

Management of Bureaucrats and Public Service Delivery: Evidence from the Nigerian Civil Service*

Imran Rasul Daniel Rogger[†]

September 2013

Abstract

We study how the management practices that bureaucrats operate under, correlate to the quantity and quality of public services delivered. We do so in a developing country context, exploiting data from the Nigerian Civil Service linking public sector organizations to the projects they are responsible for. For each of 4700 projects, we have hand coded independent engineering assessments of each project's completion rate and delivered quality. We supplement this information with a survey to elicit management practices for bureaucrats in the 63 civil service organizations responsible for these projects, following the approach of Bloom and Van Reenen [2007]. We find that management practices bureaucrats operate under matter: a one standard deviation increase in autonomy for bureaucrats corresponds to significantly *higher* project completion rates of 18%, and a one standard deviation increase in performance-based incentives corresponds to significantly *lower* project completion rates of 14%. The backdrop to these results, where 38% of projects are never started, implies these magnitudes are of economic significance and the potential gains to marginally changing management practices for bureaucrats in this setting are huge.

Keywords: autonomy, bureaucracy, performance incentives.

JEL Classification: H00, H11, J33, J38, M1, O20.

*We gratefully acknowledge financial support from the Federal Government of Nigeria; the International Growth Centre [RA-2009-11-018], the Economic and Social Research Council [ES/G017352/1], the Institute for Fiscal Studies, and the Royal Economic Society. We thank the Presidency and the Office of the Head of the Civil Service of Nigeria for their support. We are grateful to the many government officials who have assisted us during this project but are too numerous to name individually, Orazio Attanasio, Oriana Bandiera, Marianne Bertrand, Nick Bloom, Richard Blundell, Tom Crossley, Jishnu Das, Christian Dustmann, Ben Faber, Lucie Gadenne, Rachel Griffith, Larry Katz, Henrik Kleven, Guy Laroque, Willy McCourt, Jonathan Phillips, Carol Propper, Juan Pablo Rud, Marcos Vera-Hernandez, Martin Williams and seminar participants at Abuja, CMPO, CSAE, IFS, Koc, UCL, and the World Bank Nigeria Country Office for valuable comments. All errors remain our own.

[†]Department of Economics, University College London, and Institute for Fiscal Studies. Emails: i.rasul@ucl.ac.uk; d.rogger@ucl.ac.uk.

1 Introduction

We study the correlates of effective public service delivery in an important developing country context: Nigeria. To do so, we combine two data sets we collected that link the outputs of government bureaucracies with data on how bureaucrats are managed. On outputs, we use project level data measuring the completion, quality and complexity of over 4700 public sector projects implemented by organizations in the Nigerian civil service, including government ministries and other federal agencies. On management, we adapt the methodology set out in Bloom and Van Reenen [2007]’s pioneering work, to measure management practices for bureaucrats along multiple dimensions, in each civil service organization. Our study then sheds light on the relationship between the management practices in place for bureaucrats in each organization, and the quantity and quality of projects delivered by the organization.

Public services account for a substantial share of all economic activity; in social sectors such as health, water and education, government provided services are often especially important. Hence from a macroeconomic perspective, the effective functioning of the bureaucracy is an important determinant of economic growth, poverty and inequality. Effective public service delivery also matters from a microeconomic perspective: program evaluations of micro-scale interventions are often partly motivated by the assumption that successful interventions can be faithfully scaled-up by governments.

However, despite the importance of government effectiveness for citizen welfare, the literature on public administration is almost devoid of concrete evidence linking practices in civil service organizations to public goods outcomes [Goldfinch *et al.* 2012]. At the same time, economic analyses of incentives in the public sector have largely focused either on the selection and motivation of *politicians* [Besley 2004, Gagliarducci and Nannicini 2013], or on the response to incentives of *frontline* staff such as teachers and health workers [Glewwe *et al.* 2010, Muralidharan and Sundararaman 2011, Duflo *et al.* 2012, Ashraf *et al.* 2012, Miller and Babiarz 2013]. In both rich and poor country contexts, there is little evidence linking the managerial practices that the vital middle-tier of *bureaucrats* operate under, to public service delivery. It is this gap our analysis starts to fill.¹

Banerjee *et al.* [2007] highlight two constraints restricting research on public good provision in developing countries: (i) the process of project implementation is rarely quantifiable; (ii) public good quality is difficult to measure. The data we utilize allows us to make progress on both issues. More precisely, we exploit a unique period of history for the Nigerian civil service, during which the activities of public organizations were subject to detailed and independent scrutiny. As part of this process, quantitative information was collected to measure the actual *implementation* success and *quality* of public sector projects in the social sector domains of health, education and infrastructure. The scrutineers were independent teams of engineers and members of civil society.

¹One recent exception is Dal Bo *et al.* [2013] who present evidence from Mexico, exploiting experimental variation in salaries to identify their impact on the *selection* of public sector officials. We return to discuss the relation between our work on management practices with this line of work in the conclusion.

We have hand coded this information to obtain potentially unbiased assessments of individual project completion rates and their quality, for over 4700 public sector projects that began in 2006/7. The bulk of project types we study are construction projects, such as boreholes, buildings, dams and roads. We have also used the technical documents available for each project, to work with engineers to construct measures of each project’s *complexity*, following engineering best-practice [Remington and Pollack 2007]. The aggregate budgetary cost of the projects we study is US\$800 million or 8% of all social spending in Nigeria over this period.

To measure the management practices that bureaucrats operate under, we follow Nick Bloom and John Van Reenen’s pioneering work [Bloom and Van Reenen 2007, 2010; Bloom *et al.* 2012, 2013], adapting their management surveys to the Nigerian public sector setting by taking account of insights from public administration literature on the management of bureaucrats [Rose-Ackerman 1986, Wilson 1989]. We collected data on management practices for 63 organizations of the Federal Civil Service in Nigeria, including central ministries, that represent the most important service delivery agencies in the social sectors that we study. For each organization, we derive three measures of management practices: one broadly related to the *autonomy* provided to bureaucrats; one related to the provision of performance-based *incentives* and *monitoring* of bureaucrats; and one capturing multiple other aspects of management practices.

The autonomy index we construct captures the extent to which: (i) bureaucrats can input into policy formulation and implementation processes; (ii) the flexibility with which an agency can re-organize its bureaucrats to respond to best practice and project peculiarities. There are long-standing views in the public administration literature on the importance of autonomy. As Rose-Ackerman [1986] describes, at one extreme lies the view that public agencies ought to delegate as much decision making to bureaucrats as possible, relying on their professionalism and resolve to deliver public services [Simon 1983]. At the other extreme lies the Weberian view that, because the objectives of bureaucracies and society diverge, only an entirely rules-based system of public administration, that leaves little to the individual judgement of bureaucrats, can ensure consistent and acceptable levels of public service.

The second reason to focus on autonomy stems from the economics of organizations literature. Despite the early prominence of autonomy in this literature [Simon 1951, Harsanyi 1978], and the more recent contribution of Aghion and Tirole [1997] that has led to a theoretical resurgence of interest in how autonomy and decisions are allocated, little empirical evidence exists on the causes and consequences of providing autonomy in organizations. Our analysis also starts to fill this gap.

The performance-based management index we construct captures the extent to which an organization collects indicators of project performance, how these indicators are reviewed, and whether bureaucrats are rewarded for achievements reflected in these indicators. We view this as a second important dimension of management practices given the enormous economics literature on incentive theory that stresses the positive impacts performance incentives and monitoring capabilities have on organizational performance. However, the impacts of such incentives in public sector settings is more uncertain because: (i) the outputs provided by the public sector might be more complex, there might be competing views on the right way to implement them, and bureaucratic

objectives are not clear cut [Besley and Ghatak 2007]; (ii) the characteristics of public and private sector workers might also differ, so for example, performance incentives can crowd out the intrinsic motivation of those that self-select into the public sector [Perry and Wise 1990, Benabou and Tirole 2006, Francois and Vlassopoulos 2008].²

We probe these issues by exploiting a third data source: a survey we fielded to a representative sample to over 4100 civil servants, corresponding to 13% of the total workforce of the 63 organizations we study. This asked bureaucrats questions related to their tenure and intrinsic motivation, their perceptions of corruption in the organization, and their employment histories as bureaucrats. We use this evidence both to shed light on how the impacts of management practice vary with bureaucrat characteristics, and also to address econometric concerns related to non-random sorting of bureaucrats into organizations as a function of the management practices in place, or the endogenous determination of management practices as a function of bureaucrat characteristics.

Central to our empirical method is that, for any given project type, *multiple* organizations are observed conducting similar project activities. For example, small-scale dams are constructed by the federal ministries of water, agriculture, and environment. We therefore assess how the delivery of the *same* project type varies depending on the management practices in place for bureaucrats in the specific organization responsible, holding constant all other project characteristics, such as their complexity and scale, as well as other characteristics of the organization and bureaucrats.

We present three core findings linking civil service management practices and public service delivery in Nigeria. First, the management practices bureaucrats operate under matter. Despite the measures of management practice related to autonomy and performance incentives being positively correlated to each other, they have *opposing* correlations with the quantity of public service delivery: a one standard deviation increase in autonomy for bureaucrats corresponds to significantly *higher* project completion rates of 18%, and a one standard deviation increase in performance-based incentives corresponds to significantly *lower* project completion rates of 14%. The backdrop to these findings in Nigeria, where 38% of public projects are never even started, implies these magnitudes are of economic as well as statistical significance. Hence if these results reflect causal impacts, they suggest the potential gains to marginally changing management practices are huge.

Second, we find management practices correlate to *quality-adjusted* project completion rates in

²In education, positive impacts of pay for performance for teachers have been documented using RCTs in developing countries by Glewwe *et al.* [2010], Muralidharan and Sundararaman [2011], and Duflo *et al.* [2012], although Fryer [2013] finds zero or even negative impacts in the US. In health, a nascent literature documents positive impacts of performance pay in developing countries when provided to frontline workers [Miller *et al.* 2012, Miller and Babiarz 2013]. In line with our findings, Ashraf *et al.* [2013] document how non-monetary incentives elicit far more effort than monetary incentives for such tasks. In job placement and training, Burgess *et al.* [2011] report no mean impacts of performance pay for public sector teams in the UK, Heckman *et al.* [1997] report more positive impacts from the US, and Courty and Marschke [1997] present evidence of gaming in response to these incentives. Olken *et al.* [2012] document how relative performance incentives between Indonesian villages has little long term impact on the use of block grants provided for health and education goods and services. Perry *et al.* [2009] and Hasnain *et al.* [2012] present literature reviews suggesting a lack of evidence that incentives positively impact bureaucrat behaviors. Hasnain *et al.* [2012] and Muralidharan [2012] provide extensive discussions of why performance related pay might be specifically suboptimal in the public sector.

similar ways as documented for project completion rates: higher levels of autonomy for bureaucrats are associated with projects being of significantly higher quality; higher levels of performance-based incentives are associated with projects being of significantly lower quality, all else equal.

Our third set of results use the lens of contract theory to understand further why each dimension of management practice impacts organizational output in these opposing ways. For example, one class of model emphasizes potentially negative impacts of performance-based incentives relates to multi-tasking [Holmstrom and Milgrom 1991]: the provision of potentially more narrowly defined performance incentives, perhaps those that are more easily observed and contractible upon, can skew the allocation of agent's effort towards those rewarded aspects, reducing output overall. We present evidence that lines up well with this prediction: we find the negative impact of incentive based practices are even greater for more complex projects, and for projects that organizations implement less frequently and might be less specialized in.

A second characteristic considered relates to the literature suggesting performance-based incentives might crowd out the intrinsic motivation of public sector workers, or through other psychological channels [Gneezy *et al.* 2011]. We find evidence that the negative impact of performance-based incentives to managers is *offset* by the share of bureaucrats that are intrinsically motivated. Hence the provision of performance-based incentives does not crowd out effort among intrinsically motivated bureaucrats. If anything, our evidence suggests crowding-in of bureaucrat effort in the presence of management practices related to incentive provision.

While the recent economics literature has emphasized the role of intrinsic motivation, a long-standing literature in public administration emphasizes that civil servants pursue their self-interest [Tullock 1965, Downs 1967, Buchanan 1978, Wilson 1989]. This more negative view of bureaucrats spurs our final set of results, that explore how the impacts of management practices are mediated through *perceptions of corruption* among civil service organizations, as elicited in our civil servant survey. We find a large negative impact on completion rates of perceptions of corruption in organizations, but that the negative impacts of performance-based incentives do not vary with perceptions of corruption. Whatever are the practices related to performance incentives in place, they appear not be sufficiently high powered to offset the most corrupt practices.

Establishing a causal relation between management practices for bureaucrats and public sector projects delivered is not straightforward. To provide support for a causal interpretation of our results linking management practices to project outcomes, we tackle three econometric challenges: (i) projects being *assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined by bureaucrat characteristics or project outcomes.

The central contribution of the paper is to provide novel evidence on how management practices for bureaucrats in civil service organizations relate to effective public sector service delivery, and how the impacts of each dimension of management practice vary across the characteristics of projects, organizations, and bureaucrats. Our results point to new directions for theoretical research to better understand the contracting environment in public bureaucracies, as well as

highlighting specific areas in which the better measurement of inputs and outputs of public sector organizations can aid our understanding of public service delivery in the developing world.

The paper is organized as follows. Section 2 overviews the relevant aspects of the Nigerian civil service. Section 3 details our data sources and empirical method. Section 4 presents our core results linking public service delivery and management practices for bureaucrats. Section 5 provides evidence to address econometric concerns to help underpin a causal interpretation of our findings. Section 6 concludes with a discussion of the implications of our results for optimal management practices in Nigerian bureaucracies, outstanding methodological issues to be tackled, and links our findings to the wider literature on improving public services. The Appendix presents further data description and robustness checks.

2 Institutional Background

Nigeria is Africa’s most populous country, home to 160 million individuals, double the size of any other African country and representing 20% of all the population of sub-Saharan Africa. It is thus a leading setting in which to understand the determinants of public service delivery in the developing world. It also shares important characteristics with other developing countries: government expenditures represent 26% of GDP, it has generally weak institutions holding government to account, and corrupt practices in public sector organizations are commonplace.³

The transfer of institutions modelled on its colonial power also mirrors the history of other Commonwealth countries. The administration of these territories was undertaken by the British Crown until Nigeria’s independence in 1960, when it passed to the newly formed Nigerian government. The colonial government fashioned its Nigerian administration after the British Parliamentary Civil Service System, and this is essentially what passed to the independent government of Nigeria. Since independence, Nigeria’s political history has been marked by a series of military dictatorships, each accompanied by changes in the country’s constitution. The country returned to civilian rule with Presidential elections in 1999 and celebrated its first civilian-to-civilian transfer of power in 2007. Although there have been a number of periodic reforms of the civil service, and despite the fact that Nigeria has moved to a Presidential system of government, Nigeria’s civil service structure still largely replicates its British colonial origins.⁴

³According to the International Monetary Fund World Economic Outlook Database (October 2012), government expenditures as a percentage of GDP are 28% in India, 21% in China, 30% in South Africa and 27% in Kenya. Nigeria’s public sector is ranked in the bottom decile of countries rated by Transparency International’s Corruption Perceptions Index. Whilst there was a gradual improvement until 2005, Nigeria’s Corruption Perceptions Index rating has been relatively stagnant since then. Other measures, such as the Ibrahim Index of African Governance and Worldwide Governance Indicators Control of Corruption scores paint a similar story.

⁴The constitution adopted since 1999 has many similarities with that of the United States Constitution. Legislation is enacted by a bicameral National Assembly composed of the Senate and the House of Representatives. Each federal state has its own government headed by a Governor and a state parliament. Although the introduction of a Presidential system of government in 1979 saw initial reforms to the civil service, for example under the 1988 Civil Service Reorganization Decree No. 43, later decrees reversed some of these changes.

2.1 Civil Service Organizations

The Nigerian civil service is organized around the federal structure of the nation’s polity, so that there are federal, state, and local government civil services. Our analysis relates exclusively to federal civil service organizations. Various *organizations*, including ministries, are established by statute to render specified public services.⁵ Table A1 lists the 63 federal civil service organizations we study. These include ministries of health, education, environment, and water resources, and organizations that have regional bases (such as seven federal polytechnics, twelve federal medical centres, twelve river basin development authorities etc.). Table A1 highlights how these organizations vary in the size of their budgets, staffing levels, and decentralization from central government. The federal ministries are typically the largest in terms of budget, with regional organizations typically having fewer staff and being deconcentrated from central government.⁶

Each civil service organization is tasked to provide various types of *project*. These include construction projects: boreholes, buildings, roads and canals; as well as non-construction projects such as procurement, training, and advocacy. Crucially for our analysis, for any given project type, *multiple* organizations are observed conducting similar project activities. For example, small-scale dams are constructed by the federal ministries of water, agriculture, and environment, and by all of the river basin development authorities. We therefore assess how the delivery of the *same* project type varies depending on the incentive structures in place for bureaucrats in the specific organization responsible, holding constant other project and organizational characteristics.

Underlying our analysis is the notion that the objectives of civil service organizations do not run entirely counter to completing projects assigned to them. Although the true objectives of any organization are open to discussion, our analysis is informative on the importance of management practices as long as these organizations place *some* weight on project completion rates. Anecdotal evidence suggest senior management have sometimes been removed on the basis of poor project completion rates. Indeed, our management survey documents the use of performance indicators to incentivize bureaucrats. In the civil servant survey we administered, 74% of bureaucrats report that they “always or frequently expect to be held accountable for breaking the Public Service Rules” related to project implementation. Finally, the OPEN projects we focus on constitute 46% of total capital expenditure of organizations, so they undoubtedly represent an important element of what organizations are responsible for overall.

⁵The Civil Service is governed by a set of Public Service Rules and Financial Regulations, *ad hoc* Circular Instructions, decrees circulated across government, and Gazette Notices (decrees published in the Government’s gazette). Together these outline the laws regulating the business of government, and cover service appointments and exits, discipline, salaries, management of public funds, and other major aspects of official assignments.

⁶Budget figures are averages for 2006-10. Staff numbers are taken from administrative data for 2010. In the few cases such administrative records are unavailable, we estimate staff numbers from personnel expenditures (which are correlated with staff numbers by more than .9). ‘Concentrated’ organizations refer to the central organizing authority for the sector, with a direct line of responsibility to the President and the National Assembly. Decentralized organizations refer to those whose day-to-day running is largely independent of the central authority. They have boards of governors that make decisions over policy and operation, and they have a separate budget line to central ministries. In line with the literature, we refer to such organizations as being ‘deconcentrated’ or ‘fiscally decentralized’.

2.2 The Assignment of Civil Servants and Projects to Organizations

The Head of the Civil Service of the Federation organizes the postings and conditions of Nigeria's federal civil servants. Our representative survey of 4100 individual civil servants confirms this: 88% of civil servants said they had no influence over their initial posting; 60% report their current posting being 'at random', with a further 22% reporting being transferred across organizations on an impersonal basis. Hence it is unlikely that bureaucrats self-select into organizations on the basis of the management practices in place. Indeed, we later document there is little correlation between the management practices in place and bureaucrat characteristics such as their average tenure, intrinsic motivation or perceptions of corruption.

