.

The paper claims that peoples' surrounding property rights system ('surroundings') impact which tools from mechanism design wealth-maximizing people will use to solve moral hazard problems. This paper analyzes organizational adaption to surroundings by examining which tool(s) from mechanism design people will use to solve moral hazard problems. The paper finds support for this hypothesis by identifying 'bridge contracts' which Orange Mali, a mobile money firm, uses to respond to weak property rights between urban and frontier communities in Mali. These contracts appear designed to encourage agents in frontier areas to operate as largely self-sufficient networks with little oversight from Orange Mali.

The paper uses these findings to stimulate a 'context specific' approach to engineering economics. This involves developing mechanisms to encourage people to work towards social goals but also fit within specific communities. The paper applies this approach to random control trials, a relatively new tool drawn from engineering economics.

The paper has four parts. The first explains the basic logic of the impact of weak property rights on tools wealth-maximizing people will choose to solve moral hazard problems. The second introduces the data in Mali, which the paper will explore. The third provides the hypothesis for the Mali study, the framework through which it

³ See the discussion in Section 4, below.

⁴ For example, the widely used contract theory textbook by Bolton and Dewatripont (2005) which states: "We shall consider in this book is one between two parties who operate in a market economy with a well-functioning legal system. Under such a system, any contract the parties decide to write will be enforced perfectly by a court, provided, of course, that it does not contravene any existing laws." Patrick Bolton and Mathias Dewatripont, *Contract Theory* (MIT Press, 2004).

is explored, and the results. The fourth discusses the findings and applies them to propose a context-specific approach to random control trials.

2.0 Weaker Property Rights – Organizational Arrangements

2.1 Property Rights

This paper revolves around the view that people, firms, franchisees, and any other organizational arrangement involves strengthening *property rights* as much as feasible by incurring transaction costs. Strengthening property rights involves, as far as possible, maximizing the chances that the choices over something are carried out in the real world. People incur transaction costs taking a range of steps to support that goal. For example, locking my car is a transaction cost because it strengthens my property rights over it – the chances that I can act on my desire to drive it in the future.⁵

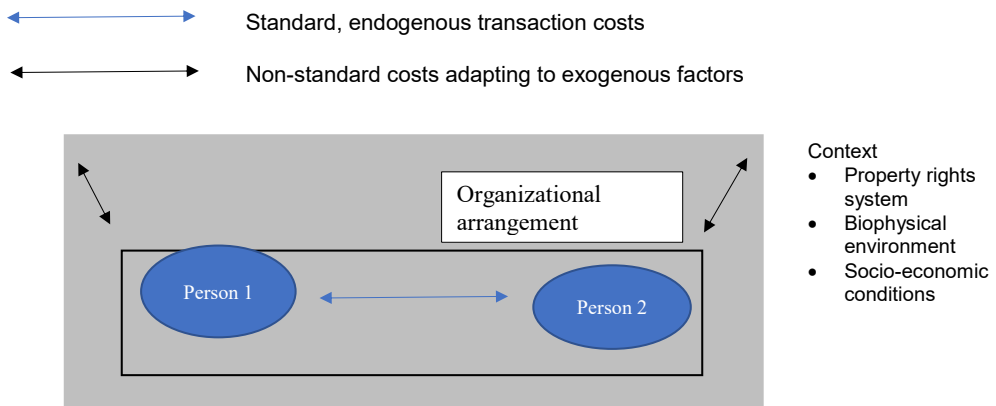
Most analyses of organizational arrangements focus on standard transaction costs people within the deal take to strengthen their property rights. These transaction costs emerge when people respond to endogenous factors such as the nature of the good and the nature of the transaction.

This paper accepts that the nature of the good and transaction are a source of transaction cost, but so are the costs involved in adapting an organizational arrangement to exogenous factors, particularly people's surrounding property rights system (surroundings). Third parties, or in the parlance of sociologists – society, provide this property rights system, which includes institutions,⁶ rules (such as specific sections of legislation), norms, physical and digital infrastructure (roads, bridges, wifi), education levels, and organizations (such as courts, government agencies). Adapting to exogenous transactions is a source of non-standard transaction costs. It involves steps such as learning about local laws and social norms, determining the useability of local roads and other infrastructure, and other jobs.

5 They do so in ways that maximize wealth net transaction costs. See a discussion in Coase (1960).

6 Often defined as the 'rules of the game' in society. See for example, Douglas North, *Institutions, Institutional Change, and Economic Performance* (Cambridge University Press 1990).

Figure 1: Organizational adaptation to endogenous and exogenous factors



The time is ripe to examine how organizational arrangements adapt to different types of property rights systems beyond the textbook and developed country models upon which most engineering economics is based. Firms increasingly using mobile phones, other technological and innovative organizational arrangements move into communities with very different property rights systems. These are the property rights systems that operate in rural and frontier areas of Africa and other developing countries. Previously, such communities have tended to operate on local, informal property rights system, often based on customary rules, with little or no interaction with the formal government or firms.⁷ However, innovative technology, donor funding from the United Nations, Gates Foundation and other organizations worth over US\$ 58 billion per year along with regulatory changes have enabled firms to begin providing clean energy, clean drinking water, and a range of other services to rural and frontier areas.⁸

While several firms have made inroads into rural and frontier areas, broadly the results of the economic inclusion are generally disappointing. Despite significant strides, the majority of the world's poor are excluded from the formal economy, blocking them from living healthier and greener lives. Over 2 billion people lack access to safely managed drinking water, 3 billion lack access to clean fuel for cooking, and 1.7 billion lack access to an account with a formal financial organization, such as a bank.⁹

⁷ Generally low-income, rural communities operate through informal, irregular employment, with little if any recourse to formal contracts and other enforcement organizations such as courts. Collins et al. (2009).

⁸ See, for example, Consultative Group to Assist the Poor <https://www.cgap.org/sites/default/files/publications/2022_01_Focus_Note_2020_Funder_Survey.pdf> (2022).

⁹ See a discussion by Emilio Hernandez of the Consultative Group to Assist the Poor, Financial Inclusion for What? (2020). <<https://www.cgap.org/blog/financial-inclusion-what>>.

The limited effectiveness of economic inclusion programmes has stimulated interest among international organizations, particularly the World Bank, for new approaches to achieve this policy goal. This is creating opportunities for new thinking, including from engineering economics, to better understand how organizational arrangements should adapt to different property rights systems.