Once posted, civil servants tend to enjoy job security. Our survey reveals mean tenure at the *current* organization to be almost 13 years. For senior managers (those above grade level 12) this rises to almost 16 years. The survey also reveals that movements across organizations are rare: 67% of bureaucrats report never having moved organization, despite very long tenures in the civil service. This lack of mobility might slow down the rate at which knowledge and implementation of the optimal management practices spreads through the bureaucracy. If so, this friction leaves scope for management practices to impact, on the margin, organizational activities such as project completion rates that we focus on.

Projects are assigned to organizations centrally by the National Assembly, that enacts a budget law defining the profile of projects to be implemented each fiscal year. The projects we study were all established in law by Budget Appropriation Bills passed in 2006 or 2007. The passage of these bills is as follows. Having received inputs from the executive branch of government, a draft Appropriation Bill is presented to the National Assembly. The draft bill is then split into sectors (water, health etc.) and sent to sectoral committees of the House and Senate. These committees are delegated to hold hearings with relevant parties, scrutinize the proposals and define budgets for organization. These committees are staffed by politicians with qualifications or experience in the relevant sector. These sectoral committees then recommend a budget for the sector to an Appropriation Committee which merges the recommendations into a single budget. This unified budget is then voted on by both houses to form that year's Budget Appropriation Bill. This legal document then defines the responsibilities of government organizations in terms of projects to be delivered. Once a project is assigned, the organization's chief executive officer delegates the planning and delivery of these projects to the relevant sub-departments.

2.3 Management of Bureaucrats

It is at this point that the *management* of civil servants becomes crucial for the transformation of government plans into public service delivery. The chief executive and other senior managers of the organization can marshal changes in management culture. Directorate-level staff at the organization have some room to determine their department's management practices, with responsibility to the chief executive for their department's activities. However, the chief executive is ultimately held accountable for the performance of the organization.

To better understand how management practices evolve in organizations, we held structured interviews at four of the federal organizations in our study. These revealed three common themes in determining the management practices in place in any given organization: (i) the Public Service Rules of the Nigerian civil service establishes guidelines on how bureaucrats should be incentivized, and these are common to all federal organizations; (ii) the history of senior management staff that have worked in an organization that each might bring their own innovations to bear; (iii) the role of external events such as demands of trade unions. Taken together, these interviews consistently emphasized the nature of management practices in the civil service organizations to be *slowly evolving* over time, and not necessarily tailored to maximize public service delivery of the types of project organizations are used to being assigned.⁷

Clearly, a central econometric concern for our analysis is the potential for there to be reverse causality so that bureaucrat characteristics/effectiveness drive the management practices in place. While we cannot rule this out entirely given our data, we also reiterate that such processes for how management practices were determined were not mentioned in any of the structured interviews conducted. We return to consider this issue in more detail as part of the econometric concerns dealt with in Section 5.

3 Data and Empirical Method

3.1 OPEN Data on Project Completion and Quality

The Nigerian Government began a program of sweeping reforms in the major organs of government in 2003 [Nkonjo-Iweala and Osafo-Kwaako 2007]. Years of military rule had undermined the country’s public institutions and the newly-elected President began his second term aiming to strengthen Nigeria’s economic position. A fiscal rule was introduced to de-link public expenditures from volatility in oil-revenues, state institutions were privatized, and a number of sectors deregulated to encourage private sector participation. As a result, the Nigerian Government received cancellation of its external debt to the tune of US\$18 billion from the Paris Club.⁸

⁷The structured interviews and responses were broadly similar across the four organizations. These took place more than two years after the other surveys were fielded. In the Nigerian public sector, management practices are said to take the Public Service Rules as their foundation. These rules provide the framework for the running of the public service, including rules around the distribution of authority, the nature of discipline, the provision of training, and so on. In each of the organizations we visited, these were said to be central to determining management practice. However, we were repeatedly told that a secondary influence on an organization’s management practices was the history of management staff who had worked at the organization. Officials are promoted into management positions based primarily on tenure. Views on management practices are said to be aggregated by committee, with the chief executive marshalling, rather than defining, the direction of reform. This situation, we were told, leads to a relatively slow changing management environment, but one that over the years can lead to substantial divergence in management practice across organizations. It was consistently argued that the set of all managers were important to management, rather than just the chief executive. Finally, external events, such as the demands of trade unions, were said to have a third-tier influence and constrain management practices.

⁸It was public knowledge that Nigeria had received debt relief, and it was stated early that as a result funding would be directed to the social sectors. Of course, each organization would be unaware of how much additional funding it might receive until any Appropriation Act is signed into law.

At the federal level, the annual savings from debt interest were channeled into the social sectors that are our focus. The Presidency saw this as an opportunity to track the effectiveness of government expenditures, and so in 2006 and 2007 the Nigerian Government undertook the Overview of Public Expenditure in NEEDS, known as the ‘OPEN initiative’, in which it traced, at a project level, the use and impact of 10% of *all* federal Government social sector expenditures approved between 2006 and 2007.⁹ The projects selected to be part of the OPEN initiative were designed to be representative of existing social sector expenditures, but also to be informative for those projects that were most needed to be scaled-up nationwide.

Under the OPEN initiative, visits to public projects by expert teams identified the extent to which they had been implemented as planned in the Federal Budget, and embodied in each project’s technical document. The Presidency contracted national and regional teams to undertake the monitoring process outside of the institutions of the civil service. Hence the public sector projects were *not* evaluated by potentially biased civil servants, but rather by teams of independent engineers and civil society. The engineers evaluating the projects were not those working on the project sites and the civil society groups were recognized third sector organizations.¹⁰

We consider projects traced under the OPEN initiative that were approved in the 2006 or 2007 federal budgets. Monitoring teams visited the relevant project sites around 18 months after the project was centrally approved. All the projects we study had twelve month completion schedules, so that even accounting for any delay in the disbursement of funds, it is feasible for these projects to be completed by the time of the monitoring survey.

The OPEN evaluation teams coded: (i) whether the project had started; (ii) its stage of completion; (iii) the quality of the inputs and work. Our main outcome variable is a *continuous* measure, from zero to one, of project completion rates. A recorded completion rate of zero does not imply the organization never even attempted to work on the project. Rather, the project might have been formulated and prepared, with responsibility for implementation having been delegated to a department and bureaucrats within the organization. At that point however, progress on the project halted, with funds either being returned due to lack of use, or being lost. We cannot distinguish whether this lack of implementation reflects active or passive waste [Bandiera *et al.* 2009].¹¹ A completion rate of one implies the project matched its full specification. For the infrastructure project types we consider, the full completion of the project nearly always implies it can be utilized by intended beneficiaries.

To maximize data coverage on project quality, we are forced to utilize the most aggregate

⁹NEEDS stands for ‘National Economic Empowerment and Development Strategy’, that was published in 2004 to act as an agenda for economic reform in Nigeria. Details of the OPEN operational framework of monitoring and evaluation are provided in Federal Government of Nigeria [2007].

¹⁰The teams were recruited in a competitive tendering process that was regulated by the government’s procurement agency. The decision to use monitoring teams independent of government was a function of the weakness of existing government systems as well as the need for impartiality [Federal Government of Nigeria 2007]. Prior to the OPEN initiative, the government had its own monitoring and evaluation systems in place (based on unannounced visits) but these were largely perceived to be ineffective.

¹¹To shed more light on why projects do not even start, in our civil servant survey we asked the main reasons for this: only 3% reported it was because of projects being technically too complex; 64% reported because of corruption.

formulation of quality reporting. A project was either of insufficient quality, satisfactory, or commended for an ‘above average or high’ quality level. With this definition, we obtain 2235 observations of project quality, 2206 of which also have project completion data. We then define a project quality indicator equal to one if the project is of satisfactory quality or above.

To further ensure the accuracy of monitoring reports, the Presidency put in place a system of checks and balances. First, a centralized team of technocrats monitored the evaluation teams, providing them with training and opportunities for standardization of their methods at national conferences. Second, evaluators were asked to provide material, photographic, or video evidence to support their reports. Third, the national teams and Presidency performed random checks on evaluated sites, all of which were consistent with the findings of OPEN monitors. Evaluations of the OPEN process indicate it successfully achieved its aims [Eboh 2010, Dijkstra *et al.* 2011].

The reports of OPEN evaluators describe the fate of projects budgeted for execution in the 2006 and 2007 federal budgets [Federal Government of Nigeria 2008, 2009]. We hand coded the material from all projects recorded in OPEN initiative reports from the federal civil service organizations listed in Table A1.¹² Taken together, the coverage of projects in our sample traces 8% of all Federal Government social sector expenditures in 2006/7 budget years, corresponding to 4721 projects from 63 organizations, with an aggregate budget of around US\$800 million.

While the OPEN reports form the basis of our measures on project-level implementation, we have also hand coded other project level characteristics such as the budget allocated to the project and whether it was a rehabilitation project. We also use detailed technical specifications for each project to form engineer-approved measures of the complexity of each project, as described below.

Table 1 provides descriptive evidence on each project type studied. Boreholes are the most common type, corresponding to 29% of all OPEN projects. Table 1 also details the number of organizations that are engaged in providing each project. Key to our empirical method is that most project types are implemented by a range of organizations: for example there are 18 civil service organizations that construct boreholes, as shown in Column 2 of Table 1. All project types bar electrification are implemented by a myriad of organizations. Hence we are later able to study the impact of management practices for bureaucrats, that vary across civil service organizations, on project implementation, *conditional on* project-type fixed effects. There are also a sufficient number of borehole projects in our sample to allow us to later study the relation between management practices and project outcomes for this project type in isolation.

Column 3 helps fix ideas on the scale of projects by project type. Most projects typically constitute the ‘nuts-and-bolts’ of rural infrastructure development: the median budget for dams is US\$18,000, and the median budget for a building is US\$120,000. It is because projects are relatively small scale that partly explains why multiple organizations are observed being tasked to implement similar project types.

¹²We have a relatively broad sample of federal social sector organizations. In the water and power sectors, we cover all the relevant federal organizations. In the health sector, we cover 28% of health organizations, with the excluded a subset of the medical service providers such as a number of Federal Medical Centres. Similarly, in education we cover 14% of education organizations, excluding a range of institutions of learning such as some Federal Colleges of Education.

Columns 4 to 7 then document information relating to completion rates by project type. Aggregating across all project types, 38% of projects are never started, and only 31% are fully completed. Conditional on being started, the average project completion rate is .75. Examining the data by project type emphasizes the variation of completion rates across and within project types. For example, 79% of dam projects are never started, while only 12% of road projects are never started. Conditional on being started, most projects are more than 50% complete, although the proportion of projects fully completed varies from 47% of procurement and advocacy projects, to only 10% of dams.

The final column provides information on the percentage of projects rated to be of satisfactory quality by the team of independent engineers and civil society: here we tend to observe the majority of projects being ranked highly irrespective of project type.

Table 2 presents descriptive evidence on the public service delivery of the ten largest civil service organizations in our sample, as defined by the total number of projects implemented (although this maps closely to the size of organizations as measured by total budget). These organizations are responsible for the delivery of 75% of projects in our sample. Table 2 again emphasizes that, with the exception of the Federal Ministry of Power and Steel, each organization is engaged in providing multiple project types.

The second half of Table 2 describes the extent to which projects are being delivered by these organizations in our sample of projects. We observe huge variation across these large organizations in the percentage of projects that are never started (11% to 95%), and that are fully completed (3% to 89%). The final column provides information on the percentage of projects rated to be of satisfactory quality: here we observe far greater variation across civil service organizations (25% to 100%) than we previously documented in Table 1 across project types.

These statistics suggest there might be important factors at the organization level that drive this variation in the quantity and quality of public sector projects. We next detail how we measure one such factor: the management practices civil service bureaucrats operate under.

3.2 Measuring Management Practices

There has been a revival of research investigating the impacts of management practices on the performance of private sector firms [Ichniowski *et al.* 1997, Black and Lynch 2001, Bloom and Van Reenen, 2007, 2010; Bloom *et al.* 2012, 2013]. We follow Bloom and Van Reenen’s (henceforth BVR) approach to measuring management practices in organizations. We adapt their survey tool and practices to the Nigerian public sector setting, taking into account long-standing views on the importance of autonomy in public administration [Simon 1983, Rose-Ackerman 1986, Wilson 1989] as well as recent insights from the ‘new performance management’ and ‘good governance agenda’ perspectives [Francois and Vlassopoulos 2008, Goldfinch *et al.* 2012].¹³

To obtain reliable information on management practices in public sector organizations, we

¹³Our approach following BVR differs from how autonomy has been measured in managerial science, using organizational charts (organograms), job titles, or statements of job responsibilities [Rajan and Wulf 2006].

have to recognize that protocol and language-use in civil services are country-specific. We therefore worked closely with members of the OPEN office in the Presidency, as well as members of the Office of the Head of the Civil Service of the Federation in undertaking the questionnaire development process. A number of pilots using semi-structured interviews like those in BVR were held to outline key similarities and deviations from the BVR methodology. After a number of months of collaborative questionnaire design, civil servants from each organization practised the survey with each other and identified where wording or phrasing was not suitable for the Nigerian context.

The management survey enumerators were trained together for a number of weeks including practice interview sessions before undertaking the first few interviews together. The aim was to ensure a consistent interview engagement across sessions. To obtain information on management practices, senior management staff from the key departments of the organization, but not the chief executive officer, were brought together in a private office to discuss managerial practice at the organization in confidence. While each manager filled in their own questionnaire during the discussion, the enumerator looked for a consensus among the group and recorded that in his own questionnaire. This is the underlying information we use to construct management practice indices for each organization.¹⁴

From September to November 2010, our survey team held interviews at the organizations listed in Table A1.¹⁵ Following BVR, interviews were ‘double blind’ in the sense that: (i) interviewees managers were not told in advance they were being scored or shown a score grid; (ii) enumerators were given no information on the performance of the organization, thus allaying concerns enumerators could be biased in recording consensus views on practices. However, the delay between the collection of the OPEN data set in 2006/7 and the Civil Servants Survey in 2010 raises the question as to whether the civil service structures changed significantly in between data collection periods. For example, those organizations that were found to have especially low completion rates might have instigated reforms to improve management practices for their bureaucrats. However, there is little evidence from other sources of any major civil service reforms being implemented over this period, or of significant changes in the political organization of federal agencies [Alabi and Fashagba 2010, Ogundiya 2011]. In addition, we find little evidence of a spike in turnover of bureaucrats around the 2007 period, that also coincided with a Presidential election: 80% of bureaucrats employed in 2010 were at the same organization in 2007.¹⁶

¹⁴Four further points are of note related to the measurement of management practices. First, in this context, conducting management surveys via telephone was judged to be far less likely to reveal true practices than conducting face-to-face group interviews. Second, given the interview format, individual manager responses on management practices are available, but we cannot link individual managers to specific projects and so do not utilize that information (each project is delivered by teams of bureaucrats across sub-departments): rather we use the consensus measure recorded by the enumerator. Managers were told their individual responses would remain confidential. Third, we checked whether recorded practices are sensitive to the number of managers present at interview (that does vary across organizations): we find no such relationship. Fourth, the mean interview time was 74 minutes, and we include this as part of our noise controls in the empirical analysis.

¹⁵We were unable to obtain data on management practices for another five organizations for which OPEN data on project completion are available: two had been closed; one was closed by strikes throughout the survey period; and two were logistically infeasible for us to visit during the study period.

¹⁶Moreover, on a wide variety of metrics, including Worldwide Governance Indicators, the Ibrahim Index of African Governance, the Freedom House Index, Transparency International Corruption Perceptions Index, and

The BVR evaluation tool elicits management practices through a semi-structured interview covering four topics: operations, targets, incentives and monitoring.¹⁷ We apply the BVR approach in the context of public bureaucracies, extending the series of practices elicited to cover those more relevant for managing bureaucrats. As a result, our management survey covers topics grouped into nine categories: roles, flexibility, incentives, monitoring, culture, targeting, facilities, skills and staffing. We then replicate the BVR method eliciting information on each of these broad topic areas from our civil service organizations, although we do so using a more limited set of underlying questions related to each topic. Table A2 details the questions that come under each of the nine topic areas, and how they are aggregated into what we refer to as ‘autonomy’, ‘performance’ and ‘other practice’ indices (denoted CS-autonomy, CS-performance and CS-other respectively).¹⁸

The questions on ‘roles’ assess the extent to which bureaucrats can input into policy formulation and implementation processes. The questions on ‘flexibility’ aim to measure whether a bureaucratic agency is able to re-organize its bureaucrats to respond to best practice and project peculiarities. We combine the answers to the roles and flexibility practices to construct an overall index of management practices capturing the ‘autonomy’ of bureaucrats (CS-autonomy).¹⁹

The questions on ‘incentives’ are designed to capture more familiar notions of incentive provision for bureaucrats, both positively in terms of rewards given, and negatively in terms of punishments for poor service; the questions on ‘monitoring’ capture practices related to the collection and use of performance indicators. We combine the answers to the incentives and monitoring practices to construct an overall index of management practices capturing the ‘performance-incentives’ that bureaucrats operate under (CS-performance).

The remaining topics cover the following practices: the ‘facilities’ questions relate to how well-functioning the organization is, for example, by collecting information on the availability of electricity and internet facilities to bureaucrats; the ‘skills’ questions relate to the human capital of bureaucrats, especially their IT competencies, and the trainings offered to them; the ‘staffing’ questions focus staff recruitment and retention, as well as how workloads are spread across bu-

Global Competitiveness Index, Nigeria’s scores have remained stable between 2006 and 2010.

¹⁷The operations section focuses on the introduction and spread of best-practices and the response of operations to the peculiarities of a particular project. The targets section examines the breadth and depth of organizational targets, assessing the extent of use of targets in operations. The monitoring section focuses on the tracking of performance of individuals and projects. The incentives section examines the use of incentives both to reward success and punish failure.

¹⁸Hence there are two important deviations from how we elicit management practices using the BVR method. First, when we were developing the questionnaire with public officials, they would often suggest wording that would be better understood by Nigerian officials. Thus, while we aimed to capture the same information on dimensions of management practice as BVR, we tailored the precise wording of some questions to better fit our context. The second difference is that we did not use the same universe of questions from the BVR survey. In the majority of cases, this was because we could not identify an analogous concept in the public sector that was relevant or not covered by other questions. For example, the majority of questions on lean manufacturing in BVR (e.g. ‘What kinds of lean (modern) manufacturing processes have you introduced?’) were not utilized. However, those on improving manufacturing processes (‘How do you go about improving the manufacturing process itself?’) were translated into the redefinition of procedures in response to new needs or challenges (‘Does your organization make efforts to redefine its standard procedures in response to the specific needs and peculiarities of a community?’).

¹⁹Our metric of flexibility partly relates to the notion of adaptive organizations in Dessein and Santos [2006] whereby organizations provide bureaucrats the room to tailor their actions to circumstances, rather than sticking to pre-specified courses of action and ignoring local information.

reaucrats; the ‘targeting’ questions relate to the existence and clarity of targets for bureaucrats, and finally, the questions related to ‘culture’ try to elicit information on how colleagues are collectively treated and interact with others outside of the workplace. We combine the answers on all these topics to construct a third index of ‘other’ management practices (CS-other).

We clearly recognize there is no definitive way to solicit management practices along these various dimensions, nor a definitive way to collate them into more aggregate indices. Our approach is primarily designed to reflect two broad areas of management practice emphasized in the public administration and economics literatures as being first order determinants of bureaucrats’ behavior: autonomy and performance incentives. However we later consider two extreme cases by documenting the correlation between project completion rates and: (i) a fully disaggregated specification showing the separate impact of all nine dimensions of management practice; (ii) an aggregate measure of management practice that collates all nine categories into a single index.²⁰ Given these indices measure *broad* practices, rather than reflecting *specific* compensation schemes or workplace policies, there might be less concern that such broad practices can rapidly endogenously respond to either past project completion rates, or to changing bureaucrat characteristics.

Each practice in Table A2 is scored from one (worst practice) to five (best practice). We follow BVR by converting responses into normalized z-scores (so are continuous variables with mean zero and variance one by construction), where in all cases, variables are increasing in the commonly understood notion of ‘better management’. For our core analysis, we aggregate z-scores into the three CS- measures by taking the unweighted mean of the underlying z-scores. We later show the robustness of our results to other weighting schemes.

Two further points are of note. First, the CS-autonomy and CS-performance management scores are *positively* correlated with each other, so organizations with greater performance-based management practices also have greater investment in the autonomous capacities of their bureaucratic staff. Hence in the cross section of federal organizations, the provision of autonomy and performance incentives do not appear to be substitutes. Second, these correlations are not high: the CS-based measures have a correlation coefficient of .24. Combined with the underlying variation in each measure across organizations, this opens up the possibility to precisely identify the separate relationship of each measure to public service delivery.²¹ The marginal impacts of these two measures can also be separately identified from that of the CS-other index: the CS-autonomy (CS-performance) index has a correlation of .17 (.43) with the CS-other measure.

These indices, and the underlying management questions, provide us with our core explanatory variation. Following BVR, we also collected data on the interviewees for each survey, interview characteristics and the quality of the survey session. These ‘noise controls’ will also be conditioned

²⁰We have also used principle components analysis to assess the importance of individual practices through factor analysis. For the matrix of all nine sub-indices, we find the factor loadings are rather evenly spread, with the first factor explaining 28% of the variation.

²¹Such substitution might have been observed if bureaucrats have strong career concerns, and so performance incentives are not required once autonomy is given to individuals. Alternatively, if bureaucrats are intrinsically motivated they might need only to be provided autonomy, and indeed, the provision of performance incentives might crowd out their intrinsic motivation.

on in our baseline empirical specifications.

3.3 Project Complexity and Other Variables

When relating project outcomes to management practices for bureaucrats across organizations, it is important to condition on project complexity. There is considerable within-project variation in budgets, and this might partly reflect differing project complexities. To measure project complexity we collaborated with a pair of Nigerian engineers familiar with the OPEN initiative and a group of international scholars with research interests in project complexity. The complexity indicators were based on the detailed technical specifications specified for each project, and are constructed following engineering practice that emphasizes multiple dimensions of complexity [Remington and Pollack 2007]. The Appendix: (i) details the construction of these indices, and presents descriptive statistics for them; (ii) describes checks we put in place, using multiple engineers, to establish the validity of these complexity measures.

These complexity indicators reflect the number of inputs and methods needed for the project, the ease with which the relevant labor and capital inputs can be obtained, ambiguities in design and project implementation, and the overall difficulty in managing the project. Many of these relate to the hallmark differences in goods supplied between public and private sectors. Our empirical approach then aims to hold constant the complexity of the project along these dimensions, including issues related to organizations needing to sub-contract project implementation to a private sector firm, for example. This allows us to focus in on the correlation between managerial practices for bureaucrats and project completion rates, all else equal.²²

For our empirical analysis, the other project level controls in addition to project complexity that we have collated include the project’s budget, whether it was a rehabilitation project, and a brief summary of its technical specifications. Finally, organizational variables we have collected that will also act as controls include administrative data on the number of employees at each organization, the proportion of staff with graduate/postgraduate qualifications, and the organization’s total budget. In some specifications we also condition on controls for the state in which a given project is located. We construct these state controls using aggregated data provided by the National Bureau of Statistics.

3.4 Empirical Method

To assess the relationship between management practices for civil service bureaucrats on the quantity and quality of public services delivered, our baseline empirical specification has as its unit of observation project i of type j in organization n . The project types are listed in Table 1, and the federal civil service organizations from which management practices have been elicited

²²Our civil servant survey also helps to shed some light on the relationship between bureaucratic organizations and such third party contractors/suppliers/consultants. For example, only 6% of civil servants agreed with the statement that, the most successful contractors “are aligned with the government in some way”; only 13% of civil servants reported having been offered a ‘small present’, ‘money’, or an ‘expensive present’ by such contractors.

are listed in Table A1. We estimate the following OLS specification,

$$y_{ijn} = \gamma_1 CS-autonomy_n + \gamma_2 CS-performance_n + \gamma_3 CS-other_n + \beta_1 PC_{ijn} + \beta_2 OC_n + \lambda_j + \epsilon_{ijn}, \quad (1)$$

where y_{ijn} corresponds to the project completion rate, or the assessment of project quality, as described in Table 1, and the three main indices of management practice are the CS-autonomy, CS-performance and CS-other indicators described above.

PC_{ijn} includes project characteristics such as the project complexity, log project budget and whether the project is a rehabilitation or not. OC_n includes organization level controls such as the log number of staff, log total organization budget, log capital budget, and the proportions of officials with a college and postgraduate degree. Following BVR, within OC_n we also condition on ‘noise’ controls related to the management surveys. These include four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer, which is a simply a subjective assessment as to whether the interview went well.²³

As typically many organizations are observed implementing the same project type j , we control for project fixed effects λ_j in our baseline specification (1). Our parameters of interest are γ_1 and γ_2 : as each CS- measure is a standardized z-score, these coefficients measure the effect size of a one standard deviation change in management practices along the respective margins of autonomy and performance incentives. As our main specification controls for project fixed effects, we allow the standard errors to be clustered by project type-organization. Namely, we assume the errors terms within the same organization across its projects of the same type might be correlated. In the Appendix we demonstrate the robustness of our result to allowing for alternative forms of clustered standard error, such as by organization (across all its project types). Our working sample is based on 4721 projects from 63 organizations on which we have data on management practices and project, organization and bureaucrat characteristics.

In specification (1) we are implicitly assuming that, within project type and controlling for project characteristics such as their scale, multiple dimensions of complexity, and other organizational characteristics, the underlying production function is the same across projects. Specification (1) then corresponds to a reduced form representation of an underlying production function that contains managerial practices as inputs into production, where these practices convert the raw total of available bureaucratic labor into effective labor inputs in the completion of public projects.

To provide support for a causal interpretation of the estimated partial correlations linking management practices to project outcomes $(\hat{\gamma}_1, \hat{\gamma}_2)$, we need to tackle three econometric challenges that broadly relate to issues of sample selection, unobservables and endogenous practices:

²³Our staff numbers come from administrative data for 2010. In the few cases we do not have the staff numbers explicitly, we estimate them from the personnel expenditures, which have a correlated with staff numbers of over 0.9. Our budget variables are averages for 2006 to 2010. The education of the officials and years of management experience is taken from the survey of officials that was undertaken in conjunction with the management surveys.

(i) projects are *non-randomly assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined by bureaucrat characteristics or project outcomes. In the next section we present our OLS results on the partial correlations between various dimensions of management practice and project completion rates. In Section 5 we then provide evidence to address each of these concerns to help underpin a causal interpretation of our core results.

4 Core Results

4.1 Project Completion Rates

Table 3 presents our main results on how civil service management practices correlate with public service delivery. The first half of the table focuses on project completion rates as the outcome of interest. Column 1 only controls for the three CS- measures, and does not condition on any of the other classes of controls described in (1). We see that higher levels of autonomy for bureaucrats correlate to significantly higher project completion rates ($\hat{\gamma}_1 > 0$). The impact of CS-performance on project completion is *negative* and also significantly different from zero ($\hat{\gamma}_2 < 0$).

In Columns 2 to 4, we sequentially condition on noise controls and organizational characteristics, project characteristics, and project fixed effects. Throughout, we find both management practices have significant impacts on project completion rates at the 1% significance level.²⁴ More precisely, organizations with higher levels of autonomy for lower-tier bureaucrats have significantly *higher* project completion rates. Organizations that provide more performance incentives to bureaucrats have significantly *lower* project completion rates. Our preferred specification is that in Column 4 with project fixed effects. This shows that a one standard deviation increase in CS-autonomy corresponds to significantly higher project completion rates of 18%. A one standard deviation increase in CS-performance corresponds to significantly lower project completion rates of 14%. The stability of both coefficients of interest across Columns 2 to 4 ameliorates the concern that there remain other important controls of these types that would likely cause large changes in magnitude and significance of the coefficients of interest.

The estimated coefficient on the other dimension management practice of CS-other, $\hat{\gamma}_3$, is less stable in magnitude and significance across specifications. This might be as expected given that it is composed of the widest range of underlying components. In all specifications, better management practices on this CS-other dimension are positively correlated with project completion rates; in Column 4 the estimated coefficient is indeed significant at conventional levels, although the effect

²⁴ Among the noise controls, neither the age, gender, or years in service of interviewees have significant impacts on project completion rates. Nor do whether the interviews were undertaken in the morning or their length, or the quality rating of the interview. Noise controls that are significant at the usual levels include whether the interviews were undertaken on a Tuesday or Saturday (negative), or during Ramadan (positive). A few of the interviewer dummies are significant. The exclusion of the noise controls does not change the qualitative nature of the main results reported.

size is significantly smaller than for the two dimensions of management practice.

In Appendix Table A4 we show the robustness of these core findings to assuming the disturbance terms ϵ_{ijn} in (1) are clustered by organization (across all project types), correcting p-values for potential biases due to a small number of clusters [Cameron *et al.* 2008].

In Figure A2 and Appendix Table A5 we probe the robustness of these results along eight margins: (i) defining threshold completion rates that deem the project usable and seeing how management practices relate to reaching these thresholds (especially those related to completion rates of zero and one); (ii) restricting the sample to the largest/smallest organizations; (iii) removing organizations at the tails of the distribution of CS-autonomy and CS-performance measures; (iv) considering the impacts of managerial practices on construction and non-construction projects separately; (v) considering the impacts of managerial practices on projects implemented by centralized and decentralized organizations separately; (vi) controlling for characteristics of the state in which the project are located, and exploring how the results vary depending on whether projects are located in the North or South of the country that defines the principal cultural divide in Nigeria; (vii) alternative constructions of the CS- management practice indices (rather than the equal weighting procedure); (viii) using a fractional regression model rather than OLS.

Our final baseline finding is presented in Column 5, in which the two management practices are interacted. We find evidence of an interplay between the two: the marginal impact of each management practice is increasing in the provision of the other. This implies the negative impacts of performance related pay on project completion rates are offset when bureaucrats are provided more autonomy and organizations are more flexible. This might be indicative of the fact that with such autonomy and flexibility, performance incentives can be better tailored to those specific margins of bureaucrat effort that positively impact projects. The bottom line is that there are gains to organizations from coupling together good management practices along these two dimensions. Indeed as discussed in Section 3.2, we do observe the two CS- measures in the cross section of organizations having a correlation coefficient of .24, so better management practices along both dimensions are weakly bundled together in most cases.

4.2 Project Quality

Our second set of results consider the impacts of management practices for bureaucrats on the quality of projects implemented. As described in Section 3, this information was also collected as part of the OPEN initiative. However, the drawback of using this outcome measure is that information on project quality is only available for around half the projects for which we have project completion data, originating in 51 civil service organizations. To ease comparison of the samples used, Column 6 in Table 3 re-estimates our main specification with the project completion rate as the dependent variable, but for the sample in which quality data is available. Qualitatively, the results are not much different between across Columns 4 and 6, although the marginal impacts of both management practices are smaller in absolute value in the sample of projects for which quality outcomes are available.

Column 7 then estimates a specification analogous to (1) but where y_{ijn} is defined as a dummy variable that is equal to one if the project is classified to be of satisfactory quality or higher, and zero otherwise. The results indicate that management practices related to autonomy do not correlate to project quality. Higher levels of CS-performance are associated with significantly *lower* quality projects, with the impact being significant at the 1% significance level.

One concern is that project quality as an outcome on its own may not be a useful indicator: projects may be implemented to a high quality, but to a low level of project completion, or *vice versa*. Column 8 therefore simultaneously accounts for project completion and project quality. To do so, we construct a ‘quality-adjusted’ proportion completed variable where the proportion completed is multiplied by the binary quality indicator. Where quality is unsatisfactory, whatever the level of completion, this variable is set to zero. These results show both CS- measures to quantitatively impact project quality in a similar way to project completion rates: higher levels of CS-autonomy are associated with significantly *higher* quality projects, and higher levels of CS-performance are associated with significantly *lower* quality projects.

Finally, Column 9 shows there to be no interactive impact of the two management practices on this quality-adjusted measure of project quality: unlike for project completion rates, there is no interplay between these management practices.

4.3 Exploring the Negative Impact of Performance Incentives

Taken together, our results confirm that the two dimensions of management practice we focus on: autonomy and performance incentives, do indeed correlate to the quantity and quality of public service delivery, as emphasized by the public administration and economics literatures respectively. The overall positive correlation of CS-autonomy with project completion rates provides support to the notion that public agencies ought to delegate some decision making to bureaucrats, relying on their professionalism and resolve to deliver public services [Simon 1983]. The evidence is less supportive of the notion that when bureaucrats have more agency or organizations are more flexibly structured, then they are more likely to pursue their own objectives that diverge from societal interests, resulting in fewer public services being delivered.

On performance incentives, the robust *negative* correlation we document between project completion rates and management practices related to the provision of incentives and monitoring of bureaucrats, is far more surprising and counter to a large body of evidence from private sector settings. As described in the introduction, the evidence on the impacts of performance-related incentives in public sector settings is far more limited (often focusing on the impacts of specific incentive schemes on frontline teachers and health workers) and rather mixed.²⁵ Ours is among the first evidence to suggest the possibility that such management practices, more broadly defined,

²⁵In health, two recent Cochrane reviews have come to different conclusions on the efficacy of pay for performance [Flodgren *et al.* 2011, Scott *et al.* 2011]. Perry *et al.* [2009] review 57 studies on pay for performance in the public sector and conclude ‘pay-for-performance continues to be adopted but persistently fails to deliver’. Hasnain *et al.* [2012] review over 60 public sector studies, and find the vast majority are for tasks where outputs are more easily measurable such as teachers, health workers, and revenue inspectors. They argue there is simply insufficient evidence of the impact of incentives on bureaucrats.

have negative impacts on civil service *bureaucrats*. Given this, we now probe this result further using the lens of contract theory to investigate how characteristics of projects, organizations and bureaucrats might interplay with such management practices in determining outcomes.

4.3.1 Project and Organizational Characteristics

A leading explanation for why performance incentives might have detrimental impacts is if bureaucrats need to multi-task [Holmstrom and Milgrom 1991]. Specifically, bureaucrats might be required to exert different types of effort to ensure projects are successfully implemented. The provision of potentially more narrowly defined performance incentives – perhaps only for those efforts that are easily observed – can skew the allocation of effort towards those aspects that are rewarded, reducing overall project completion if tasks are highly complementary. We examine this hypothesis by establishing whether the impact of management practices for bureaucrats related to performance incentives varies with the complexity of projects, assuming that more complex projects require a greater number of effort types to be exerted, all else equal.²⁶

Column 1 in Table 4 takes this prediction to the data by interacting the CS-performance measure with the continuous measure of project complexity. For expositional ease, this interaction term is defined in terms of its deviation from mean, so the coefficients on CS-autonomy and CS-performance are interpreted as the marginal effect of these practices, evaluated at the mean of project complexity. We see the negative impacts of CS-performance related practices for bureaucrats are exacerbated in more complex projects, in line with a multi-tasking interpretation.

To probe further the notion that it might be difficult to target performance-related management practices towards those efforts that generate project completions, we next examine how the impacts of this practice vary across projects conducted by the organization. More precisely, for each organization we define the *modal* project type that it is tasked to implement. We then create a dummy equal to zero if project i is of this modal type and equal to one if it corresponds to a more atypical project that the organization is tasked to complete. Column 2 shows the impact of performance incentives to indeed be even more negative among non-modal project types (the magnitude of the impact being around 40% of that on modal project-types). This suggests management practices related to performance are better tailored to the modal project type each organization is engaged in.

If the negative impacts of performance incentives reflect the inability of organizations to correctly target such incentives to all relevant type of effort bureaucrats need to exert, this problem might be ameliorated in organizations with better IT facilities for example. To explore this we interact our CS-performance measure with the practices captured in CS-facilities: as Table A2 shows, this relates to the availability of computing facilities at the organization. In this specification we redefine CS-other to exclude the CS-facilities component. The result in Column 3 indeed shows the impacts of CS-performance to be significantly less negative in organizations with better

²⁶The evidence on multi-tasking is rather mixed, even within similar contracting environments. In health contexts, Olken *et al.* [2012] find little evidence for multi-tasking concerns, while Mullen *et al.* [2010] find they do matter.

IT facilities.

Finally, we check whether the inherent riskiness/ambiguity of projects as encompassed in their technical specifications interplays with management practices related to performance. The inherent trade-off between exposing workers to risk and providing them effort incentives lies at the heart of contract theory [Prendergast 1999]. To explore this, we consider projects of different types j to be of systematically different levels of riskiness and ambiguity, and then proceed in two steps.

First, we measure this riskiness using subcomponents of the complexity indicator described in Table A3: in particular we construct a z-score based on the design uncertainty, implementation uncertainty, design ambiguity and implementation ambiguity components of the project complexity metric. We then take the average of this over all projects of type j , denoting the average riskiness of projects of type j by $\bar{\sigma}_j$ which is itself a z-score. Second, we estimate a specification analogous to (1) for a given project type j , obviously excluding project fixed effects. In our sample, there are sufficient numbers of projects implemented by enough organizations for five project types: boreholes, buildings, dams, procurement and training. For each project type j we then obtain an estimate of the partial correlation between CS-performance and project completion rates, $\hat{\gamma}_{2j}$, conditional on CS-autonomy Figure 1 plots the five $(\hat{\gamma}_{2j}, \bar{\sigma}_j)$ pairs, as well as a cubic best fit. The evidence suggests a strong negative relationship across project types between the inherent risk/ambiguity of project types, as assessed by engineering best practice, and the marginal impact of management practices related to incentives and monitoring on project completion rates.²⁷

4.3.2 Bureaucrat Characteristics

The remaining specifications consider how the impact of management practices related to performance incentives vary with three bureaucrat characteristics: their tenure, intrinsic motivation and perceptions of organizational corruption. To measure civil servant characteristics along each dimension we use the survey we administered to a representative sample of officials at each organization. We interviewed 4148 civil servants from the 63 federal organizations studied here, corresponding to around 13% of their total workforce.

As described in Section 2, Nigerian bureaucrats enjoy long tenure. Tenure can interplay with the effectiveness of management practices. On the one hand, longer serving bureaucrats might learn over time how best to respond to incentives by exploiting other flexibilities. On the other hand, bureaucrats' might learn how to game mis-targeted incentives, or become de-motivated by constantly being subject to monitoring.²⁸ To check for this, Column 3 controls for an interac-

²⁷Given the CS-performance and CS-autonomy are positively correlated and have opposite signed impacts on project completion rates, this negative relationship between risk and incentives would be attenuated if we do not control for CS-autonomy when estimating $\hat{\gamma}_{2j}$. A lack of ability to control for the provision of autonomy granted to employees was precisely the explanation given by Prendergast [2002] for why much of the empirical literature has failed to find evidence of the trade-off between risk and incentives.