2.2 Mechanism Design

The paper examines a subset of engineering, mechanism design strategies to address moral hazard problems to explore linkages between organizational arrangements and surroundings. By brief introduction, moral hazard arises through the nature of the transaction – it involves situations in which one person (often labeled the principal) delegates authority to another (often labelled the agent). The agent will act on behalf of the principal. The challenge is that the agent can take private action – these are actions that the principal cannot observe (Avinah et al., 2021). Such action may not be in the principal’s best interest. Alternatively, the principal can observe the action but cannot establish breach of the agreement to an outside party, usually a court, known broadly as verifiability.

Mechanism design provides a toolkit through which the principal aims to maximize the strength of her property rights by designing an incentive scheme that aligns the interests of the agent with her (the principal’s) own. One set of tools tend to revolve around facilitating the principal’s monitoring of the agent. Another set revolves around bonding, ensuring the wealth of the agent ultimately reflects the principal.

However, mechanism design provides little, if any guidance on which tool wealth maximizing principal’s will choose in different surroundings to maximize the strength of their property rights. If a firm must solve moral hazard across Mali, will it choose identical tools from mechanism design when operating in Bamako, the capital city, compared to rural areas across the country? Traditional explanations of mechanism design argue that people will choose which are practicable in the situation. A tool is useful if it enables the less informed party (principal) to *observe* the more informed (agent) and, if necessary, *verify* breach of agreement to a third party. Furthermore, the tool must be *enforceable*. This means an enforcement agency must have the incentive and ability to enforce whatever judgment it finds. This cannot be assumed in many developing countries whereby courts and other agencies face significant corruption and resource problems.

The key question for economic inclusion, including mobile money, is in which surroundings – namely different parts of Mali - will a tool be observable, verifiable and/or enforceable? Usually, we have little or no answer for this because mechanism design assumes that observability and verifiability are endogenous problems only, meaning they arise from the nature of the participants themselves and their desired transaction.

Exploring which mechanism design tools are appropriate for different contexts is key to the effectiveness of the economic inclusion movement. This is because firms, operating as principals need to find ways of ensuring their agents located in different

parts of developing countries perform their jobs effectively. This is a particularly challenging job given the weak roads, unreliable courts, and many other barriers between firms and rural and frontier communities.¹⁰ In this case, Orange Mali as principal must determine appropriate mechanism design tools for its agents located in different parts of Mali.

2.3 Combining Property Rights, Mechanism Design and Economic Inclusion

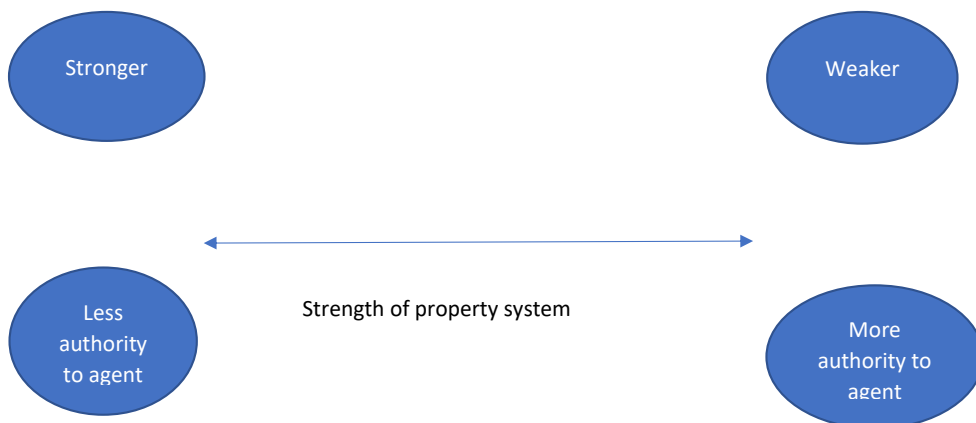
The key to connecting property rights, mechanism design, and economic inclusion revolves around understanding ‘stronger’ and ‘weaker’ surrounding property rights. A stronger system, operating exogenously on people designing mechanisms, strengthens their property rights by providing mechanisms for observation, verification, and enforcement of their agreement. In this case, the principal can use clear, fixed terms from mechanism design. A weaker system weakens people’s property rights and so the principal and agent must incur costs working out substitute methods for observation, verification, and autonomy.¹¹ Usually, that will result in the principal providing more autonomy to the agent to work out how to provide those mechanisms.¹²

10 Conning, J and Udry, C. (2005); Mark R. Rosenzweig, M. R. (1988). For example, significant portions of the population in Africa do not live within two kilometers of an all-season road. In Angola, this figure is 58% with similarly high percentages in Malawi (62%), Tanzania (62%), and Ethiopia (68%). Another useful example is limitations with the Internet. In 20 African countries, over 75% of the population do not have access to the Internet. In 12 more countries, this figure is over 50%. Rosenthal, J. (2017). Internet access that exists tends to be very slow and unreliable when compared to developed countries. For example, 39 African countries do not have the average internet speed, which, according to the United Kingdom’s telecoms regulator, is needed to participate in a digital society. Kazeem, Y. (2017). See a discussion of the limitations of institutions in developing countries in Buscaglia, E.(2004). See limited reference in passing, eg Fafchamps, M. (2003). Hype versus reality of the ‘tech revolution’: Rosenthal, J. (2017). And banks operating in developing countries tend to provide deposits and loans to comparatively wealthy people who usually reside in cities rather than unbanked communities in rural areas. Freedman, P. L. (2014) . See also: Collier P. (2009). Over 1.1 billion people lack identity documentation (2017 Findex Database). See also a discussion of Mali’s infrastructure later in this paper.

11 As already noted by Macneil, contracts could not develop without institutional support, typically laws regulating property rights, support rooted in ‘moral, economic’, social, legal’ support conditions that are external to the contracting parties (Ian Macneil, 1977. *Contracts: Adjustment of Long-Term Economic Relations Under Classical, Neoclassical and Relational Contract Law*. 72 Nw. U. L. Rev. 854 (1977-1978) 746 sq).

12 This view rests on an economy of scale interpretation of property rights systems. A benefit of moving from the state of nature (without third parties) to a social contract (in which third parties such as a state provide much of the scaffolding for transactions in property rights) revolves around economies of scale. Transaction costs are lower when a third party performs a range of functions rather than everyone having to perform many of those functions him or herself.

Figure 2: The relationship between property rights systems and tools from mechanism design



The strength of a property rights system can be understood by the extent to which third parties, rather than people designing the organizational arrangement, must do one or more of the following jobs that are relevant to observation, verification, and enforcement. These third parties could be the state, firm, collection of firms, or other type of actors.