²⁸In private sector settings, the interplay between managerial tenure and performance based incentives has been documented [Griffith and Neely 2009]. They show how the introduction of 'balanced scorecards' in a private sector firm in the UK, a commonly used but potentially complex system of performance-based incentives, has little impact on branch performance except for those branches with more experienced managers. There is also a setting in which multi-tasking is important for firm output.

tion between the average tenure of bureaucrats in the organization (in deviation from mean) with the CS-performance measure, as well as the direct impact of tenure. We find the negative impacts of performance-based incentives are even worse in organizations staffed by more experienced bureaucrats, as might be consistent with bureaucrats learning to game incentives or becoming de-motivated by them. We also note there is no direct levels effect of tenure on project completion rates, so that there is no strong evidence of bureaucrats naturally reducing effort over time as they become embedded within long-standing norms of poor standards in civil service organizations.

A burgeoning literature suggests those attracted to public service might be relatively more *intrinsically motivated* than those working in the private sector. Performance incentives might then be detrimental if they crowd out such intrinsic motivation [Rose-Ackerman 1986, Perry and Wise 1990, Benabou and Tirole 2006, Francois and Vlassopoulos 2008].²⁹ To measure civil servant’s intrinsic motivation, we asked bureaucrats which factor that had most influenced them to *originally* enter the civil service from the following options: ‘I was interested in the type of work’, ‘income prospects’, ‘the prestige associated with such a job’, ‘the stable career path that a job in the service affords’, ‘the chance to serve Nigeria’, ‘it was the only employment I could get’, ‘educational opportunities’, ‘other’. We define those that answered, ‘the chance to serve Nigeria’ as being intrinsically motivated. Roughly a third of officials state that they entered the civil service to serve Nigeria (with the percentage being slightly higher among less senior bureaucrats).³⁰ For each organization, we then construct the fraction of intrinsically motivated bureaucrats.

Column 4 in Table 4 then shows how the impacts of CS-performance varies by the intrinsic motivation of bureaucrats in the organization. The interaction is again defined in deviation from mean. We see the previously documented negative impact of providing performance incentives to bureaucrats, is significantly offset when a greater share of bureaucrats are themselves intrinsically motivated. This suggests that although on average providing performance incentives to bureaucrats has negative impacts on public service delivery, this is *less* the case when such incentives are provided to intrinsically motivated bureaucrats. Indeed, our evidence suggests such incentives and monitoring might well crowd in the effort of intrinsically motivated bureaucrats.³¹

²⁹Delfgaauw and Dur [2008] and Buurman *et al.* [2012] review the evidence suggesting individuals self-selected into the public sector are more intrinsically motivated than those in the private sector. Gregg *et al.* [2011] use the BHPS data in the UK to show that public sector workers are more likely to donate labor in the form of unpaid overtime. Importantly, they find no evidence of changes in behavior when individuals switch sectors, suggesting it reflects an individual trait rather than sectoral differences in workplace environments or implicit contracts.

³⁰In the public administration literature, public service motivation is usually measured using the scale developed in Perry [1996], based on statements related to politics, public service and pro-social activities. This is the approach also followed in Dal Bo *et al.* [2013]. Alternative approaches employed in the economics literature include: (i) dictator games to examine how many resources an individual transfers to a pro-social task [Ashraf *et al.* 2012]; (ii) unpaid overtime [Gregg *et al.* 2011]; (iii) charitable contributions [Buurman *et al.* 2012]. In our civil servant survey, ‘the chance to serve Nigeria’ was the modal answer given. The other two most frequent reasons were ‘I was interested in the type of work’ and ‘the stable career path that a job in the service affords’, that were each given by around 20% of individuals

³¹Experimental evidence from related settings has shown that performance incentives do not crowd out the effort of intrinsically motivated workers. Ashraf *et al.* [2012] present such evidence from a field experiment in Zambia for workers hired to engage in a pro-social task; Berg *et al.* [2013] present evidence based on a field experiment on insurance workers in India: both studies document that monetary incentives do not crowd out effort of more intrinsically motivated agents hired.

While the recent economics literature has emphasized the importance of the intrinsic motivation of bureaucrats, a long-standing literature in public administration emphasizes that civil servants might pursue their own self-interest [Tullock 1965, Downs 1967, Buchanan 1978] or be disinclined to exert effort [Wilson 1989]. This more negative view of bureaucrats spurs our final set of results, that explore how the impacts of management practices are mediated through perceptions of corruption among civil service organizations. Corruption in public bureaucracies is a first order issue in Nigeria, and in many countries at similar stages of development. The fact that 38% of projects are never started, provides one insight into the potential extent of the problem (although the fact that 31% of projects are completed fully also suggests it is not all pervasive).

We again use our civil service survey to measure perceptions of corrupt practices among bureaucrats. To elicit such information, we began with vignettes of hypothetical situations, then made those scenarios closer to the bureaucrat’s actual situation, and finally asked individuals about their own observations and experiences of corruption. We asked on what proportion of recent projects the official had worked on, did they observe ‘others breaking service rules for their own benefit’. On average, officials stated that on 38% of projects such observations of corrupt practice had been made, that, by chance, coincides exactly with the proportion of projects with a zero completion rate. We aggregate this to the organization level to construct the proportion of bureaucrats that report having observed corrupt practices taking place.³²

Column 5 in Table 4 then shows how the impacts of our CS-performance measure varies by perceptions of corruption among bureaucrats in organizations. To begin with we note the robustly negative *levels* impacts of our corruption measure on project completion rates. This affirms that our measure is indeed capturing some element of civil servant behavior that is deleterious for public service delivery. However, we see that the negative impacts of performance-based incentives do not vary with perceptions of corruption among bureaucrats. Whatever are the performance incentives in place, they appear not be sufficiently high powered to offset corrupt practices on the margin. In short, the evidence suggests that corruption is pervasive, has direct and quantitatively large negative impacts on project completion rates, but that marginal changes in management practices have no impact on such behaviors.

Two final points are of note. First, we explored whether there exists within-sample values of the interacted variables at which the overall marginal impact of CS-performance becomes positive. Generally, this is not the case. Hence, for example, even for the least complex projects or the most IT advanced organizations (so far below the mean), the marginal impact of management practices related to performance-incentives is negative. The one exception relates to bureaucratic tenure: in 8% of organizations average bureaucratic tenure is less than 7 years, and the coefficients from Column 4 then imply that the total marginal impact of CS-performance on project completion

³²We also asked whether officials had themselves been put under pressure to: (i) change the project location; (ii) change project specifications; (iii) help select particular contractors/suppliers/consultants; (iv) divert some of the funds. Aggregating responses across these four variables into an organizational average, we find that officials stated that they had experienced such pressures on 19% of projects. We prefer to use the measure related to observed corrupt practices over the measure related to pressures of corruption because officials are obviously cautious when potentially incriminating themselves.

rates is positive.

Second, we have also explored the heterogeneous impacts of management practices related to autonomy. However, we place less attention on these findings because economic theory is less developed to guide such an empirical analysis. However, for completeness we note that the impacts of management practices related to autonomy appear to be generally more homogeneous than the impacts of performance incentives. For example, they do not significantly vary with project complexity, non-modal project types, bureaucratic tenure, or the prevalence of reported corrupt behavior by bureaucrats. This last result again emphasizes that corrupt practices are unlikely to be affected by marginal changes in management practice. We do however find that the positive impacts on project completion rates of practices related to autonomy are significantly stronger when a greater proportion of bureaucrats report being intrinsically motivated: providing more autonomy and flexibility to bureaucrats might be especially beneficial when bureaucrats are socially minded. We leave for future research the exploration of such heterogeneous impacts.

5 Econometric Concerns

We now present evidence to underpin a causal interpretation of the partial correlations we have thus far documented between project completion rates and management practices. To view these coefficients as being informative of causal impacts, we need to tackle three econometric challenges broadly related to issues of sample selection, unobservables and endogenous practices: (i) projects being *non-randomly assigned* to organizations based on their management practices; (ii) *unobserved* bureaucrat or organizational characteristics that are correlated to management practices and also drive project completion rates; (iii) management practices being *endogenously* determined by bureaucrat characteristics or project outcomes.

5.1 Project Assignment

The first class of concerns relate to the assignment of projects to organizations being driven by the management practices in place. If so, our coefficients of interest are identified conditional on this assignment algorithm. For example, if better managed organizations are more likely to be assigned harder-to-implement projects, this creates a spurious *negative* correlation between our CS- measures and project completion rates. This suggests $(\hat{\gamma}_1, \hat{\gamma}_2)$ are both biased in the *same* direction: given that our baseline estimates suggest the impacts of management practices related to autonomy and performance incentives are of opposite signs, we note that a more complicated explanation is required to imply that $\hat{\gamma}_1$ is both upwards biased and $\hat{\gamma}_2$ is downwards biased.

This issue notwithstanding, we address concerns about the non-random assignment of projects in three ways. Our first approach uses a conditional logit model to estimate the factors determining the assignment of project i to organization n , including the management practices in place in organization n . As described in more detail in the Appendix and as Table A6 shows, we find no robust evidence of such a correlation between the assignment of projects to an organization

and any of the three CS- measures for organizations we study (autonomy, performance or other management practices). This is true unconditionally on other controls, conditional on organization characteristics, and conditional on interactions between project and organization characteristics. Hence the specific assignment of projects to organizations appears, on the margin, unrelated to the management practices in place in the organization along any dimension.

The second approach we use conducts further analysis at the organization level, estimating the following OLS specification,

$$w_n = \theta_1 CS-autonomy_n + \theta_2 CS-performance_n + \theta_3 CS-other_n + \pi X_n + \epsilon_n, \quad (2)$$

where observations are for the 63 organizations listed in Table A1, w_n are measures related to the set of projects assigned to organization n by Parliament, the CS- measures are as previously described, and X_n includes the same organization level controls and noise controls as previously described. Robust standard errors are reported.

The results are presented in Table A7: Column 1 first shows how the total number of projects assigned to an organization correlates with the management practices in place. Two points are of note: (i) $\hat{\theta}_1$ and $\hat{\theta}_2$ are both positive, so that better managed organizations in dimensions related to autonomy and performance incentives do appear to be assigned more projects; (ii) this relationship is weak, and neither correlation is significantly different from zero. Column 2 then explores the heterogeneity of project assignment and shows that the unique number of project types assigned to an organization is also not significantly related to the management practices in place.

Taken together, these two sets of results suggest that there might well be some complex bargaining game between various stakeholders in the lengthy Parliamentary procedure that assigns projects to organizations. However, organizations are one of many stakeholders potentially lobbying for certain projects (alongside local politicians, say), so the procedure does not likely result in a random assignment of projects, but nor is there much evidence to suggest it is based on management practices in place either.

Our third approach to this concern is more tailored to the issue that project *types* differ from each other, and that organizations might be tasked to implement a specific project type as a function of the management practices they have in place. To deal with this type of concern, we exploit the fact that the modal project type, boreholes, occurs with sufficient frequency to allow a specification similar to (1) to be estimated but exclusively for this one project type (and we obviously do not condition on project type fixed effects). There are 18 organizations tasked to implement 1348 boreholes in our sample.

The results for borehole projects are shown in Table A8. The estimated impacts of each CS-measure qualitatively replicate the baseline findings: increased provision of management practices to bureaucrats related to autonomy significantly *increases* project completion rates; increased provision of performance related incentives to bureaucrats significantly *decreases* project completion rates, and there is a positive interactive effect of these two dimensions of management practice on project completion rates. The magnitude of the impacts can be benchmarked against the

proportion of projects that never start, or are fully completed: as reported at the foot of Table A7, 44% of borehole projects never start, and 37% are fully completed. As such, the effect sizes implied in the preferred specification in Column 3 suggest changes in management practice along the dimensions emphasized to be of economic as well as statistical significance.

5.2 Unobservables

The second class of econometric concern is that our measures of management practice are correlated to the unobserved factors captured in ϵ_{ijn} in (1), and these unobservables directly determine project completion rates thus biasing our coefficients of interest. To develop some intuition on the direction of bias, we consider the simplest case where we only condition on the constant term and the two CS- measures of interest in (1), ignoring other covariates including the management practices captured in CS-other. It is then straightforward to show that, in general, the parameters of interest are functions of the variances of the two management practices, denoted σ_{CS-a}^2 and σ_{CS-p}^2 , their covariance with each other ($\sigma_{CS-a,CS-p}$) and with the outcome ($\sigma_{CS-a,y}$, $\sigma_{CS-p,y}$):

$$\hat{\gamma}_1 = \frac{\sigma_{CS-a,y} \cdot \sigma_{CS-p}^2 - \sigma_{CS-p,y} \sigma_{CS-a,CS-p}}{\sigma_{CS-a}^2 \cdot \sigma_{CS-p}^2 - [\sigma_{CS-a,CS-p}]^2}, \quad (3)$$

and $\hat{\gamma}_2$ can be analogously defined. Given both CS- measures are standardized z-scores, $\sigma_{CS-a}^2 = \sigma_{CS-p}^2 = 1$ and their covariance with each other is .24, the denominator in (3) is .9424. Substituting in for y in $\sigma_{CS-a,y}$ and $\sigma_{CS-p,y}$ in the numerator in (3) for the simple case, it can then be shown that the direction of bias depends on the following term:

$$\hat{\gamma}_1 - \gamma_1 = cov(CS-a, \epsilon) - \sigma_{CS-a,CS-p} cov(CS-p, \epsilon). \quad (4)$$

To fix ideas we assume the unobserved factor is positively correlated with management practices. In this case the impact of CS-autonomy management practices on project completion rates is actually underestimated (so $\hat{\gamma}_1 \leq \gamma_1$), and so in truth, even more positive than our baseline findings suggest, if:

$$\frac{cov(CS-a, \epsilon)}{cov(CS-p, \epsilon)} \leq \sigma_{CS-a,CS-p} = .2366. \quad (5)$$

Following a similar logic, the impact of CS-performance management practices on project completion rates is actually overestimated ($\hat{\gamma}_2 \geq \gamma_2$), and so, in truth, even more negative than our baseline findings suggest, if:

$$\frac{cov(CS-p, \epsilon)}{cov(CS-a, \epsilon)} \geq \sigma_{CS-a,CS-p} = .2366. \quad (6)$$

Figure A1 shows the parts of the $(cov(CS-p, \epsilon), cov(CS-a, \epsilon))$ parameter space where each condition can be met. This makes precise that if both management practices are approximately equally positively correlated with the unobserved factor (so $cov(CS-a, \epsilon) \approx cov(CS-p, \epsilon) > 0$), $\hat{\gamma}_1 > \gamma_1$ and

we would overestimate the positive impact of CS-autonomy, but it would still be the case that $\hat{\gamma}_2 > \gamma_2$ so that, in reality, the impact of CS-performance is even more negative than estimated. This is somewhat reassuring since the documented negative impact of management practices related to performance incentives might be the more novel and surprising finding among our core results.

For the remainder of the discussion, we classify such unobserved factors as arising from three potential sources: organizational features, those related to undocumented management practices, and those related to unobserved bureaucrat characteristics.

5.2.1 Organization Features

On unobserved organizational features, we have previously noted that in Table 3 when moving from Columns 1 to 2 by adding in a battery of organizational controls, the change in the coefficients of interest ($\hat{\gamma}_1, \hat{\gamma}_2$) did not suggest the potential omission of important organizational level controls (indeed both point estimates rise in absolute value rather than becoming attenuated towards zero). Moreover, if we add a further battery of organizational controls derived largely from the civil servants survey we conducted, the coefficients of interest remain quite stable ($\hat{\gamma}_1 = .13$, $\hat{\gamma}_2 = -.15$), and both remain significant at the 1% level.³³

We address this concern using an alternative approach by returning to Table A7 and continuing to probe the data at the organizational level using specification (2) to check whether management practices in place correlate to other organizational outcomes beyond project completion rates. Two natural checks follow. First, in Column 3 we construct the average complexity of projects assigned to organization n as our dependent variable, and then regress this against our measures of management practice and other organizational characteristics. Neither CS- measure is significantly correlated to the average complexity of projects the organization is tasked to implement. Hence it is not the case that organizations with better practices related to autonomy or flexibility are assigned easier projects, and those with more performance incentives are assigned harder to implement projects. Second, in Column 4 we use the log of the organization’s aggregate budget as our dependent variable: again we find no correlation between the management practices in place and the resources provided to an organization. Hence it is not the case that organizations that have better practices towards their bureaucrats also command larger budgets overall, that might otherwise have indicated it was easier for the organization to complete their assigned projects.

5.2.2 Management Practices

Our management survey tool elicited management practices along nine dimensions in each organization: roles, flexibility, incentives, monitoring, culture, targeting, facilities, skills and staffing. We have thus far aggregated these into three measures. We now estimate a specification analogous

³³The additional organizational level controls included are the average tenure, intrinsic motivation and perceptions of corruption of bureaucrats, the share of bureaucrats that report being the first civil servant in their family, the average number of work colleagues known and the average number of closest colleagues known before entering the organization, the share of bureaucrats that have worked with the same colleagues throughout their service, average reported levels of satisfaction with rewards, and aggregates related to initial posting preferences.

to (1) but where we condition on the nine separate dimensions of management practice. This disaggregated specification serves two purposes: (i) by breaking up the CS-other measure into its components, it highlights if there are likely to be wider aspects related to how organizations are functioning, that the CS-autonomy and CS-performance measures might pick up; (ii) it underpins the validity of the three-way classification of management practices in our baseline specification.

Constructing z-scores along each dimension, we note that the pairwise correlations between these nine dimensions are not especially high: varying from $-.51$ to $.47$ (out of 36 possible pairwise correlations between CS- component measures, 23 are positive). To begin with, in Table A9 we focus on estimating the impact of each dimension separately. Columns 1 and 2 split the two components that previously formed our CS-autonomy measure. The roles and flexibility subcomponents are individually positive and significantly different from zero. Columns 3 and 4 then split the CS-performance index into its constituent parts. Again we see that each component is negatively and significantly related to project completion rates. In other words, practices related to both the provision of incentives and monitoring of bureaucrats are significantly negatively associated with project completion rates. Columns 5 to 9 then split the remaining management practices that were previously subsumed within the CS-other measure. Rather dramatically we see that most of these have no significant impact on project completion rates. The one exception is the facilities index: as is intuitive, those organizations that have more reliable power, internet and computing facilities, have higher project completion rates.

In Column 10 we simultaneously control for all nine CS- components, and find: (i) both roles and flexibility components remain positive and individually significantly correlated to project completion rates, with the impact of roles being significantly larger than for flexibility; (ii) the incentives component is negative but not significantly different from zero (the point estimate hardly changes from Column 3 but the standard error almost doubles), while the monitoring component remains negative and significantly correlated with project completion rates; (iii) the impacts of the other dimensions of management practice remain rather weak, with four out of five of these measures not being significantly different from zero.³⁴

The fact that different elements of management practice have positive, zero, or negative impacts on project completion rates (despite each metric being defined to be increasing in ‘good’ practice) helps allay the concern that the CS- measures used in our baseline sample are simply picking up some unobserved element of management practice that correlates with at least one of these aspects of measured management practice. If organizations that employed the most resourceful and skilled bureaucrats were also those best able to provide autonomy to their bureaucrats and adapt to new scenarios, then we would be concerned that the partial correlation between CS-autonomy and project completion rates was being partly confounded by these other (potentially unobserved) factors. The result that other dimensions of management practice related to culture or staffing are not robustly correlated with project completion rates, suggests this is not the case.

³⁴The fact that practices related to incentives are imprecisely measured in Column 10 when all components are controlled for is not altogether surprising: this component is positively correlated with seven of the other eight components.

In Column 11 we aggregate all nine indices into a single metric for ‘good management’, as considered by BVR for manufacturing firms. In our setting such aggregation leads to the wrong conclusions being drawn: we find no significant relationship between the aggregate CS-management measure and project completion rates. The reason for this is clear: the underlying components of the aggregate index do not all have the same signed impacts on project completion rates. Hence management of bureaucrats does matter, but different dimensions of management practice have very different impacts on outcomes in this bureaucratic setting.

Taken together, the results in Table A9 re-affirm that the original aggregation of indices into the three components in our baseline specification (1) is justifiable. As discussed earlier, principal components analysis of the matrix of all nine management practices also suggests there are multiple factors at play, with the first factor explaining 28% of the variation.

5.2.3 Bureaucrat Characteristics

The third class of unobservable that might bias our coefficients of interest relates to bureaucrat characteristics. To examine this issue, we exploit the full richness of our civil servants survey to provide evidence that bureaucrat characteristics do not correlate to management practices in place. We consider two types of issue. First, bureaucrats might *sort* into organizations based on the management practices in place. If so, then the impacts of management practices are confounded by any direct relation between bureaucrat characteristics and project delivery. Second, bureaucrat characteristics might simultaneously determine both project completion rates and management practices. This issue is addressed in the next subsection.

On sorting, we have previously noted in Section 2 the evidence suggesting: (i) bureaucrats have no influence over their initial assignment to civil service posts, with 88% reporting that they had ‘no influence’ over their existing posting; (ii) once bureaucrats have entered the civil service, they enjoy long tenures with little movement between organizations; (iii) 80% of bureaucrats employed in 2010 were already in place in 2007 prior to the earlier Presidential election. In Table A10 we present additional characteristics of bureaucrats elicited in our civil servant survey to shed further light on this issue. We aggregate each response to an organizational average, for the 63 organizations in our sample. Column 1 shows the mean and standard deviation of the bureaucrat characteristic for the average organization. Columns 2 and 3 then show some of the regression coefficients from a specification analogous to (2), so estimated at the organization level, where the dependent variable is the organizational average for the reported bureaucrat characteristic, and the reported coefficients are $(\hat{\theta}_1, \hat{\theta}_2)$, the implied effect sizes from the CS-autonomy and CS-performance management practices, and their corresponding robust standard errors in parentheses.

The first batch of characteristics probe further the specific social connections they might have with more senior staff in the organization to which they are appointed: almost no bureaucrats report knowing their direct boss, or other managers, prior to their appointment. The lack of variation in this response precludes it being regressed against the CS- practices. Where there is more variation is in terms of the number of close colleagues that were known to the individual

prior to their assignment: on average, bureaucrats report knowing 4.40 other colleagues. However, we find this degree of linkage across bureaucrats, when averaged to the organization level, to be uncorrelated with the management practices in place related to autonomy and performance incentives, as shown in Columns 2 and 3.

Our next question potentially uses a more subtle means through which to elicit information on personal connections among bureaucrats. We asked individuals whether they were the first family member to join the civil service: 48% of bureaucrats in the average organization report being the first in their family to be part of the civil service. We find no correlation between this measure of bureaucrat networks and the management practices in place.

Taken together, the evidence suggests bureaucrats are unable to sort into organizations on the basis of management practices in place. This has the important implication that bureaucracies cannot use practices to induce individuals to endogenously sort into (or exit from) them. Such selection mechanisms have been argued to be important when evaluating the impacts of compensation schemes in private sector settings [Lazear 2005, Bandiera *et al.* 2007].

5.2.4 Endogenous Management Practices

The final set of econometric concerns we discuss relate to endogenous determination of management practices. In particular, bureaucrat characteristic might *simultaneously* determine both project completion rates and management practices. If for example some organization completes projects because they employ more dedicated civil servants, they might then endogenously choose to give those bureaucrats more autonomy, and be less reliant on the use of explicit performance incentives. On the other hand, in those organizations staffed by less reliable bureaucrats, the organization might choose to monitor them more intensively, incentivize them through explicit performance incentives, and allocate them less autonomy.³⁵ This is the econometric concern that most plausibly generates the pattern of partial correlation coefficients. We use three strategies to make some headway on this issue.

Our first approach is to consider additional bureaucrat characteristics that might be indicative of the ‘reliability’ of bureaucrats, as shown in the lower half of Table A10. Throughout, we split bureaucrat characteristics into those of senior and low-tier bureaucrats, as these different tiers might differentially impact the management practices in place. Two points are of note: (i) there is no significant correlation between management practices related to autonomy or performance incentives and the average tenure of bureaucrats, the proportions of them that report being intrinsically motivated, or that report observing corrupt practices on projects; (ii) this is the case for characteristics of senior and lower-tier bureaucrats.

If any of these dimensions relate closely to unobserved bureaucratic reliability, these results would ameliorate against the concern that unobserved reliability itself drives management practices in place. Moreover, these results suggest that it is not the case that organizations limit the

³⁵Given the slowly evolving nature of practices and their multi-dimensional nature, it is not obvious credible instruments for each practice can be found. A promising avenue for future work includes the use of experimental manipulation of management practices as has been done in private sector settings [Bloom *et al.* 2013].

provision of performance-based incentives to attract intrinsically motivated workers [Delfgaauw and Dur 2010], or that the matching of intrinsically motivated workers to public sector organizations limits the need to use performance-based incentives [Besley and Ghatak 2005]. Both findings are partly driven in this setting by the potential rigidities in the process assigning bureaucrats to organizations, where individuals cannot ask to be posted to organizations because of the management practices in place, nor can organizations use practices to attract bureaucrats.

A second approach to measuring bureaucrat ‘types’ and examining whether the distribution of types in organizations correlate to the management practices in place, is based on responses to *vignettes* related to scenarios a bureaucrat might face in service. For example, one vignette we use relates to a bureaucrat being faced with the following scenario: an official in an organization like theirs is told by her manager to take funds from a certified project and give them to a contractor/supplier for projects that the government has yet to complete due process on, against public service rules. The contractor then does not do the work he was paid for. We asked bureaucrats whether they agreed/disagreed with various statements related to the vignette: whether the bureaucrat acted correctly, whether the bureaucrat’s manager acted correctly, whether bureaucrats should sometimes go against rules and so forth. We find little evidence of any significant relationship between the proportion of bureaucrats that agree with each such statement and the management practices in place in the organization. If such vignettes are informative of bureaucrat ‘types’, this evidence also suggests that hard to observe measures of bureaucrat reliability are not much correlated with management practices in place.³⁶

Our third approach to addressing concerns over endogenous management practices is to identify those organizations that would have the greatest incentives to fine tune their management practices to maximize project completion rates: namely, those organizations in which the completion of projects of the type recorded in the OPEN data are relatively more important in the set of overall activities the organization is tasked with. The measures of importance we use is the share of the total budget that is assigned to capital expenditures (such as those on OPEN-style projects). We then estimate a specification analogous to our baseline model in (1) and additionally interact each CS- measure with this measure of ‘project importance’ (for expositional ease, this interaction term is defined in terms of its deviation from mean). We also control for the log of the organization’s total budget. If management practices are endogenously determined, we might expect their impact to vary depending on how important such projects are to an organization’s overall objectives. The result in Table A11 shows there to be no evidence of such heterogeneous impacts, and this is the

³⁶Enumerators stressed there were no right answers to the vignettes, and the question was not an exam, but an exercise in obtaining the opinions of bureaucrats. The vignette was phrased in reference to a bureaucrat in the third person (Ngozi). Officials were asked whether they agreed or disagreed with the following statements: (i) ‘Ngozi should have refused to divert the funds and paid the contractors/suppliers/consultant for the certified project’ (76% agreed); (ii) ‘The contractors/suppliers/consultant should not have accepted the funds given that Due Process had not been followed’ (68%); (iii) ‘The boss was wrong to direct Ngozi to share the funds of a project with others’ (81%); (iv) ‘Sometimes it is right to go against strict rules, as Ngozi did, so to make things fairer or more efficient’ (28%); (v) ‘Bureaucrats should be given more space to interpret what the best action to take in a given situation is’ (59%). We then check whether there is a significant correlation between the proportion of bureaucrats that agree with each of the five statements and the two management practices in place: we find that nine out of ten correlations are not significantly different from zero.

case if we interact CS-autonomy and CS-performance with this ratio (Column 1) or all three CS-measures with this ratio (Column 2).

6 Discussion

We have studied whether management practices for bureaucrats correlate with effective public service delivery in an important developing country context: Nigeria. We do so by combining novel project level data measuring the completion, quality and complexity of over 4700 projects implemented by various civil service organizations, with a management survey in each organization. Despite the importance of government effectiveness for economic growth and societal welfare, and the voluminous literatures on public management and incentives in organizations in economics, evidence linking practices in civil service organizations to public goods outcomes is currently almost entirely lacking [Goldfinch *et al.* 2012].

Our primary contribution is thus to provide among the first evidence on whether and how the management of bureaucrats matters for public service delivery. The relevance of such investigations is first order, given the large number of developing countries engaged in reforming public bureaucracies along the lines of the ‘good governance’ agenda of the World Bank and United Nations [Goldfinch *et al.* 2012, Hasnain *et al.* 2012]. This agenda has much promoted the use of performance pay in bureaucracies despite the mixed evidence of its efficacy in such settings [Perry *et al.* 2009, Hasnain *et al.* 2012].

Our central result is that management practices for bureaucrats matter: a one standard deviation increase in management practices associated with providing bureaucrats autonomy and allowing the organization to flexibly adapt to changing circumstances, corresponds to a significantly *higher* project completion rates of 18%. A one standard deviation increase in management practices related to the provision of incentives and monitoring of bureaucrats is associated with significantly *lower* project completion rates of 14%. These magnitudes are of economic as well as statistical significance: in the Nigerian context, 38% of projects are never started, and only 31% are ever fully completed.

We document dimensions over which the impacts of each management practice are *homogenous*: such as whether the implementing organization is centralized or decentralized, its operating scale, and whether projects are located in the North or South of Nigeria that marks a stark cultural divide. These results highlight some of the margins over which in other settings our results might well have external validity. Moreover, our results might well have external validity in other developing countries that have civil services organized along British colonial lines, and also operate in contexts where public accountability is weak and corrupt practices commonplace.

We also probe how the impacts of management practices are *heterogeneous* with the characteristics of projects, organizations and bureaucrats. This highlights that performance incentives might have especially detrimental impacts on project completion rates for more complex projects, for more atypical projects, and among organizations with longer serving bureaucrats. Our evi-

dence strongly refutes the hypothesis that performance incentives are detrimental because they crowd out the intrinsic motivation of bureaucrats: if anything, our findings imply the effort of intrinsically motivated bureaucrats is crowded in by such practices. We also find evidence of an interplay between the two practices of autonomy and performance incentives: the latter have more beneficial impacts when bureaucrats are also given more autonomy and flexibility. Taken together, these results suggest the cases in which such performance incentives, that a large body of evidence documents as having positive productivity impacts in private sector settings, might optimally be employed in bureaucracies is more nuanced.

Our results point to new directions for theoretical research to better understand the contracting environment in public bureaucracies, as well as highlighting specific areas in which better measurement of inputs and outputs can aid our understanding of public service provision in the developing world.³⁷ In this final Section we discuss the implications of our findings for understanding optimal management practices in public bureaucracies, and highlight two important directions for future research: on the methodology of collecting management practices for bureaucrats, and the interplay between such practices and other mechanisms to improve public service delivery.

6.1 Optimal Management Practices

Our core results on the relationship between management practices for bureaucrats and project completion rates suggest there are potentially huge gains to be made from marginal changes in management practices: increased provision of autonomy and flexibility to bureaucrats, and reduced provision of performance incentives and monitoring. This naturally begs the question of why civil service organizations are not optimizing over management practices to begin with. The first explanation is based on a Weberian view that the objectives of bureaucracies and society necessarily diverge. Such agency considerations lead to the need for rules-based systems for bureaucracies. In short, organizations might well be optimizing their management practices according to whatever is their true objective, and our evidence might suggest this objective is only weakly aligned with maximizing project completion rates. To check for this, we have investigate whether the management practices correlate to the frequency with which bureaucrats report performing other functions, such as engaging with politicians or citizens/members of civil society, but we find no such relations. Moreover, we have previously noted that the type of projects we study constitute almost half the total capital expenditures of these civil service organizations, so their completion is likely to be weighted to some extent in the objectives of the organization, but it is by no means their sole objective.³⁸

As discussed by BVR for private sector firms, suboptimal management practices might also persist in equilibrium despite the resultant loss of efficiency because: (i) the fixed costs of adopting

³⁷Dixit [2002] discusses that optimal management practices can differ in public and private sectors because of the existence of multiple principals, multiple tasks, a lack of competition, and motivated agents.

³⁸To further assess the degree of alignment in organization with project completion rates, we regressed the log of project budgets on each of the 16 subcomponents of the project complexity indicator, as shown in Table A3. The residuals from this regression, that might capture the rents to be gained from the project if it is completed, are found to be weakly positively correlated with actual project completion rates, with a correlation of .13.

better practices; (ii) best management practices might be heterogeneous across organizations. On the first point, to derive an estimate of the required fixed cost of changing management practices, we note the sum of capital expenditures for all projects from the 63 organizations studied is \$3,694mn. Focusing on the impacts of management practices on those 38% of projects that never start, assuming a linear relationship between costs and completion rates, and taking the marginal impacts from Table 3 of a one standard deviation change in each management practice, implies there would need to be fixed cost per organization of around $(.38 \times .32 \times 3,694)/63 = \7.13mn for such a move not to occur for this reason alone.³⁹

The second point has been examined when we explored the heterogeneous impacts of management practices in Section 4.3. Those results imply the optimal performance incentives in place should partly reflect the complexity of projects in an organization’s portfolio, as well as the tenure and intrinsic motivation of its bureaucrats. However, in contrast to this evidence, these issues were not at the fore during the semi-structured interviews we conducted at organizations to better our understanding of what drives management practices in reality. These all highlighted how practices evolve slowly over time as a function of ground rules laid out in the Public Service Rules of the Nigerian civil service, the history of senior management staff in an organization, and external events such as trade union demands.

As further discussed in BVR, inefficient management practices might also persist for dynamic reasons: learning and adjustment costs might cause best practice to diffuse over time. This is certainly in line with the evidence collected in our survey to civil servants: the average tenure of bureaucrats is 13 years, and 67% of bureaucrats report never having moved organization, despite such long tenures in the civil service. Hence good management practices are unlikely to spread through channels related to bureaucrat re-assignments.

Finally, a particularly acute concern is that a lack of competitive pressure enables poorly managed public sector organizations to survive. This might especially be true in developing country contexts where mechanisms are rarely in place to allow citizens to choose across alternative public providers of a given good or service. We return to this issue below when discussing alternative mechanisms through which public service delivery can be improved.⁴⁰

6.2 Methodology

A novel aspect of our analysis is the construction of indices related to management practices for bureaucrats along multiple dimensions: we have done so by adapting the BVR methodology, that was originally designed in the context of private sector manufacturing firms. As such, we add to a nascent literature utilizing this approach to measure management practices in non-profits

³⁹This is a lower bound estimate because, as discussed in the Appendix, the impacts of management practice on project completion rates apply not only at the margin of ensuring projects are started, but have similar impacts at all thresholds of project completion rate.

⁴⁰In the private sector, Bloom *et al.* [2012] provide evidence that product market competition drives innovations towards more better management practices. Bloom *et al.* [2013] find evidence that hospitals that face competition for patients from rival hospitals do indeed adopt better management practices.

including hospitals [Bloom *et al.* 2013] and universities [McCormack *et al.* 2013].⁴¹

Clearly, when adapting the methodology for civil service bureaucracies in a developing country context, many methodological issues remain to be explored. As described earlier, our survey instruments were designed over a long period of close collaboration with officials in the Nigerian civil Service, but open questions remain on the dimensions of management practice to focus on, the specific questions to ask relating to each practice, how best to aggregate measures, and the validation of survey responses. On the logistical implementation of such surveys, open questions remain as to whether telephone or face-to-face interviews are more reliable, and in the latter case, whether group or individual interviews are desirable.⁴²

6.3 Other Mechanisms To Improve Public Sector Delivery

The evidence we have provided shows how top-down practices for bureaucrats in the civil service filter through to public service delivery. Our analysis fits within a broader literature documenting mechanisms through which public service delivery might be improved in developing country contexts. There are at least two additional mechanisms that can interplay with the management practices for bureaucrats within organizations.

First, a better understanding is required of what drives the *selection* of workers into the public sector. This is especially relevant if the long tenures of civil servants documented in Nigeria are reflective of civil servants in developing countries more generally. Bureaucratic tenure is important both because longer serving bureaucrats shape the management practices in place, but they might also react differently to any given set of incentives, as highlighted in Table 4. There is a need to reconcile the competing views of which types of individuals might sort into the public sector, be they self-interested and lazy, or intrinsically motivated. A recent model combining these views is Prendergast [2007], who demonstrates conditions under which the equilibrium selection to bureaucratic positions becomes bifurcated: only the most intrinsically motivated and most self-serving enter. Hence selecting on intrinsic motivation alone need not be efficient. There remains much scope to combine and jointly test models of *selection* into, practices *within* and turnover of bureaucrats *between*, public sector organizations.⁴³

A recent contribution in this direction is Dal Bo *et al.* [2013] who present evidence from Mexico, exploiting experimental variation in salaries to identify their impact on the selection of public sector officials. They find higher wages attracted more able workers, and that there are no adverse selection impacts in terms of motivation. This evidence neatly complements our findings

⁴¹McCormack *et al.* [2013] find that management matters in universities: practices, especially those related to the provision of incentives for staff recruitment, retention and promotion, are correlated with both teaching and research performance conditional on resources and past performance.

⁴²On validation, a concern in the public administration literature is the notion of ‘isomorphic mimicry’ that denotes circumstances in which the outward forms of bureaucracies (as measured using a BVR-style management survey) actually camouflage a persistent lack of function [Pritchett *et al.* 2012]. In short, those worse performing organizations are those most likely to be want to be outwardly seen as adopting good management practices, and practices related to monitoring and performance incentives might be most easy for them to identify and mimic.

⁴³Rauch and Evans [2000] provide evidence from 35 developing countries on how effective recruitment and promotion practices in government bureaucracies relate to bureaucratic performance.

on the impact of management practices once bureaucrats are hired.