2.3.1 General property rights

One is establishing the fundamentals of a property right system, which are to define, defend, and transfer property rights, and address negative externalities.¹³ Mechanisms to support these functions tend to support observability, verification and/or enforcement. For example, when third parties define property rights, they often gather and produce information that lowers observation costs. These include conducting national census, establishing, and implementing a nation-wide property registry, and providing passports. People's costs of monitoring and observing each other when third parties provide mechanisms to transfer rights, such as roads and payment systems, could lower the costs of physically observing each other and imposing financial penalties, respectively. Furthermore, the more third parties defend and enforce rights through, for example, investing in high-quality, clean, and capable courts, the less costly verification and enforcement will be. This is because people can, at lower cost, verify breach of agreement (because a court can more easily understand the contractual relationship) and does not need to incur additional price costs enforcing the arrangement (for example, people do not need a private army because they can rely upon the courts and police provided by the state).

¹³ See Anderson, T. and Fred McChesney, F., page 6. This section draws extensively on Avinash Dixit, A. (2009), pp. 5-24)

2.3.2 Third party bonding and monitoring

Third parties can also provide the tools needed to address moral hazard, particularly bonding and monitoring arrangements. When effectively drafted and implemented by the third party, such mechanisms can lower transaction costs on people because they do not need to design organizational arrangements for this problem.

2.3.3 Ancillary support

Often, third parties can provide other goods and services which support each of these functions above. For example, third parties such as the State, can provide education. Broadly, more educated communities are better able to process information and make better use of tools that can reduce observing, verification and/or enforcement costs. For instance, a better educated set of judges will be able to understand more complex cases, which then reduces people's verification costs.

Connecting to economic inclusion: weak property rights between urban and rural areas are a fundamental reason for relative inability of most firms to move into frontier areas of Africa and other developing regions. In urban areas, third parties, particularly the State, have a more significant role in property right systems, reducing the transaction cost firms face in observing and monitoring their counterparties, and otherwise solving moral hazard problems. Rural communities tend to operate in isolated communities with little recourse to formal property rights such as laws; instead, they overwhelmingly rely on social convention and customary property rights systems (Rosenzweig, 1988). Third parties, particularly the State, have tended to provide little, if any of the infrastructure needed to strengthen property rights between these systems such as roads, public identification systems such as birth certificates, functioning and effective courts.

Without third party support, firms operating as principals incur greater transaction costs developing and operating mechanisms to address moral hazard. This is a particular challenge because banks usually have little, if any presence in rural frontier communities. This creates a challenge for people and firms trying to find safe locations for storing money, including cash and e-money. This is because a combination of a bank's business model (comprising intermediating deposits and providing loans, holding liquidity and capital, and extensive governance arrangements) and prudential regulation (particularly deposit insurance) enable this type of firm to store funds obtained from the public over long periods.¹⁴ The relative absence of banks in rural and frontier areas means that firms must develop costly alternatives, which the paper explores below.

Furthermore, the lack of third-party support means that property rights systems are decentralized – localized systems – and so firms must develop innovative mechanisms to understand and then slot within such systems. Mobile money firms have appeared able to do that as explored in the context of Mali, below.

¹⁴ See a discussion of the operation of banks in Armour et al. (2016).

3.0 Mobile Money in Mali

3.1 Mobile Money in Mali

The material below outlines the state of the Malian mobile money sector in 2014. Financial exclusion in Mali was significant in 2014. Just 8% of the population held a formal bank account. About 11 million lived in rural areas (at the time of the GSMA study, this comprised 61% of the Malian population)¹⁵ and 42% of the population lived below the poverty line.¹⁶

The mobile money sector grew from 2013 when Orange Mali, a mobile money firm, launched 'Orange Money'. The service provided airtime top-up, P2P transfer (domestic), merchant payment, international remittances, and bill payment. By 2014, mobile networks covered over 40% of the Malian territory, and 40% of the population used a mobile phone (GSMA, 2015). By 2014, Orange Mali processed value equivalent to over 20% of Mali's Gross Domestic Product (GSMA, 2015).

However, Orange Mali faced the same problem still confronting many mobile money firms; how to build cash merchant liquidity systems in rural areas. Just 15% of Orange Mali's cash merchants operated in rural areas (GSMA, 2015). The firm wanted to expand into rural areas.¹⁷

Consistent with the theme of this paper, Orange Mali could not design the one contractual innovation for its cash merchant system which would operate effectively across the entire country. This is because of the differences in property rights systems between urban and rural areas in Mali, and between rural communities across the country. The next section explores these property right systems in greater detail.

15 GSMA, "Spotlight on Rural Supply: Critical Factors to Create Successful Mobile Money Agents" (2015), page 8. Note the GSMA report defined Rural" is defined as 5km outside an urban center and 10km outside a capital city. The data is based on a transactional analysis conducted between May 2014 in Mali, page 9).

16 See a discussion of the urban rural divide in Jeffrey Bloem of the US Department of Agriculture (2021) <<https://www.ers.usda.gov/amber-waves/2021/june/mali-s-rural-urban-gap-in-food-security-vanished-amid-the-coronavirus-pandemic/>>

17 GSMA (2015)

3.2 The Context for Transacting in Mali

Mali is one of the largest countries in Africa with a relatively small population of 21,120,000, which is largely centred along the Niger River. The Bambara (Bamana) ethnic group and language predominate, with several other groups, including the Fulani (Fulbe), Dogon, and Tuareg—also present in the population. Agriculture is the dominant economic sector in the country, with cotton production, cattle and camel herding, and fishing among the major activities.¹⁸

¹⁸ Encyclopedia Britannica, 'Mali': <<https://www.britannica.com/place/Mali>>.

Figure 3: Mali



A mobile money firm is likely to tailor its contracts for liquidity management between urban and rural areas of Mali because of the different types of property rights systems between these types of communities. Property rights systems in urban areas are much more formal, and in rural communities they are largely based on informal, local, customary systems. Most people in frontier communities had little or no interaction with the formal judiciary.¹⁹ Roads between urban and rural areas are also relatively weak. There is a broad divide between formal law enforcement in urban areas (largely provided by courts and police) and informal approaches in rural communities, tending to revolve around village chiefs and justices of the peace. There was little interaction between the two types of property right systems.²⁰ There is relatively little information on people in rural areas due to lack of birth registration and other factors. There was also significant variation between property rights systems across communities.

19 See a discussion of weak rural infrastructure lack of rural trust in formal legal systems, use of customer and social norms in rural areas of Mali. See Moussa P. Blimpo, Robin Harding, and Leonard Wantchekon, 'Public Investment in Rural Infrastructure Some Political Economy Considerations' (2012). <<https://scholar.princeton.edu/lwantche/files/BlimpoHardingWantchekon042013.pdf>>.

20 This is due to amount other reasons, administrative backlogs, and an insufficient number of lawyers, particularly in rural areas, often prevented prompt access <https://2009-2017.state.gov/documents/organization/252915.pdf>.