Second, the role of grass roots monitoring or accountability of public service providers is also important and might well interplay with management practices in place. For example, such channels might create competitive pressure for management practices to move towards their optimal levels. Bjorkman and Svensson [2009] present evidence from an RCT in Uganda on how community based monitoring of primary health care providers led to large increases in utilization of services and improved health outcomes: in part these findings are driven by changes in the behavior of health providers themselves. Andrabi *et al.* [2013] study the impact of providing report cards on schools on test scores, prices, and school enrollment. Their results suggest that information provision allows for better comparisons across providers, improves market efficiency and raises child welfare. Reinikka and Svensson [2011] and Duflo *et al.* [2012] provide other examples of the gains to public service delivery to be had from bottom-up monitoring of frontline public sector workers. On the other hand, such findings are not uniform: Olken [2007] finds more muted impacts of community based monitoring on reducing corruption in road infrastructure projects in Indonesia. Rather, top-down audits are effective in reducing corruption on such locally organized public works projects. Along the same lines of top-down monitoring, Besley and Burgess [2002], Stromberg [2004] and Ferraz and Finan [2008] have all documented the significant role that media scrutiny can play for public service provision.⁴⁴

We view there to be a rich future agenda for understanding public service delivery – in rich and poor countries – that effectively links incentives and practices in civil service organizations, the selection and retention of bureaucrats, and public monitoring and accountability of organizations.

A Appendix

A.1 Measuring Project Complexity

Data on the complexity of government projects is not directly part of the OPEN data set. We thus worked with a pair of Nigerian engineers familiar with the OPEN projects and a number of international researchers working on technical complexity to define a relevant set of indicators based on the technical documents for each OPEN project. We followed the perspectives on complexity suggested by Remington and Pollack [2007], by asking the engineer-assessors to individually assess projects along the following five topics, each with their own set of indicators.

Structural complexity stems from the scale of different interconnected tasks and activities. The indicators associated with this topic capture structural aspects such as project size and the number of inputs required for production. They also capture issues in raw material and labour supply, and the ease with which any necessary specialized skills and equipment can be sourced. *Temporally complex* projects are those whose production involves uncertainties. Hence there are indicators

⁴⁴Evidence from our civil servants survey confirms that bureaucrats do regularly engage with community groups and so such bottom-up approaches might well interplay with management practices in place. For example, 24% of surveyed bureaucrats reported personally engaging with community/religious groups; 11% reported engaging with members of the National Assembly.

for uncertainties in design and implementation. *Technically complex* projects are those whose production have ambiguous risks, namely their uncertainties are not well understood. Hence some indicators capture ambiguities in design and implementation. *Directional complexity* refers to the potential for preferences over the project to diverge. The engineer assessors are thus asked to rate the managerial complexities of the project. Finally, there is a subjective assessment as to the overall complexity of the project. This allows any unassessed aspects of complexity to be measured and provides a coherent picture of project complexity.

Two qualified and independent Nigerian engineers were then contracted to assess each project in the OPEN data set along these margins. The process of aggregation between engineers used in this project aimed to build a consensus. The first engineer coded indicators for the entire data set. The codings of the first engineer were then provided to the second engineer who then constructed his own codings with reference to the codings of the first. The aim was to anchor the coding of the second engineer in that of the first but give him freedom to disagree where he felt the coding was incorrect. Other methods would have been to have them code independently and average the two data sets or to have them work together. We decided our approach was a balance between consensus and subjectivity.

The two engineers were provided with project details and documents and asked to code a value for each indicator. The documents only contained information available *before* implementation such that there was no bias from the coding being done after the projects were implemented.

Table A3 provides descriptive statistics for all 16 indicators from which the complexity index is constructed, as well as how each is correlated with the other indicators. Aggregate complexity is a subjective assessment of the overall complexity of the projects by the two engineers, that includes ‘all factors that might influence the difficulty of implementing the project, not only those assessed [by the other indicators]’. We asked the engineers to take the distribution of complexity in the OPEN data set as a whole, with the least complex project in the data having an aggregate complexity of zero and the most complex project having an aggregate complexity of 100, and place each project within this distribution.

We undertook a number of measures to check the complexity of the OPEN indicators coded by the engineers. First, we inserted 200 randomly chosen repeated projects into the data set provided to the engineers. Since the project characteristics of the original and repeat projects are identical, we would expect that the codings of the two sets of projects would be similar. Reassuringly, we find that in general the original and duplicate projects are coded in similar ways. We compare the differences between these two sets by looking at group and paired means, and distributional tests for each variable. The differences are only statistically significant at conventional levels in a few cases, and the magnitude of the differences are relatively small. For example, the only variable that is statistically significantly different below the 10% level in the mean-comparison t-test relates to raw material storage. Here, despite a standard deviation of 0.2 in the originals, the difference is 0.07 between the originals and the duplicates.

Second, we looked at the similarity of the codings of the two engineers. We find that the second engineer’s codings are not dramatically different from the first engineer’s efforts. Whilst there are

a small number of differences, they are relatively small and rarely significant, indicating that the re-coding left the overall picture relatively stable.

Finally, over a year after he had completed the prompted codings, we asked the second engineer to re-code a sub-sample of projects from scratch, this time without prompting. The differences between these independent codings and the consensus data we rely on are again relatively minor. It seems that once he had become accustomed to the broad parameters of the coding framework, the second engineer’s coding was not dissimilar to the consensus generated by the two engineers working one after the other.

We therefore have evidence of similar projects within the data set being coded in a similar way, of the two engineers coding in similar ways both when prompted and unprompted, and when there were deviations, of the deviations not being particularly quantitatively large. Taken together these checks reassure us that the complexity measures pick up meaningful variation across projects, rather than merely picking up noise that should have led to the multiple reports (either across engineers or over time) being uncorrelated.

A.2 Standard Errors

Our baseline specification (1) assumes the disturbance term is clustered by project type-organization. This might best capture the nature of unobserved factors that relate to project completion rates, such as the quality of the sub-departments in each organization that are tasked with the same project types. In Table A4 we show the robustness of our results to alternative assumptions on the error structure. The table is structured to cover the same specifications as in Columns 1 to 4 of Table 3, but where we now report standard errors based on alternative assumptions. These include: (i) robust standard errors; (ii) errors clustered by project-type and organization as in Table 3; (iii) standard errors clustered by organization. One concern with such clustered standard errors is that they may be downwards biased when the number of clusters is small (and in our specification the number of clusters corresponds to 63, the number of organizations in the sample) [Cameron *et al.* 2008]. They propose various asymptotic refinements using bootstrap techniques, finding the wild cluster bootstrap-t technique performs particularly well in Monte Carlo simulations. We have implemented this method on our baseline specifications and show in brackets in Columns 1 to 4 the resulting p-values. This correction does not alter the significance of any of the coefficients from our preferred specification with project fixed effects shown in Column 4 of Table A3.

A.3 Robustness Checks

We conduct a range of robustness checks on our core result on project completion rates, shown in Column 4 of Table 3: higher levels of CS-autonomy are associated with significantly higher quality projects, and higher levels of CS-performance are associated with significantly lower quality projects. Both coefficients of interest are significant at the 1% significance level.

The baseline results in Table 3 used our continuous measure of project completion rates (from zero to one) as the dependent variable. However, an alternative approach is to define a threshold of completion that would deem the project usable. To do so we consider all potential thresholds from 1% to 100% in increments of 1% and then estimate a specification analogous to (1) where y_{ijn} is defined as a dummy variable equal to one if the project completion rate is above the given threshold $p\%$, and zero otherwise. For any given threshold p the coefficients of interest are denoted γ_{1p} and γ_{2p} . Figure A2 then plots each pair of $(\hat{\gamma}_{1p}, \hat{\gamma}_{2p})$ estimates, for each threshold and their associated 95% confidence interval.

Two points are of note. First, at the extreme left of the figure where we consider a 1% threshold, we are essentially using a linear probability model to assess the relationship between management practices in civil service organizations and whether projects are *started* in some way. Here we find marginal impacts of each type of management practice to be qualitatively similar to those documented earlier for the average completion rate, although the point estimate on CS-autonomy seems to be lower than the baseline specification.⁴⁵ Second, we cannot reject the null that the sign and significance of the coefficients are the same for every possible definition of project completion. Taken together, the results imply that managerial incentives along both margins have similar impacts on the extensive margin of public service delivery (namely whether projects are started at all) and the intensive margins of project completion (namely the extent to which projects are completed).

The second series of robustness checks detailed in Table A5 all verify the robustness of our main finding to alternative samples of organizations and projects: Column 1 excludes those projects implemented by the largest organization in terms of total expenditures. Column 2 excludes projects implemented by the largest organization in terms of total expenditures. Columns 3 and 4 remove the 10 smallest organizations by expenditures and number of projects respectively. Columns 5 and 6 exclude organizations at the top and bottom of the CS-autonomy and CS-performance management scales respectively. In each cut of the data, the core results remain remarkably stable, so that our findings do not appear to be driven by outlier or specific organizations.

The third series of robustness checks in all probe the core results in alternative subsamples of data (with the caveat that such splits of the data inevitably lead to less precise estimates). Columns 7 and 8 in Table A5 break down the project types listed in Table 1 into two groups: those related to construction projects (borehole, building, electrification, dam, road and canal) and those related to non-construction projects. We find that for construction projects, the results closely replicate the baseline findings. Indeed, for construction projects as a whole the point estimates on each management practice index is slightly larger in absolute value than the baseline result in Column 4 of Table 3. For non-construction projects, the results show that CS-autonomy continues to have a positive and significant impact on project completion rates; CS-performance

⁴⁵The result needs to be interpreted carefully. There is not continuous mass in project completion rates over the $[0,1]$ interval: hence we do not expect the marginal impact of the each management practice to be sensitive to marginal changes in threshold p where there is little mass in project completion rates. This explains why the marginal impacts shown in Figure A2 jump at a small number of points.

has a negative correlation with project completion rates that is significant at the 10% level.

The next split considered in Columns 9 and 10 is between centralized and decentralized civil service organizations, where centralized agencies correspond to government ministries. We see the impacts of CS-autonomy to be similar in both, although the CS-performance index only has negative impacts in the centralized agencies. This latter result is worth exploring in future work.

The next robustness check addresses the concern that different management practices might be spread across the country in a way that is correlated with characteristics of the organization’s local geographies. Indeed, it is well understood that the characteristics of local populations interplay with them being able to solve collective action problems, and thus are an important driver of public goods provision [Banerjee *et al.* 2007]. To check the robustness of our findings to such issues, Column 11 additionally controls for a wide variety of state-level controls for each project and finds almost no change in the coefficients of interest. In short, local area characteristics do not seem to be driving our results.⁴⁶ Columns 12 and 13 split the sample into projects that are located in the Northern and Southern regions of Nigeria respectively, that characterizes the first order cultural divide in Nigeria, and provides a relatively even split in the number of projects. We find the impacts of both management practices to remain significant in both regions. This suggests that cultural differences across regions do not much interact with responses to these management practices.

The final two robustness checks relate to methodological issues. First, we consider alternative constructions of the CS- management practice indices. As described in Section 3.3, following BVR, we aggregated responses to individuals questions to construct our indices of management practices giving equal weight to all questions. A natural alternative is to cluster the variables into the various management topics described in Table A2 and weight each *topic* (rather than each variable) equally. We re-construct our CS-autonomy and CS-performance measures along these lines and reestimate our preferred specification (1). The result, in Column 14 of Table A5 is qualitatively in line with our baseline results, although the absolute magnitude of each measure of public sector management is *larger*: a one standard deviation increase in CS-autonomy corresponds to a significantly higher project completion rate of 23%, and a one standard deviation increase in CS-performance corresponds to a significantly lower project completion rate of 14%.

The analysis has so far estimated (1) using OLS. The final robustness check estimates this specification using a fractional regression model that accounts for the dependent variable being a continuous variable between zero and one. To do so, we utilize Papke and Wooldridge’s [1996] fractional logit model in which the conditional expectation function is modelled as a logistic function that can take all values in the unit interval. The interpretation of the marginal effects are the same as in the binary logit model and evaluated at sample averages, the partial effects are approximately comparable to the coefficients from a linear regression. The result in Column 15 of Table A5 shows our core findings to be robust to this alternative estimation model.

⁴⁶The sample drops slightly in this specification because the state in which the project is located (or should have been located for those projects that are never started) is missing for around 450 projects.

A.4 The Assignment of Projects to Organizations

A central econometric concern addressed in Section 5.1 is that the assignment of projects to organizations might correlate to the management practices in place. For example, projects for which there is concerted political pressure to complete might be allocated to better managed organizations, all else equal. To investigate the issue we use a conditional logit model to directly estimate the likelihood of project i being assigned to organization n conditional on the management practices for bureaucrats in place in the organization, and other project and organizational characteristics exploited in our analysis.

To do so we first reshape our data as follows: for each project we created a binary variable with 63 values corresponding to our 63 organizations. The variable, denoted D_{in} , takes the value one for the organization at which that project is actually assigned, and zero otherwise. Thus, the data-set is at the project-organization pair level (in), with a total of $4721 \times 63 = 297,423$ project-organization paired observations. To each observation, we attach the relevant organization-level characteristics used in our analysis (that were denoted OC_n in (1)), such as our management indices, capital controls and organizational averages of bureaucrat characteristics. We then also consider whether specific project-organization interactions, denoted Z_{in} , correlate with the assignment of projects to organizations. We estimate a conditional logit specification for $\text{Prob}(D_{in} = 1)$, based on both sets of characteristics;

$$\text{prob}[D_{in} = 1] = \frac{\exp(\beta' OC_n + \gamma' Z_{in})}{\sum_n \exp(\beta' OC_n + \gamma' Z_{in})}. \quad (7)$$

Note that in this modelling framework project characteristics play no role as these do not vary within a given project i over the organizations n it could potentially have been assigned to.

We run three sets of specifications. The first takes the perspective that each project could have been assigned to *any* of our 63 organizations. The second takes the perspective that projects can only be implemented by organizations of the same sector. Thus, health projects could only be implemented by health sector organizations for example. When we impose this restriction on the permissible project-organization pairs, we lose 847 projects as there is only one organization of that sector in our data, and there are 44,429 potential within sector project-organization pairs. The third specification further imposes the assumption that projects can only potentially be assigned to organizations in the same sector that are observed being tasked to implement a project of the same complexity. This further reduces the sample to 33,480 feasible project-organization pairs. In all specifications we cluster standard errors by organization as there are likely to be unobserved characteristics of organizations that determine project assignments.

Table A6 presents the results. Column 1 utilizes the entire set of project-organization combinations and uses only our management scores in the regression. Unconditional on other organization characteristics, neither management practice related to autonomy or performance-based incentives significantly predicts the assignment of projects to organizations. When we restrict the sample so that each project can only feasibly be assigned to organizations in the same sector, Column 2

shows the coefficient on CS-autonomy to become significant at the 10% level, but this result is not robust. In Column 3 where we restrict the feasible pairs also using information on the complexity of projects, we find the probability of projects being assigned to organizations do not significantly correlate with the management practices in place in the organization.

Column 4 extends the specification to include all the organizational controls utilized in our baseline specification in Table 3 (capital, general and noise), as well as the full set of organizational controls that we use elsewhere in the paper. The coefficients on the management practices remain insignificantly different from zero at the usual levels. Moreover, we find no evidence that any of these other organizational characteristics predict the assignment of a given project to that particular organization rather than other organizations it could feasibly have been assigned to.

In Column 5 we additionally control for a series of interactions between project characteristics (scale, complexity) and organizational characteristics (total staff, total budget). Some of these project-organization interactions do predict the assignment of projects. As is intuitive, we find that the interactions between the number of staff at an organization and the project budget, and the organization's total budget and the project complexity, both are positive and significant predictors of project assignment. Over and above these interactions, we continue to find no impact of management practices on project assignment even once we allow for specific matched pairs to be assigned in this way.

Overall, these results suggest our results are not reflecting the non-random selection of projects to organizations based on their management practices. While there is no doubt some complex bargaining process between Parliament, civil service organizations and other stakeholders that determined the assignment of projects to locations and organizations, on the margin, this assignment is uncorrelated with the management practices in place in implementing organizations.

References

- [1] AGHION.P AND J.TIROLE (1997) "Real and Formal Authority in Organizations," *Journal of Political Economy* 105: 1-29.
- [2] ALABI.M.O.A AND J.Y.FASHAGBA (2010) "The Legislature and Anti-corruption Crusade under the Fourth Republic of Nigeria: Constitutional Imperatives and Practical Realities," *International Journal of Politics and Good Governance* 1.
- [3] ANDRABI.T, J.DAS AND A.I.KHWAJA (2013) Report Cards: The Impact of Providing School and Child Test Scores on Educational Markets, mimeo Harvard University.
- [4] ASHRAF.N, O.BANDIERA AND K.JACK (2012) No Margin, No mission? A Field Experiment on Incentives for Pro-social Tasks, mimeo, London School of Economics.
- [5] BANDIERA.O, I.BARANKAY, AND I.RASUL (2007) "Incentives for Managers and Inequality Among Workers: Evidence from a Firm Level Experiment", *Quarterly Journal of Economics* 122: 729-74.

- [6] BANDIERA.O, A.PRAT AND T.VALLETTI (2009) "Active and Passive Waste in Government Spending: Evidence from a Policy Experiment," *American Economic Review* 99: 1278-308.
- [7] BANERJEE.A, L.IYER AND R.SOMANATHAN (2007) "Public Action for Public Goods," in *Handbook of Development Economics* Vol. 4, T.P.Schultz and J.Strauss (eds.), Amsterdam: Elsevier.
- [8] BENABOU.R AND J.TIROLE (2006) "Intrinsic and Extrinsic Motivation," *Review of Economic Studies* 70: 489-520.
- [9] BERG.E, M.GHATAK, R.MANJULA, D.RAJASEKHAR AND S.ROY (2013) Motivating Knowledge Agents: Can Incentive Pay Overcome Social Distance?, mimeo, London School of Economics.
- [10] BESLEY.T (2004) "Paying Politicians: Theory and Evidence," *Journal of the European Economic Association* 2: 193-215.
- [11] BESLEY.T AND R.BURGESS (2002) "The Political Economy of Government Responsiveness: Theory and Evidence from India," *Quarterly Journal of Economics* 117: 1415-52.
- [12] BESLEY.T AND M.GHATAK (2005) "Competition and Incentives with Motivated Agents," *American Economic Review* 95: 616-36.
- [13] BESLEY.T AND M.GHATAK (2007) "Reforming Public Service Delivery," *Journal of African Economics* 16 AERC Supplement 1: 127-56.
- [14] BESLEY.T AND T.PERSSON (2010) "State Capacity, Conflict and Development," *Econometrica* 78: 1-34.
- [15] BJORKMAN.M AND SVENSSON.J (2009) "Power to the People: Evidence from a Randomized Field Experiment of a Community-Based Monitoring Project in Uganda", *Quarterly Journal of Economics* 124: 735-69.
- [16] BLACK.S AND L.LYNCH (2001) "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity," *Review of Economics and Statistics* 88: 434-45.
- [17] BLOOM.N AND J.VAN REENEN (2007) "Measuring and Explaining Management Practices Across Firms and Countries," *Quarterly Journal of Economics* 122: 1351-1408.
- [18] BLOOM.N AND J.VAN REENEN (2010) "New Approaches to Surveying Organizations," *American Economic Review* 100: 105-9.
- [19] BLOOM.N, R.SADUN AND J.VAN REENEN (2012) "The Organization of Firms Across Countries," *Quarterly Journal of Economics* 127: 1663-1705.
- [20] BLOOM.N, B.EIFERT, A.MAHAJAN, D.MCKENZIE AND J.ROBERTS (2013) "Does Management Matter: Evidence from India," *Quarterly Journal of Economics* 128: 1-51.