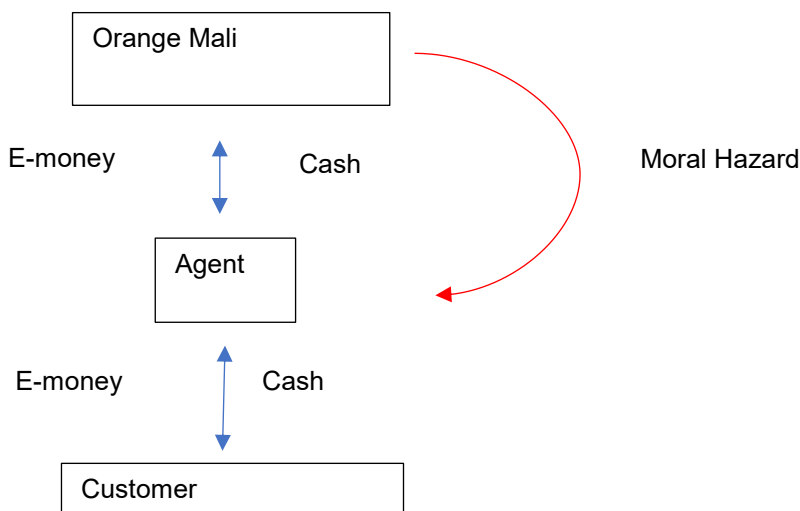
3.3 Mobile Money

Mobile money has had some success in moving into rural and frontier areas of Mali, other countries of Africa and other developing countries, despite the issue of moral hazard and the weak property rights between urban and rural communities.²¹ A person can deposit, store, transfer and withdraw funds from her mobile money account, much like a bank account. Safaricom, a Vodacom partner, launched the world's first major mobile money service in 2007 in Kenya. There are now 866 million accounts overwhelmingly located in Africa.

This paper focuses on how mobile money firms, operating as principals, solve moral hazard problems among agents. Agents are independent contractors comprising of people and small organizations (such as corner stores, petrol stations and other retail outlets) in the formal and informal sectors. Some agent networks are very extensive; for example, M-Pesa in Kenya alone has 180,000 agents. Such schemes often involve other actors, including banks and marketing companies which monitor and otherwise support the operation of agents.

The question then arises of how mobile money firms adapt their tools from mechanism design to address moral hazard problems across the different communities in which they operate.

Figure 4: Operation of mobile money agents and moral hazard problem



²¹ This growth has emerged through regulatory deployments permitting increased contractual and organizational innovation and the advent and spread of mobile phones, which has increased and spread rapidly across Africa and other parts of the developing world. The number of mobile phones increased from zero in 2000 to over 747 million by 2018. See GSMA, The Mobile Economy, 2019 < <https://www.gsma.com/subsaharanafrika/resources/the-mobile-economy-sub-saharan-africa-2019>>.

Material from a 2015 industry study, discussed below, provides methods for comparing organizational arrangements, which a mobile money firm uses as principal with agents in urban and rural areas.

3.4 Data to Explore Contractual Variation

The data for exploring contractual variation between cash merchants in rural versus frontier areas comes from a 2015 report released by the Mobile Money of the Unbanked (MMU) programme provided by the Groupe Speciale Mobile Association (GSMA). The GSMA is an industry organization representing mobile operators and organizations across the mobile ecosystem and adjacent industries.²²

In 2014, the GSMA conducted an empirical analysis of mobile money cash merchants used by Orange Money, a mobile money service, in Mali (GSMA, 2015). The GSMA gathered this data as part of a broader goal of understanding how ‘successful’ rural cash merchants operate. While this term was not specifically defined, broadly GSMA appeared to mean cash merchants with high levels of transaction history, compared to active (with a moderate amount) and ultimately dormant (with little or no transaction activity) (GSMA, 2015). Doing so could better support the mobile money industry in understanding how mobile money firms should adapt their operational strategies to service more remote locations and identify the ones upon which to first focus (GSMA, 2015).

The GSMA conducted research through three stages and an analysis of six months of transactional data:²³

1. Transactional data analytics leveraged Call Detail Records (CDRs) from mobile money cash merchants and customers to gain granular knowledge of each market, in addition to transactional data for cash merchants and customers. The transactional data analysis was primarily used to segment and geo-locate cash merchants to create a baseline for defining successful cash merchants in rural areas. The GSMA analyzed one month of CDR data for all mobile money cash merchants, all mobile money customers, and 50,000 random GSM customers, in addition to one month of mobile money transactional data for all mobile money cash merchants and mobile money customers.
2. Quantitative phone-based interviews with a total of 2,000 mobile money cash merchants, selected based on their location (urban versus rural) and their activity level (dormant, active, or successful).
3. Field-based interviews with 500 mobile money cash merchants, face-to-face, to capture more in-depth qualitative information. In each market, an additional 40 field-based interviews were done with aggregators

²² See information in GSMA, <<https://www.gsma.com/aboutus/>>.

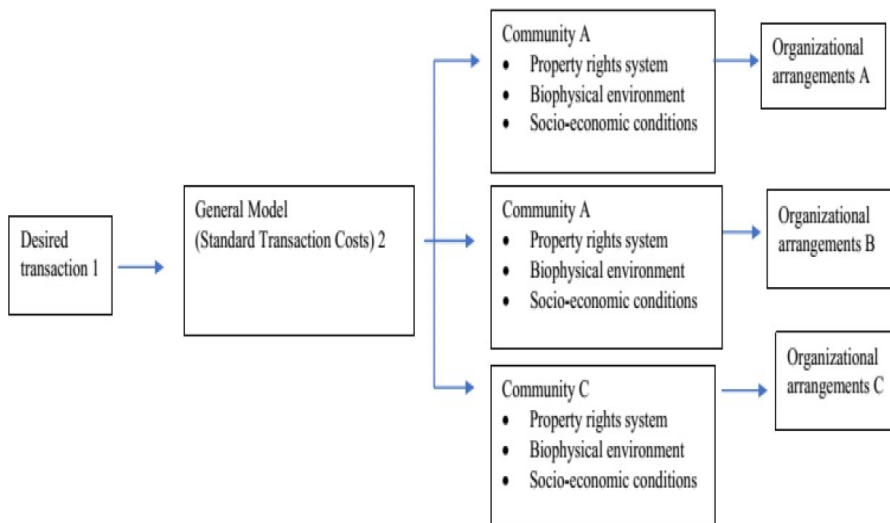
²³ GSMA (2015), see discussion of methodology in Appendix and page 8.

(defined and discussed in section 3.2.2). To ensure data collection and analysis were consistent across markets, the criteria for both urban and rural cash merchants, and dormant, active, and successful cash merchants, were clearly defined.

3.4 Framework and Hypothesis

This paper explores the impact of surroundings on methods to solve moral hazard problems among urban agents as opposed to rural agents through the framework below. This framework aims to combine insights from literature covering property rights, mechanism design, and Elinor Ostrom and her colleagues, particularly the Institutional Analysis and Development (IAD) framework. The framework is designed to be tentative only, serving to obtain initial data for this paper and help encourage additional scholarship, and examining the interplay between organizational arrangements, particularly those to address moral hazard, and property right systems.

Figure 5: Framework for analysis



The desired transaction (Box 1), among agent networks is ‘liquidity’. This involves enabling people to deposit and withdraw funds from their mobile money account, much like a bank branch or an Automated Teller Machine (ATM). Agents engage in liquidity management, managing their reserves of e-money and cash so that they can always honor customers’ demands for one or the other (Kiarie et al., 2018). Each agent obtains reserves of e-money, which it needs to provide liquidity. The agent provides cash to an Orange Mali branch (or a bank branch with reserves of Orange Mali, email, or cash). In exchange, agents obtain an equivalent amount of electronic

money or 'e-money' in their Orange Mali account. The agent then distributes that e-money throughout its network for agents.

The template organizational arrangement (Box 2) is the generalized scheme that Orange Mali might use to address moral hazard among its agents. Such a scheme will seek to address standard transaction costs emerging through the nature of the transaction, in this case whether the good is excludable or subtractable. Mobile money deals with a private good and actors will need to incur costs excluding others from using the good. For example, an agent will need to incur costs protecting cash stored on her premises to be used for mobile money transactions.

This scheme will also address transaction costs emerging from the nature of the transaction, which is a moral hazard problem. This is because the agent may fail to perform this job effectively and then have insufficient e-money or cash to honor customers' requests to deposit or withdraw money, much like an 'out of order' ATM or bank branch. This is because the agent may decide to reallocate her reserves of e-money or cash for other purposes. For example, an agent who also runs a laundromat service may decide to invest her cash reserves into that business. Moral hazard problems are particularly feasible because agents are usually granted considerable autonomy to build sub-agent networks.

The third box aims to explore how Orange Mali, as principal, varies its toolkit for addressing moral hazard across different surroundings, which are different communities in which the firm provides mobile money through agent networks. This involves the exogenous variables that the IAD framework provided – biophysical conditions and socio-economic conditions – and, of particular interest to this paper, the extent to which the surrounding property rights system strengthens the property rights of people in the deal. As discussed above in Section 1, this involves exploring the extent to which third parties define and transfer property rights, private bonding and monitoring, and other infrastructure to support contracting, such as education.

The data from the GSMA is limited to a broad urban-rural divide. A more nuanced analysis would include several different communities, providing insights on patterns of organizational adaption to different contexts.

4.0 Hypothesis, Findings and Explanation

4.1 Hypothesis

Consistent with the general hypothesis in this paper, broadly, when property rights are weaker in a surrounding, a principal will draw on tools from mechanism design, which provides more autonomy to the agent. This means that Orange Mali will use organizational arrangements, which provide more autonomy to agents in rural than urban areas. This autonomy enables the principal and agent to work out substitute methods for observation, verification, and enforcement. Orange Mali wants rural agents to be more self-sufficient/autonomous because it does not know what type of organizational arrangements (contract, handshake agreement, firm, etc) is best suited for different rural areas. This autonomy is a form of 'bridge contracts,' specifically designed to 'leapfrog' weak property rights between urban and rural communities, which amplify observability and moral hazard problems.

Bridge contracts will involve three main features. First, the mobile money firm will incur more significant costs learning about locals in rural than urban areas and determining appropriate mechanisms for observability and verifiability. This is because of lack of publicly available information such as postal systems; birth certificates mean the firm will have less understanding of rural property rights system than urban. The firm will need to develop alternative mechanisms to choose local counterparties.

The second is that contracting in rural areas is likely to be more relational in nature due to challenges with observing, verifying and enforcing agreements (Menard and Shirley, 2022). Such contracts tend to shift from mechanisms relying on contractual enforcement to ones that rely on relationships, and will not be enforced through courts (Menard and Shirley, 2022). Instead, such contracts aim to find other mechanisms to determine appropriate compliance levels and enforcement, such as membership in a well-identified community and informal social norms. This is because of high verification costs in such rural areas.

The third is lower levels of performance, and which level of performance is acceptable to both parties. This is because parties accept that contextual matters mean they cannot fully align incentives. Alternatively, even if they can align incentives,

weak property rights outside of their control impede performance of any mechanisms they design for the purposes of observation and verification. Therefore, this would involve parties, particularly the mobile money firm, accepting a wider set of outcomes in terms of liquidity from a rural rather than urban agent.

4.2 Findings

The GSMA's findings suggest that Orange Mali did vary its contractual arrangements for cash merchant liquidity management systems across urban and rural areas of Mali. In particular, the data suggests that Orange Mali used innovative contractual mechanisms to enable its rural cash merchants to be more self-sufficient than cash merchants in rural areas. This variation appears to centre on the following three points.

4.2.1 More information costs

First, before signing a contract, Orange Mali appears to gather significantly more information on rural than urban cash merchants. Despite some variation in market context, rural cash merchants tend to be older, with more established businesses and a broader product portfolio and are the first to market (GSMA, 2019). This suggests that Orange Mali wants its rural cash merchants to operate with less direct oversight than the firm's urban cash merchants. To support this goal, the firm looks for cash merchants, which signals an ability to manage liquidity, which such merchants signal through more established businesses.

4.2.2 Aggregators

Orange Mali also appears to develop complex contractual relationships with non-bank firms in rural areas, which it does not do with urban communities. In the former, cash merchants can store any excess cash with a bank. As discussed above, banks are less prevalent in rural areas of Mali. Given the vacuum of banks, Orange Mali signs contracts with 'aggregators' (GSMA, 2019). These are larger non-banking businesses that provide liquidity management systems, particularly redemption and issuance of e-money and have presence in rural areas. These include petrol(gas) stations, supermarkets, wholesalers, and large telecommunication dealers.

Aggregators become intermediaries who buy cash and e-money (float) from the provider and then resell it to cash merchants. They are typically paid a share of the percentage earned on cash merchant commissions (generally an 80/20 split, with 20% for aggregators), which creates an incentive to encourage sales and transactions at the local level. Much like a bank branch, aggregators tended to help cash merchants manage their liquidity and answer queries about training, branding, technical issues and more (GSMA, 2019).