- [21] BLOOM.N, C.PROPPER, S.SEILER AND J.VAN REENEN (2013) The Impact of Competition on Management Practices in Public Hospitals, mimeo, Stanford University.
- [22] BUCHANAN.J.M (1978) *The Economics of Politics*, London: Institute of Economic Affairs.
- [23] BURGESS.S, C.PROPPER, M.RATTO AND E.TOMINEY (2011) Incentives in the Public Sector: Evidence from a Government Agency, CMPO WP 11/265.
- [24] BUURMAN.M, J.DELFGAAUW, R.DUR AND S.VAN DEN BOSSCHE (2012) "Public Sector Employees: Risk Averse and Altruistic?," *Journal of Economic Behavior and Organization* 83: 279-91.
- [25] CAMERON.C, J.GELBACH AND D.MILLER (2008) "Bootstrap-Based Improvements for Inference with Clustered Errors", *Review of Economics and Statistics* 90: 414-27.
- [26] COURTY.P AND G.R.MARSHKE (1997) "Measuring Government Performance: Lessons from a Federal Job-Training Program", *American Economic Review Papers and Proceedings* 87: 383-88.
- [27] DAL BO.E, F.FINAN AND M.ROSSI (2013) "Strengthening State Capabilities: The Role of Financial Incentives in the Call to Public Service," forthcoming, *Quarterly Journal of Economics*.
- [28] DELFGAAUW.J AND R.DUR (2008) "Incentives and Workers' Motivation in the Public Sector," *Economic Journal* 118: 171-91.
- [29] DELFGAAUW.J AND R.DUR (2010) "Managerial Talent, Motivation, and Self-Selection into Public Management," *Journal of Public Economics* 94: 654-60.
- [30] DESSEIN.W (2002) "Authority and Communication in Organizations," *Review of Economic Studies* 69: 811-38.
- [31] DESSEIN.W AND T.SANTOS (2006) "Adaptive Organizations," *Journal of Political Economy* 114: 956-95.
- [32] DIJKSTRA.G, B.AKANJI, C.HIDDINK, S.SANGARABALAN AND F.DE MEVIUS (2011) *Mutual Interests - Mutual Benefits: Evaluation of the 2005 Debt Relief Agreement Between the Paris Club and Nigeria*, The Hague: Ministry of Foreign Affairs of the Kingdom of the Netherlands.
- [33] DIXIT.A (2002) "Incentives and Organizations in the Public Sector: An Interpretive Review," *Journal of Human Resources* 37: 696-727.
- [34] DOWNS.A (1967) *Inside Bureaucracy*, Boston: Little Brown.
- [35] DUFLO.E, R.HANNA AND S.P.RYAN (2012) "Incentives Work: Getting Teachers to Come to School," *American Economic Review* 102: 1241-78.

- [36] EBOH.E (2010) *MDGs-based Planning in Africa: Lesson, Experiences and Challenges: A Case Study of Nigeria*, Addis Ababa: United Nations Economic Commission for Africa.
- [37] FEDERAL GOVERNMENT OF NIGERIA (2007) *The Story of OPEN*, Abuja: Federal Government of Nigeria.
- [38] FEDERAL GOVERNMENT OF NIGERIA (2008) *Monitoring and Evaluation Report of the DRG-Funded MDG Projects and Programmes in Nigeria 2006*, Abuja: Federal Government of Nigeria.
- [39] FEDERAL GOVERNMENT OF NIGERIA (2009) *Monitoring and Evaluation Report of the DRG-Funded MDG Projects and Programmes in Nigeria 2007*, Abuja: Federal Government of Nigeria.
- [40] FERRAZ.C AND F.FINAN (2008) "Exposing Corrupt Politicians: The Effects of Brazil's Publicly Released Audits on Electoral Outcomes," *Quarterly Journal of Economics* 123: 703-45.
- [41] FLODGREN.G, M.P.ECCLES, S.SHEPPERD, A.SCOTT, E.PARMELLI AND F.R.BEYER (2011) "An Overview of Reviews Evaluating the Effectiveness of Financial Incentives in Changing Health-care Professional Behaviours and Patient Outcomes," *Cochrane Database of Systematic Reviews* Issue 7, Art. No.: CD009255.
- [42] FRANCOIS.P AND M.VLASSOPOULOS (2008) "Pro-social Motivation and the Delivery of Social Services," *CESifo Economic Studies* 54: 1-33.
- [43] FRYER.R.G (2013) "Teacher Incentives and Student Achievement from New York Public Schools," *Journal of Labor Economics* 31: 373-407.
- [44] GAGLIARDUCCI.S AND T.NANNICINI (2013) "Do Better Paid Politicians Perform Better? Disentangling Incentives from Selection," *Journal of the European Economic Association* 11: 369-98.
- [45] GLEWWE.P, N.ILIAS AND M.KREMER (2010) "Teacher Incentives," *American Economic Journal: Applied Economics* 2: 205-27.
- [46] GNEEZY.U, S.MEIER AND P.REY-BIEL (2011) "When and Why Incentives (Don't) Work to Modify Behavior," *Journal of Economic Perspectives* 25: 191-210.
- [47] GOLDFINCH.S, K.DEROUEN AND P.POSPIESZNA (2012) "Flying Blind? Evidence for Good Governance Public Management Reform Agendas, Implementation and Outcomes in Low Income Countries," *Public Administration and Development* 33: 50-61.
- [48] GREGG.P, P.A.GROUT, A.RATCLIFFE, S.SMITH AND F.WINDMEIJER (2011) "How Important is Pro-Social Behavior in the Delivery of Public Services?," *Journal of Public Economics* 95: 758-66.

- [49] GRIFFITH.R AND A.NEELY (2009) "Performance Pay and Managerial Experience in Multi-task Teams: Evidence from Within a Firm," *Journal of Labor Economics* 27: 49-82.
- [50] HARSANYI.J.C (1978) "The Dimension and Measurement of Social Power," in K.W.Rothschild (ed.) *Power in Economics*, Harmandsworth: Penguin Books.
- [51] HASNAIN.Z, N.MANNING AND J.H.PIERSKALLA (2012) Performance-related Pay in the Public Sector, World Bank Policy Research Working Paper 6043.
- [52] HECKMAN.J, C.HEINRICH AND J.SMITH (1997) "Assessing the Performance of Performance Standards in Public Bureaucracies", *American Economic Review Papers and Proceedings* 87: 389-95.
- [53] HOLMSTROM.B AND P.MILGROM (1991) "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design", *Journal of Law, Economics and Organization* 7: 24-52.
- [54] ICHNIOWSKI.C, K.SHAW AND G.PRENNUSHI (1993) "Effects of Human Resource Management Practices," *American Economic Review* 87: 291-313.
- [55] LAZEAR.E.P (2005) "Output-Based Pay: Incentives or Sorting?" *Research in Labor Economics – Accounting for Worker Well-Being*, edited by S.W.Polachek, 23: 1-25.
- [56] MCCORMACK.J, S.SMITH AND C.PROPPER (2013) Herding Cats? Management and University Performance, CMPO Working Paper 13/308.
- [57] MILLER.G, R.LUO, L.ZHANG, S.SYLVIA, Y.SHI, P.FOO, Q.ZHAO ET AL. (2012) "Effectiveness of Provider Incentives for Anaemia Reduction in Rural China: A Cluster Randomised Trial," *British Medical Journal* 345, e4809.
- [58] MILLER.G AND K.S.BABIARZ (2013) Pay-For-Performance Incentives in Low- and Middle-Income Country Health Programs, NBER WP 18932.
- [59] MULLEN.K.J, R.G.FRANK AND M.B.ROSENTHAL (2010) "Can You Get What You Pay For? Pay-for-performance and the Quality of Healthcare Providers," *Rand Journal of Economics* 41: 64-91.
- [60] MURALIDHARAN.K AND V.SUNDARARAMAN (2011) "Teacher Performance Pay: Experimental Evidence from India," *Journal of Political Economy* 119: 39-77.
- [61] MURALIDHARAN.K (2012) Long-Term Effects of Teacher Performance Pay: Experimental Evidence from India, mimeo UCSD.
- [62] NKONJO-IWEALA.N AND P.OSAFO-KWAAKO (2007) Nigeria's Economic Reforms: Progress and Challenges, Brookings Institute Global Working Papers Washington: Brookings Institute.

- [63] OLKEN.B (2007) "Monitoring Corruption: Evidence from a Field Experiment in Indonesia," *Journal of Political Economy* 115: 200-49.
- [64] OLKEN.B, J.ONISHI AND S.WONG (2012) Should Aid Reward Performance? Evidence from a Field Experiment on Health and Education in Indonesia, NBER WP 17892.
- [65] OGUNDIYA.I.S (2011) "Anti-corruption Reforms in Nigeria: Challenges and Failures," in I.S.Ogundiya, S.Ilufoye, A.Olanrewaju Olutayo and J.Amzat (eds.) *Assessment Of Democratic Trends In Nigeria*, Delhi: Gyan Publishing House.
- [66] PAPKE.L.E AND J.M.WOOLDRIDGE (1996) "Econometric Methods for Fractional Response Variables with an Application to 401(k) Plan Participation Rates," *Journal of Applied Econometrics* 11: 619-32.
- [67] PERRY.J.L AND L.R.WISE (1990) "The Motivational Basis of Public Service," *Public Administration Review* 50: 367-73.
- [68] PERRY.J.L (1996) "Measuring Public Service Motivation: An Assessment of Construct Reliability and Validity," *Journal of Public Administration Research and Theory* 6: 5-2.
- [69] PERRY.J.L, T.A.ENGERS AND S.Y.JUN (2009) "Back to the Future? Performance-related Pay, Empirical Research, and the Perils of Persistence," *Public Administration Review* 69: 39-51.
- [70] PRENDERGAST.C (1999) "The Provision of Incentives in Firms", *Journal of Economic Literature* 37: 7-63.
- [71] PRENDERGAST.C (2002) "The Tenuous Trade-Off between Risk and Incentives", *Journal of Political Economy* 110: 1071-102.
- [72] PRENDERGAST.C (2007) "The Motivation and Bias of Bureaucrats," *American Economic Review* 97: 180-96.
- [73] PRITCHETT.L, M.WOODCOCK AND M.ANDREWS (2012) Looking like a State: Techniques of Persistent Failure in State Capability for Implementation, mimeo, Harvard University.
- [74] RAJAN.R.G AND J.WULF (2006) "The Flattening Firm: Evidence from Panel Data on the Changing Nature of Corporate Hierarchies," *Review of Economics and Statistics* 88: 759-73.
- [75] RAUCH.J.E AND P.B.EVANS (2000) "Bureaucratic Structure and Bureaucratic Performance in Less Developed Countries," *Journal of Public Economics* 75: 49-71.
- [76] REINIKKA.R AND J.SVENSSON (2011) "The Power of Information in Public Services: Evidence from Education in Uganda," *Journal of Public Economics* 95: 956-66.
- [77] REMINGTON.K AND J.POLLACK (2007) *Tools for Complex Projects*, Aldershot: Gower.

- [78] ROSE-ACKERMAN.S (1986) "Reforming Public Bureaucracy Through Economic Incentives?," *Journal of Law, Economics and Organization* 2: 131-61.
- [79] SCOTT.A, P.SIVEY, D.AIT OUAKRIM, L.WILLENBERG, L.NACCARELLA, J.FURLER AND D.YOUNG (2011) "The Effect of Financial Incentives on the Quality of Health Care Provided by Primary Care Physicians," *Cochrane Database of Systematic Reviews* Issue 9. Art.No.: CD008451.
- [80] SIMON.H (1951) "A Formal Theory of the Employment Relation," *Econometrica* 19: 293-305.
- [81] SIMON.W (1983) "Legality, Bureaucracy, and Class in the Welfare System," *Yale Law Journal* 92: 1198-269.
- [82] STROMBERG.D (2004) "Radio's Impact on Public Spending," *Quarterly Journal of Economics* 119: 189-221.
- [83] TULLOCK.G (1965) *The Politics of Bureaucracy*, Washington: Public Affairs Press.
- [84] WILSON.J (1989) *Bureaucracy: What Government Agencies Do and Why They Do It*, Basic Books: New York.

Table 1: Descriptive Evidence on Project Types

Project Type	(1) Number of Projects [Proportion]	(2) Number of Implementing Organizations	(3) Median Budget Allocation (US\$000s)	(4) Proportion Never Started	(5) Average Completion Rate	(6) Proportion Completed Conditional on Being Started	(7) Proportion Fully Completed	(8) Proportion With Satisfactory Quality
Borehole	1348 [0.29]	18	29	0.44	0.47	0.84	0.37	0.85
Building	806 [0.17]	32	120	0.37	0.50	0.79	0.34	0.81
Electrification	751 [0.16]	2	93	0.14	0.56	0.65	0.25	0.87
Dam	624 [0.13]	14	18	0.79	0.15	0.74	0.10	0.50
Procurement	345 [0.07]	41	87	0.30	0.58	0.83	0.47	0.85
Road	217 [0.05]	4	167	0.12	0.52	0.59	0.22	0.79
Training	189 [0.04]	26	80	0.20	0.60	0.74	0.42	0.84
Financial project	157 [0.03]	8	17	0.38	0.49	0.79	0.35	0.84
Research	122 [0.03]	21	67	0.11	0.63	0.72	0.52	0.99
Advocacy	86 [0.02]	23	49	0.24	0.61	0.80	0.47	0.94
Canal	76 [0.02]	12	347	0.70	0.14	0.45	0.05	0.92

Notes: The "project type" classification refers to the primary classification for each project. Other project classifications exist. The median budget allocation in Column 3 is in thousands of US Dollar (assuming an exchange rate of US\$1: Naira 150). The sample of projects covers those which have a positive budget allocation and for which the proportion completed evaluation variable and management scores are available. The project quality variable in Column 8 is not available for all projects. Standard deviations are in parentheses. Figures are rounded to two decimal places where relevant.

Table 2: Descriptive Evidence on Largest Civil Service Implementing Organizations

Civil Service Organization	(1) Number of Projects	(2) Number of Unique Project Types	(3) Budget Allocation (US\$mn)	(4) Proportion Never Started	(5) Proportion Completed	(6) Proportion Completed Conditional on Being Started	(7) Proportion Fully Completed	(8) Proportion With Satisfactory Quality
Federal Ministry of Agriculture and Rural Development	797	9	144	0.54	0.29	0.63	0.14	0.76
Federal Ministry of Power and Steel	750	1	490	0.14	0.56	0.25	0.65	0.87
Federal Ministry of Water Resources	520	4	426	0.95	0.04	0.77	0.03	0.69
National Primary Health Care Development	447	4	56	0.19	0.64	0.79	0.42	0.75
Sokoto Rima River Basin Development Authority	277	2	23	0.22	0.66	0.85	0.51	0.76
Upper Benue River Basin Development Authority	169	3	13	0.11	0.89	1.00	0.89	0.25
Ogun/Oshun River Basin Development Authority	165	4	22	0.55	0.32	0.71	0.24	0.89
Chad Basin River Basin Development Authority	148	3	16	0.43	0.56	1.00	0.56	1.00
Lower Benue River Basin Development Authority	143	3	16	0.45	0.42	0.77	0.17	0.86
Nigerian Agricultural Cooperative and Rural Development Bank	133	2	8	0.42	0.46	0.80	0.34	0.81

Notes: The sample covers the ten largest civil service organizations ranked by number of projects from our overall sample of projects. The "project type" classification refers to the primary classification for each project. Other project classifications exist. The budget allocation in Column 3 is in millions of US Dollars (assuming an exchange rate of US\$1: Naira 150). The sample of projects covers those which have a positive budget allocation and for which the proportion completed evaluation variable and management scores are available. The project quality variable in Column 8 is not available for all projects. Standard deviations are in parentheses. Figures are rounded to two decimal places where relevant.

Table 3: Management Practices and Public Sector Service Delivery

Standard Errors: Clustered by Project Type Within Organization
OLS Estimates

	Project Completion Rates					Project Quality			
	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Project Type Fixed Effects	(5) Interaction	(6) Baseline, Quality Sample	(7) Quality	(8) Quality-Adjusted Completion Rate	(9) Interaction
CS-Autonomy	0.11** (0.05)	0.18*** (0.03)	0.17*** (0.03)	0.18*** (0.03)	0.23*** (0.03)	0.14*** (0.04)	-0.04 (0.03)	0.11** (0.04)	0.12** (0.05)
CS-Performance	-0.06* (0.03)	-0.11*** (0.02)	-0.11*** (0.02)	-0.14*** (0.02)	-0.15*** (0.02)	-0.07*** (0.02)	-0.07*** (0.02)	-0.08*** (0.02)	-0.08** (0.04)
CS-Other	0.10*** (0.04)	0.05 (0.03)	0.05 (0.03)	0.08*** (0.02)	0.08*** (0.02)	0.03 (0.02)	0.10*** (0.02)	0.08*** (0.02)	0.08*** (0.02)
CS-Autonomy x CS-Performance					0.06** (0.02)				0.01 (0.04)
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	None	None	None	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	2206 (144)	2206 (144)	2206 (144)	2206 (144)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in Columns 1 to 6 is the proportion of the project completed (that is a continuous measure between zero and one). The dependent variable in Column 7 is a dummy variable that takes the value one if project quality is reported as satisfactory or higher, and zero otherwise. The dependent variable in Columns 8 and 9 is a product of the proportion completed variable and the dummy variable for quality. The sample of projects in Columns 6 to 9 is limited to those for which project completion and quality data is available. Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Note that no quality information is available for organizations surveyed on a Saturday, and thus the dummy variable indicating a survey took place on a Saturday is omitted in Columns 7, 8 and 9. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Table 4: Heterogeneous Impacts of Management Practices Related to Performance-Based