Aggregators can use their understanding of local context to perform those roles effectively. Aggregators are located much closer to rural cash merchants than Orange Mali branches, which appears to increase the likelihood that cash merchants will

effectively manage their liquidity (GSMA, 2019). Finally, aggregators can leverage their personal relationship with cash merchants, something that Orange Mali lacks.

4.2.3 Accepting lower levels of performance in rural areas

Orange Mali accepted lower levels of liquidity in urban than rural areas, particularly revolving around liquidity levels. Just 13% of very isolated cash merchants were considered successful.²⁴ Furthermore, most of its cash merchants – 56% – operate near a bank, which is in urban areas. The further these cash merchants are located from banks, commonly in rural areas, the less liquidity they tend to have.²⁵ However, Orange Mali continued to work with illiquid rural cash merchants, suggesting that the firm's willingness to continue contractual relationships is stronger in such communities, even when the cash merchant is unable to perform its role effectively. The intuition may be that over time, a rural cash merchant will become more effective in managing its liquidity.

4.3 Discussion

Broadly, the findings appear to support the contention that weaker property systems, in this case between urban and rural areas, stimulate organizational arrangements which provide more autonomy to local agents. Each method above appears to work towards this end and develop alternative observability and verifiability mechanisms.

4.3.1 Gathering information

Gathering additional information on potential agents serves two purposes in weak property rights systems. One is that it increases the likelihood that the mobile money firm, as principal, chooses a reliable agent who will be able to operate as a largely self-sufficient actor. This is particularly important in rural areas because the weak property rights system means the firm will have challenges observing their actions, and therefore mechanism designs here will require less observation. Furthermore, the absence of banks in rural and frontier areas of Mali makes it particularly important for

24 In the GSMA report, 'isolation' is a sub-segment of the rural definition used in this research and refers to a cash merchant's proximity to the nearest road. Cash merchants who are "very isolated" are roughly more than 2 kilometers from the nearest road, page 12.

25 For instance, Helix found that 72% of cash merchants in Uganda are located within 15 minutes of a rebalancing point (Annabel Lee, *The Future of Uganda's Mobile Money Market: Why Agent networks Are Key to Growing the Sector*, <<https://nextbillion.net/the-future-of-ugandas-mobile-money-market/>>. Similar trends were observed in Mali and Chad, where the average travel time to a financial institution is 27 minutes, respectively. GSMA, note 23, page 21. Moreover, having access to a bank appears a key enabler of success. For example, in Mali, more than half (56%) of successful cash merchants had access to a formal financial service, and it was a key differentiator from an active cash merchant (page 21).

agents to operate, with little training and support from Orange Mali based in urban areas of Mali. A broad product portfolio provides information on the agent's ability to manage e-money and cash reserves and can provide information that an agent will be able to become a successful agent.

A related benefit of gathering information on potential agents is finding an agent who is subject to a range of informal arrangements in the community. Such arrangements can substitute for observing and verification tools that Orange Mali may need to introduce. More established agents are subject to non-contractual relationships of trusts with the community. Instead of monitoring agents itself, Orange Mali can rely upon these informal relationships, operated largely by people living in the community, to ensure that the agent broadly complies with her obligations under the mobile money contract.

4.3.2 More relational contracting

Orange Mali's use of agent aggregators is consistent with several components of relational contracting and reduces the need for costly observation and verification. Aggregator actors tend to have pre-existing presence in such communities. By contracting with an agent, the mobile money firm can access their local knowledge and increase the likelihood that Orange Mali agents will operate efficiently (GSMA, 2014). Furthermore, Orange Mali can delegate the tasks of training, branding technology support and more to agent aggregators, who can use their understanding of local context to perform those roles effectively.²⁶ Furthermore, agent aggregators are located much closer to rural agents than Orange Mali is located, which appears to increase the likelihood that agents will effectively manage their liquidity.²⁷ Finally, agent aggregators can leverage their personal relationship with agents, something that Orange Mali lacks. The ties and incentives embedded within personal relationships substitute for the limited ability of Orange Mali to observe and monitor agents directly.

²⁶ A further 50% of agents reported that their master agent was the first person they called when they faced any type of problem. GSMA (2014).

²⁷ Mali followed a similar trend: 60% of agents reported it is always their master agent who visits them.

5.0 Conceptual and Policy Implications

How, if at all, can insights from this paper, particularly the empirical material from Mali, help scholars and policy makers determine whether they can apply engineering economics to Africa and other developing and middle-income regions? As discussed, this involves including contextual factors – laws, culture, local norms, and other factors – in analysis of what people are doing and how, if at all, to shape the agreements they operate.

The key insight from the paper involves being the type of doctor who studies a patient’s symptoms and *then* prescribes medication. This involves moving away from a one-size-fits-all approach to designing mechanisms, contractual provisions, and other organizational arrangements that engineering economics is increasingly proposing. Instead, firms and policy makers should adopt mechanisms that will better ‘fit’ with individual property rights systems. Scholars and policy makers must take this contextual approach because, as the Malian example demonstrates, contextual matters impact appropriate organizational arrangements.²⁸

The section below explores how the findings from this paper could apply to a subset of engineering economics. These are 'random control trials'.

5.1 Introduction to RCTs

Random control trials (RCTs) have multiplied in number, particularly since the 2019 Nobel Prize in economics was awarded to three pioneers of this tool, Michael Kremer, Abhijit Banerjee, and Esther Duflo. Usually, RCTs involve randomly allocating a treatment to some members of a group and comparing outcomes against the remaining members who did not receive treatment (Muller et al., 2019). The idea is that RCTs allow us to know what works for international development due to its so-called “experimental” approach. For example, a scholar wishing to test whether providing credit helps to grow small firms might partner with a financial organization and randomly allocate credit to applicants that meet certain basic requirements. A year later, the researcher would compare changes in sales or employment in small firms that received the credit to those that did not. Particularly prominent RCTs have

²⁸ The GSMA report concludes by stating “local context matters” to developing appropriate agent relationships and contracts. GSMA, note 23. page 26.

involved experiments in Kenya and India on teacher attendance (Duflo et al., 2012), the extent to which, if at all, providing textbooks increases test scores, the effect of monitoring nurse attendance (Banerjee et al., 2008), and the impact of micro-credit on the lives of borrowers (Banerjee et al., 2015).

The Nobel Committee awarded the 2019 prize to Kremer, Banerjee, and Duflo on the grounds that “their experimental approach to alleviating global poverty” has “transformed development economics” (Barnes, 2019). International organizations have driven the use of RCTs to the purpose which the Nobel Committee identified, particularly the Abdul Latif Jameel Poverty Action Lab (J-PAL). Duflo and Banerjee created J-PAL in 2003. Since then, J-PAL has conducted 876 policy experiments in 80 countries (Banerjee, 2018). RCT programmes that have been scaled up after evaluation by the network’s researchers have reached more than 400 million people (Barnes, 2019). This figure does not include evaluations and field experiments implemented by development economists not affiliated with J-PAL, such as the International Initiative for Impact Evaluation (Barnes, 2019).

Advocates of RCTs argue that this method provides the most reliable evidence upon which governments should make policy. Such evidence is consistent with the broader international emphasize on “evidence-based policy”, comprising “objective”, “rigorous” and “rational” information, and analysis (Muller et al, 2019).

5.2 Critiques

In recent years, scholars have raised a range of concerns about the ability of RCTs to inform public debate about economic development. Critics claim that many experiments violate ethical principles.²⁹

This paper focuses on several methodological concerns raised by scholars.³⁰ For example, problems with quality of data in household surveys hampers the most basic understanding of growth, poverty, and inequality.³¹ Sampling is also a potential challenge given that the village or clusters that are part of the treatment and the control group itself are not always randomly drawn.³² Heterogenous treatment effects can contribute to over-claiming.³³

²⁹ Stephane J Baele, 2013.

³⁰ See, for example, Deaton and Cartwright (2018) who claim that that researchers put “too much trust” into investigation methodologies concerning RCTs Deaton and Cartwright, *Understanding and misunderstanding Randomized Control Trials*

³¹ Deaton (2016), pp. 1223. The scholars focus on India given the difference between national and household survey estimates of per capita income levels in the country

³² Instead, the claim goes that usually populations chosen are a convenient sample that is available

This paper examines a particular methodological problem, which is the challenges of applying results from RCTs in one context to another. Scholars have begun to argue that without understanding context, governments and firms that use the results of RCTs can claim external validity too easily, meaning they can extrapolate and generalize the results of their findings across otherwise unrelated communities.³⁴

Here, 'context' means the property rights system operating around the people who will be subject to an RCT, and ignoring it is a mistake because it is often much more complex than outsiders might presume. Breakthroughs in anthropology and economic development have established that local communities often operate a much more sophisticated local property rights systems than initially presumed.³⁵ Material from Professor Elinor Ostrom and her colleagues is particularly informative in identifying the complex ecosystems of property rights, which people use to manage common pool resources (Ostrom, 1990).

Increasingly, scholars in economic development and neighbouring disciplines, such as medicine, are claiming that 'context' matters for the design of RCTs.³⁶ For example, as Cowen et al. (2017: 265-92) explain:

Some interventions will work only because of very special circumstances; they can work in some places but don't have a widespread potential to succeed. Even those that have widespread potential do not operate on their own; they will work only when the requisite support factors are in place, or some suitable substitute for them.³⁷

to those running the experiments/RCT. Therefore, the sample used for computing average treatment effects might not provide representative estimates of the average treatment effect of the program. For instance, household (HH) surveys in Africa are "often weak, often outdated, are sometimes inconsistent over time within countries, have nonmatching definitions – different reporting periods, or are surveyed at different times of year, either over time or over countries, so that it is extremely difficult...to make comparisons of poverty or inequality between countries". It is to be noted that HH surveys focus on global poverty and global inequality wherein the former requires HH survey data to understand uniformity which in turn leads to issues in the global context. (Deaton 2016), pp.1224

33 Further, that the average treatment effect obtained from any given RCT may be in fact only as good as the study sample from which it was obtained leading to heterogenous treatment effects, which in turn contribute to over-claiming. A useful example of this would be in the context of Purchasing Power Parity (PPP) rates wherein problems arise because this index "has properties that are not always well understood". (Deaton 2016), pp. 1225. Often PPP indices are subject to change owing to "substantial methodological revisions" although variations may also arise owing to the choice of goods for sampling, the sampling of prices itself, choice of index formulae (eg. Laspeyres/Paasche).

34 See a related point in Deaton and Cartwright, Understanding and misunderstanding Randomized Control Trials, 'Abstract'

35 See, for example, Jean Ensminger Making a Market: The Institutional Transformation of an African Society (Political Economy of Institutions and Decisions).

36 McCormack et al, 2002; Seckinelgin, 2016; Waters et al, 2006, 288; White n.d.

37 See also Lant Pritchett and Justin Sandefur, Learning from Experiments when Context Matters! Our

Despite the growing acceptance of the importance of context, many scholars are unsure how to incorporate this feature in either the design of RCTs or the extrapolations to be taken from them.³⁸ This is at least partly because of lack of understanding about what comprises context and then a lack of attention to it.³⁹

Failing to analyze a community before designing an RCT creates two limitations. One, scholars do not understand the most pressing constraints in a community, and thus the jobs an RCT should perform. Scholars believe they know the problem to be solved and that the RCT should provide incentives to solve that problem. Without studying a community, scholars cannot know that problem. Such scholars are behaving like a doctor who prescribes medication ('solution') for a patient (a community) without asking the patient about her symptoms (the property rights systems and imperfections with it).

Another related problem is that without studying a community, scholars face difficulties in explaining the outcome of an RCT. A range of academic material has explained that a key reason for people's behaviour is the context in which they operate.⁴⁰ Without including context in a meaningful way, scholars struggle to explain what has happened.

5.3 Relevance for Financial Inclusion

Failing to understand context impedes the usefulness of RCTs for financial inclusion. This is because many developing countries operate in highly decentralized property rights systems, making it difficult to extrapolate between two communities. Rural and frontier communities tend to operate on local, informal property rights systems, often based on customary rules, with little or no interaction with the formal government or firms.⁴¹ Such communities often vary significantly from each other, particularly in

results suggest that as policymakers draw lessons from experimental impact evaluations, they would do well to focus attention on heterogeneity in program design, context, and impacts, and may learn little from meta-analyses or "systematic reviews" that focus exclusively on rigorous estimates of average effects for broad classes of interventions (e.g., microcredit) across contexts that differ in income by an order of magnitude, and with big differences in social, institutional, political, and infrastructure conditions.. See also As Pritchett and Sandefur also point out, empirical heterogeneity across contexts in nonexperimental estimates of treatment effects in development economics is large: (Pritchett and Sandefur 2015), pp. 473. See especially Cowen et al. (2017).

38 See for example, Cowen et al, who claim that "That context matters is fast becoming accepted across the EBP literature, but its substantive implications are not."

39 See, for example, Pritchett and Sandefur, who claim that context includes a long list of unknown factors which interact in often unknown ways". Pritchett and Sandefur, *Learning from Experiments where Context Matters*, pp. 474.

40 Again, the literature is far too extensive to cite in this paper. An interesting starting point is Mark Granovetter, *Economic Action, and Social Structure: The Problem of Embeddedness*, *American Journal of Sociology* Vol. 91, No. 3 (Nov. 1985), pp. 481-510 (30 pages)

41 Generally low-income, rural communities operate through informal, irregular employment, with little if any recourse to formal contracts and other enforcement organizations such as courts.

countries with weak states. For example, over 75% of Nigerians live in rural, largely decentralized communities comprising a variety of customs, languages, and traditions among the country's 250 ethnic groups.⁴² The relative weakness with the Nigerian State stems from many rural and frontier areas in Nigeria, operating as largely self-governing communities (Akinola, 2008). In turn, this means that any firm or government seeking to move into such communities may need to adapt their products, contracts, and other arrangements so that they can 'fit in' with such communities.

Without understanding context, scholars will struggle to design RCTs that enable firms to move beyond urban areas into these largely decentralized rural and frontier communities. Scholars will also struggle to understand the results of any RCTs they design.

An RCT in-context approach, introduced above, can help design more tailored RCTs and is appropriate given it matches what firms are already doing. The next section explains how empirical data from the paper can inform an RCT in context approach.

5.4 Using Results from the Paper

How, if at all, can insights from this paper, particularly the empirical material from Mali, help scholars and policy makers design effective RCTs, particularly for the purposes of financial inclusion? This paper can contribute to beginning a discussion on this process.

A key insight from the Mali data is the importance of moving away from a blanket, nationwide approach, to designing RCTs and related interventions. Instead, scholars and policy makers should use a more nuanced approach involving designing interventions that can work effectively in specific communities. This involves designing RCTs that are appropriate for the 'context' in which they are designed to operate. Such RCTs must explore how to support people in performing jobs that are appropriate for that context.

An RCT in context approach reveals that scholars may need to think creatively and design interventions that are specifically suited for rural communities, as opposed to urban areas. Such interventions should be targeted still further by being adapted across different types of rural communities.⁴³

The following provide several potential starting points for designing RCTs that are specifically suited for rural areas, given the limitations with roads and other infrastructure, lack of banks, and other factors discussed earlier in this paper. Such starting points are preliminary only and should be adapted for individual communities.

(Rutherford, note 8, 2009).

42 "Demographics of Nigeria." n.d. Accessed September 27, 2022. <https://www.cs.mcgill.ca/~rwest/wikispeedia/wp/d/Demographics_of_Nigeria.htm>.

43 See related material in GSMA (2015)

One avenue involves designing innovative technological innovations specifically designed to stimulate contracting in rural areas, given the challenges of using traditional contracting techniques. For example, scholars could experiment with analyzing telecommuting call records (CDR) and mobile money transactional data. Doing so could help firms identify regions with higher transactional potential in which cash merchants might operate profitably.

Firms could also experiment with contractual innovations in rural areas, and carefully designed RCTs could support this process. Firms could also follow the broad approach that Orange Mali uses, in which a potential cash merchant has a wider product portfolio, illustrating this person's ability to invest in mobile money.

A related intervention would involve RCTs that try to help build aggregators in urban areas. The data on Orange Mali suggests that such actors are particularly important. The key would involve trying to understand how to build aggregators in different environments, such as different strategies across urban to rural and between rural communities.

RCTs could also revolve around new payment products specifically tailored to rural customers and other contractual innovations that might support cash merchants in such communities. This could include training cash merchants with tools to launch additional ancillary businesses, and developing partnerships with companies in other industries, including agricultural suppliers. These could come from a range of sources such as petrol station networks and fast-moving consumer goods sectors that already operate in rural areas (Unnikrishnan, 2019). RCTs could explore the extent to which partnerships enable mobile money firms to identify and recruit potential cash merchants and manage existing cash merchant networks.

Scholars could also stimulate RCTs through government policies. For example, scholars could design an RCT that involves digitizing direct benefit transfer payments to rural areas (GSMA, 2015). Doing so could potentially begin the process of growing demand, which then makes agent networks viable. Governments could also provide subsidies or revenue guarantees for mobile money firms trying to build rural agent networks as a means of subsidizing the risk (GSMA, 2015). Also, it has become increasingly common for governments to make mobile money firms liable for actions of their agents.⁴⁴ Doing so could potentially make mobile money firms more conservative on their choice of agents and refuse to move into rural areas. Policy makers may consider trials of not making mobile money firms liable for their agents and observe the impact of growth. To that end, one RCT might involve exploring the extent to which regulating cash merchants more lightly in rural areas stimulates the formation of cash merchants.

⁴⁴ Section 14(4) of Kenya's National Payment System Regulations was a first mover, later copied by many countries (examples).

5.5 Going Further

Scholars need several tools to better understand how to design context-specific RCTs. One of these is the operation of property rights systems in a specific community. Current strands of property rights focus on the extent to which actors define, defend, and transfer property rights (Anderson and McChesney, 2003). Other scholars such as Ostrom, discussed above, focus on property rights systems within common pool resources (Ostrom, 1990). The next steps involve trying to pull together these streams of research to understand the operation of property rights within a certain community.

The next related stream of required research is understanding the binding constraints within an individual community, which is relevant to understanding what an RCT should do in that community. What part of a property rights systems is breaking down? An RCT should aim to fix such a problem. To this end, one approach to developing this line of research involves exploring the type of diagnostics that economics has produced, particularly the work in the last twenty years on this topic (Rodrik, 2010).

Finally, research is needed into the interaction between organizational arrangements (contracts, firms, informal arrangements) and surrounding property rights systems, including institutions. This is relevant for trying to project the consequences of choosing an RCT in each context. For example, this involves understanding how a contract might operate in Nairobi (where roads, courts, and other components of a property rights system operate relatively well) compared to Wajir (where these component parts operate much more poorly). Currently, there is little research in understanding the interaction process discussed above. Instead, research tends to focus on firms, organizations (such as the work of Oliver Williamson) or institutions (such as the work of Douglass North) (Ménard, 2014).

6.0 Conclusion

A deeper understanding of transaction costs emerges from the property rights system surrounding people wanting to work collectively and can enable scholars and policy makers to adapt mechanism design, market design and related fields of economics to new environments, particularly communities in Africa and other developing and middle-income regions. Primarily, data from mobile money in Mali suggests that the boundaries of the firm are shaped by far more factors than hold up problems: lack of infrastructure and information on particular communities appear relevant.

Moving forward, scholarship needs to begin by clearly linking organizational arrangements with contextual variables. Section 5 provides primarily ideas for such an appropriate study for doing so. Moving forward, scholars could look for patterns between desired organizational arrangements and actual arrangements once contextual factors are considered.

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Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

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