Dependent Variable: Project Completion Rate

Standard Errors: Clustered by Project Type Within Organization

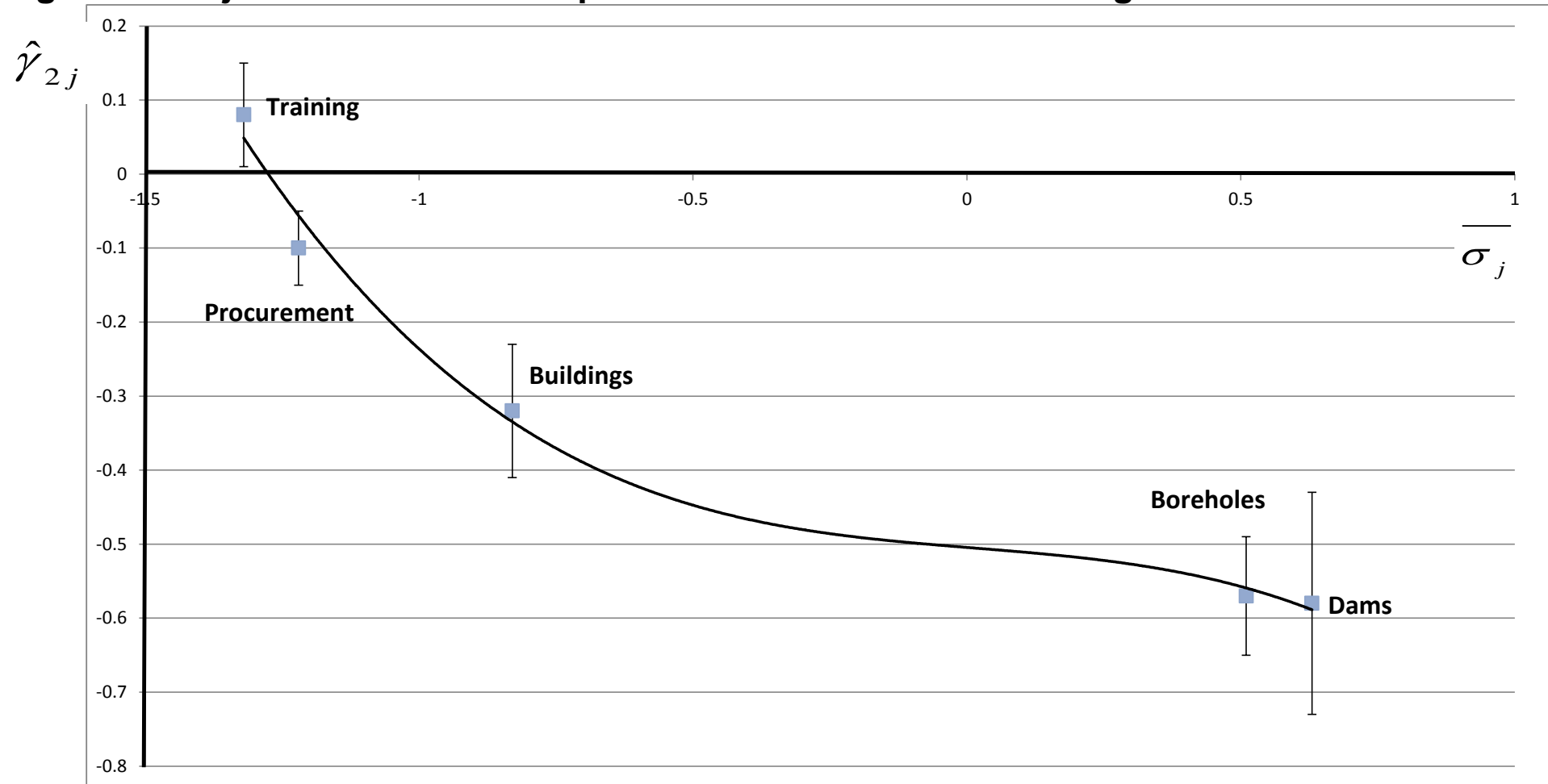
Interactions in Deviation from Mean in Columns 1, 3, 4, 5 and 6

OLS Estimates

	(1) Project Complexity	(2) Non-modal Project	(3) Facilities	(4) Tenure	(5) Intrinsic Motivation	(6) Observe Corrupt Practices
CS-Autonomy	0.19*** (0.03)	0.19*** (0.03)	0.20*** (0.03)	0.20*** (0.03)	0.21*** (0.03)	0.16*** (0.03)
CS-Performance	-0.16*** (0.03)	-0.13*** (0.03)	-0.14*** (0.02)	-0.11*** (0.03)	-0.17*** (0.03)	-0.17*** (0.03)
CS-Other	0.08*** (0.02)	0.08*** (0.02)		0.06** (0.03)	0.07*** (0.02)	0.07*** (0.03)
CS-Performance x Project Complexity	-0.19*** (0.06)					
CS-Performance x Non-modal Project Type		-0.05* (0.03)				
CS-Performance x CS-Facilities			0.03* (0.02)			
CS-Other (Without Facilities)			0.09*** (0.03)			
CS-Facilities			0.01 (0.02)			
CS-Performance x Average Tenure of Bureaucrats				-0.02*** (0.004)		
CS-Performance x Proportion of Bureaucrats Intrinsically Motivated					0.54** (0.22)	
CS-Performance x Proportion of Projects that Bureaucrats That Report Observing Corrupt Practices						0.25 (0.28)
Project Complexity	-0.01 (0.11)	0.05 (0.12)				
Project of Non-modal Type for Organization		-0.04 (0.03)				
Average Tenure of Bureaucrats				-0.01 (0.01)		
Proportion of Bureaucrats Intrinsically Motivated					-0.47 (0.33)	
Proportion of Projects that Bureaucrats That Report Observing Corrupt Practices						-1.09*** (0.37)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. In Column 1, the aggregate complexity is a project-level subjective assessment by Nigerian engineers of the relative difficulty of the project within the population of OPEN projects. In Column 2, the non-modal project type is a binary indicator as to whether the project is of a different project type (as defined above) as the modal project type at the organisation. In Column 4, tenure is an organization-level average for the number of years officials have worked at the implementing organization. In Column 5, intrinsic motivation is an organization-level proportion of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?' in the Civil Servants Survey. In Column 6, observation of corrupt practices is an organization-level average of the proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit' in the Civil Servants Survey. Figures are rounded to two decimal places.

Figure 1: Project Risk and the Response to CS-Performance Management Practices



Notes:

Table A1: Federal Civil Service Organizations Under Study

Civil Service Organization	Sector	Annual Budget (US\$)	Number of Staff	Level of Centralization
Anambra/Imo River Basin Development Authority	Water	26,651,696	324	Deconcentrated
Benin Owena River Basin Development Authority	Water	17,637,829	333	Deconcentrated
Chad Basin River Basin Development Authority	Water	15,781,353	399	Deconcentrated
Cross River River Basin Development Authority	Water	18,823,211	318	Deconcentrated
Citizenship and Leadership Training Centre	Youth	3,510,409	601	Deconcentrated
Federal College of Education, Gombe	Education	5,319,472	608	Deconcentrated
Federal College of Education, Gusau	Education	4,665,009	379	Deconcentrated
Federal College of Education, Omuku	Education	5,887,740	699	Deconcentrated
Federal Government Girls College, Gboko	Education	1,233,030	161	Deconcentrated
Federal Government Girls College, Lejja	Education	1,325,661	122	Deconcentrated
Federal Medical Centre, Abeokuta	Health	6,459,959	1,646	Deconcentrated
Federal Medical Centre, Asaba	Health	4,957,423	777	Deconcentrated
Federal Medical Centre, Bayelsa State	Health	5,026,215	725	Deconcentrated
Federal Medical Centre, Bida	Health	4,135,214	709	Deconcentrated
Federal Medical Centre, Ebute Metta	Health	5,358,665	958	Deconcentrated
Federal Medical Centre, Gombe	Health	5,640,897	1,518	Deconcentrated
Federal Medical Centre, Kebbi State	Health	3,560,097	528	Deconcentrated
Federal Medical Centre, Makurdi	Health	7,120,460	955	Deconcentrated
Federal Medical Centre, Nasarawa State	Health	4,572,968	785	Deconcentrated
Federal Medical Centre, Owerri	Health	8,709,623	1,722	Deconcentrated
Federal Medical Centre, Owo	Health	8,219,773	1,119	Deconcentrated
Federal Medical Centre, Umuahia	Health	7,157,419	1,306	Deconcentrated
Federal Ministry of Agriculture and Rural Development	Agriculture	144,055,160	5,789	Concentrated
Federal Ministry of Education	Education	44,055,244	2,776	Concentrated
Federal Ministry of Environment	Environment	20,324,048	2,093	Concentrated
Federal Ministry of Federal Capital Territory Administration	Education	473,280,702	18,987	Concentrated
Federal Ministry of Health	Health	170,406,214	3,871	Concentrated
Federal Ministry of Housing and Urban Development	Housing	58,610,300	7,837	Concentrated
Federal Ministry of Intergovernmental Affairs, Youth Development and Special Duties	Youth	11,233,012	392	Concentrated
Federal Ministry of Power and Steel	Power	490,123,985	580	Concentrated
Federal Ministry of Water Resources	Water	425,805,770	740	Concentrated
Federal Ministry of Women Affairs	Women	14,934,361	577	Concentrated
Federal Polytechnic, Bida	Education	4,766,557	1,025	Deconcentrated
Federal Polytechnic, Ede	Education	5,111,209	706	Deconcentrated
Federal Polytechnic, Idah	Education	7,643,274	987	Deconcentrated
Federal Polytechnic, Nasarawa	Education	6,431,211	810	Deconcentrated
Federal Polytechnic, Nekede	Education	9,104,663	1,282	Deconcentrated
Federal Polytechnic, Offa	Education	5,397,664	673	Deconcentrated
Federal Polytechnic, Oko	Education	11,266,398	1,627	Deconcentrated
Federal Staff Hospital, Apo-Abuja	Health	2,439,537	471	Deconcentrated
Hadejia-Jama'are River Basin Development Authority	Water	32,758,143	589	Deconcentrated
Jos University Teaching Hospital	Health	19,008,930	2,261	Deconcentrated
Lower Benue River Basin Development Authority	Water	16,307,146	347	Deconcentrated
Lower Niger River Basin Development Authority	Water	18,954,248	436	Deconcentrated
Mass Literacy Commission	Education	6,706,812	154	Deconcentrated
National Action Committee on Aids	Health	12,554,883	243	Deconcentrated
National Arbovirus and Vector Research	Health	301,502	207	Deconcentrated
National Board for Technical Education	Education	10,956,835	460	Deconcentrated
National Centre for Women Development	Women	1,430,538	135	Deconcentrated
National Commission for Colleges of Education	Education	5,633,851	222	Deconcentrated
National Commission for Nomadic Education	Education	4,159,863	195	Deconcentrated
National Primary Health Care Development	Health	56,036,340	646	Deconcentrated
National Tuberculosis and Leprosy Referred Hospital and Training Centre, Zaria	Health	3,000,639	153	Deconcentrated
National Teachers Institute	Education	33,613,921	728	Deconcentrated
National Youth Service Corps	Youth	121,389,773	103,686	Deconcentrated
Niger Delta River Basin Development Authority	Water	18,600,953	406	Deconcentrated
Nigerian Agricultural Cooperative and Rural Development Bank	Agriculture	7,798,094	474	Deconcentrated
Ogun/Oshun River Basin Development Authority	Water	22,259,121	285	Deconcentrated
Sokoto Rima River Basin Development Authority	Water	23,430,400	566	Deconcentrated
Specialist Hospital, Gwagwalada	Health	10,953,476	1,275	Deconcentrated
Universal Basic Education Commission	Education	50,549,049	393	Deconcentrated
Upper Benue River Basin Development Authority	Water	12,822,263	272	Deconcentrated
Upper Niger River Basin Development Authority	Water	21,951,907	239	Deconcentrated

Notes: The budget figures are averages for 2006 to 2010. They are in US Dollars exchanged at a rate of US\$1: Naira 150. Staff numbers come from administrative data for 2010. In the few cases we do not have the staff numbers explicitly, we estimate them from the personnel expenditures, which have are correlated with staff numbers with a coefficient of over 0.9. Concentrated organizations refer to the central organizing authority for the sector, with a direct line of responsibility to the President and the National Assembly. Deconcentrated organizations refer to those whose day-to-day running is largely independent of the central authority. They have boards of governors that make decisions over policy and operation and a separate budget line to the central ministries.

Table A2: Defining Management Practices Using the CS Indices

Management Practice	Topic	Specific Questions Related to this Topic
CS-Autonomy	Roles	<p>Can most staff above SGL 7 in your organization make substantive contributions to the policy formulation and implementation process?</p> <p>Can most staff above SGL 15 in your organization make substantive contributions to the policy formulation and implementation process?</p> <p>To what extent do the employees in this organization have the ability to determine how they carry out the assignments in their daily work?</p>
	Flexibility	<p>Does your organization make efforts to redefine its standard procedures in response to the specific needs and peculiarities of a community?</p> <p>How flexible would you say your organization is in terms of responding to new practices, new techniques, and regulations?</p> <p>At your organization, how efficiently is best practice shared between departments?</p> <p>Given past experience, how effectively would a conflict within your organization be dealt with?</p>
CS-Performance	Incentives	<p>Given past experience, how would under-performance be tolerated?</p> <p>Given past experience, what happens if there is a part of your organization that isn't achieving agreed results?</p> <p>What percentage of <i>workers</i> were rewarded when targets were met?</p> <p>What percentage of <i>managers/directors</i> were rewarded when targets were met?</p> <p>Given past experience, are members of this organization disciplined for breaking the Public Service Rules?</p> <p>Given past experience, what would most likely happen to a person in this organization who accepted money or a present from someone who came to them with a problem?</p>
	Monitoring	<p>In what kind of ways does your organization track how well it is delivering services?</p> <p>If have performance indicators, how often are these indicators collected?</p> <p>If have performance indicators, how often are these indicators reviewed by Minister or Permanent Secretary?</p> <p>If have performance indicators, how often are these indicators reviewed by non managerial staff?</p> <p>Does the organization use performance or quality indicators for tracking the performance of its employees?</p> <p>At your organization, how highly regarded is the collection and use of data in planning and implementing projects?</p>
CS-Other	Facilities	<p>During a typical working day (8 hours from 8am to 4pm), how many hours is there electricity (PHCN or generator)?</p> <p>Out of the five [5] working days, how many days is the network (GSM) coverage working for 50% of calls or more?</p> <p>Out of the five [5] working days, how many hours is their internet access good enough to check e-mail?</p> <p>Out of every ten [10] officers above SGL 7, how many have access to a computer (desktop or laptop)?</p> <p>Out of every ten [10] officers above SGL 7, how many have access to a vehicle (privately owned or otherwise) that can be used for work?</p>
	Skills	<p>Out of every ten [10] officers above SGL 7, how many can use a computer to write a memo?</p> <p>Out of every ten [10] officers above SGL 7, how many can use a computer to create a PowerPoint presentation?</p> <p>Out of every ten [10] officers above SGL 7, how many can use a computer to create an Excel spreadsheet?</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? Technical trainings.</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? Laws and regulations.</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? Legal rights of the public.</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? Good relations with the public.</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? Ethics.</p> <p>On which topics have trainings been performed at your organization in the last five [5] years? What to do with presents.</p> <p>Out of every ten [10] officers above SGL 7 at your organization, how many have had some form of training over the last five [5] years?</p>
	Staffing	<p>Do you think the most senior staff of your organization talk about attracting and developing talented people?</p> <p>Do you think the most senior staff of your organization then actually goes about attracting and developing talented people?</p> <p>If two people both joined your organization five years ago and one was much better at their work than the other, would he/she be promoted through the service faster?</p> <p>Given past experience, if there is a 'top performing' civil servant, does your organization do their best to keep him/her?</p> <p>Is the burden of achieving the organization's targets evenly distributed across its different departments, or do some groups consistently shoulder a greater burden than others?</p> <p>How do you feel the number of staff in your organization relates to the activities undertaken there?</p> <p>What percentage of staff is doing most of the work at your organization?</p> <p>Thinking about all the projects that your organization has been involved in since your appointment here, would you say that senior staff try to use the right staff for the right job?</p>
	Targeting	<p>Does your organization have a clear set of targets derived from its mission and goals?</p> <p>How tough are the targets of the organization?</p> <p>When you arrive at work each day, do you and your colleagues know what your organization is trying to achieve on that particular day?</p>
	Culture	<p>How effectively would you say your organization is in making the bulk of its staff feel valued?</p> <p>To what extent would you say employees of your organization trust each other?</p> <p>If you think about the way that employees of this organization respond to a standard work challenge, would you say that there is a set of 'shared values' amongst all the staff?</p> <p>Out of every ten [10] officers above SGL 7, how many people from this organization participate in groups, committees and activities with other people from this organization outside of the formal structure of government (for example, in community or social organizations)?</p>

Table A3: Correlation of Subcomponents of the Project Complexity Indicator

	Mean	Standard deviation	Project size	Number of inputs	Number of methods	Interdependencies	Access to raw materials	Storage of raw materials	Requires local labor	Requires skilled labor	Access to construction equipment	Design uncertainty	Implementation uncertainty	Design ambiguity	Implementation ambiguity	Difficulty to manage	Number of agencies involved	Aggregate complexity
Project size	0.27	0.45	1.00															
Number of inputs	6.82	4.13	0.06	1.00														
Number of methods	5.04	2.29	0.33	0.61	1.00													
Interdependencies	0.65	0.48	-0.03	0.13	0.07	1.00												
Access to raw materials	0.25	0.43	-0.11	-0.24	-0.09	0.04	1.00											
Storage of raw materials	0.04	0.21	0.19	-0.05	0.07	0.07	-0.05	1.00										
Requires local labor	0.45	0.50	0.31	-0.03	0.48	0.04	0.23	0.14	1.00									
Requires skilled labor	0.45	0.50	-0.16	-0.02	-0.21	0.53	0.21	-0.03	0.00	1.00								
Access to construction equipment	0.21	0.41	-0.01	-0.24	0.06	0.36	0.62	0.12	0.53	0.53	1.00							
Design uncertainty	0.70	0.46	0.10	0.18	0.12	0.77	-0.08	0.02	0.26	0.45	0.31	1.00						
Implementation uncertainty	0.78	0.41	0.06	0.26	0.20	0.58	-0.16	-0.01	0.35	0.42	0.24	0.78	1.00					
Design ambiguity	0.66	0.47	-0.08	0.08	-0.01	0.84	-0.01	0.08	0.04	0.60	0.35	0.73	0.63	1.00				
Implementation ambiguity	0.65	0.48	0.00	0.06	0.02	0.85	0.02	0.11	0.07	0.56	0.36	0.75	0.58	0.89	1.00			
Difficulty to manage	0.28	0.45	0.15	-0.16	0.24	0.38	0.47	0.19	0.64	0.37	0.81	0.36	0.27	0.43	0.43	1.00		
Number of agencies involved	3.54	0.51	-0.01	0.12	-0.05	0.21	0.11	-0.02	0.25	0.55	0.21	0.39	0.54	0.30	0.26	0.22	1.00	
Aggregate complexity	24.98	17.92	0.36	0.24	0.50	0.25	-0.21	0.16	0.39	-0.09	0.03	0.35	0.37	0.29	0.32	0.33	-0.05	1.00
Observations (projects)	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721	4721

Notes: The sample used is those projects in our core analysis for which we have complexity and project completion data. 'Project size' is a binary variable that aims to gauge the physical size of the project. It takes the value 1 if it is classified as equivalent to a medium scale build or larger. 'Number of inputs' counts the number of distinct product classes the finished project contains. 'Number of methods' counts the number of distinct disciplines or methods involved in implementing the project. 'Interdependencies' is a binary variable reflecting the extent of interdependencies between the activities involved in the project. It takes a value of 1 if the project is classified as highly interdependent. 'Access to raw materials' is a binary variable that takes the value 1 if raw materials could not be sourced within the state of implementation. 'Storage of raw materials' is a binary variable that takes the value 1 if some of the raw materials could not be easily stored or transported. 'Requires local labor' is a binary variable that takes the value 1 if local labor was useful or critical. 'Requires skilled labor' is a binary variable that takes the value 1 if specialized skills were necessary and difficult to obtain. 'Access to construction equipment' is a binary variable that takes the value 1 if the equipment required is difficult to obtain, heavy duty, or difficult to transport to the site. 'Design uncertainty' is a binary variable that takes on the value 1 if the design of the project is context specific. 'Implementation uncertainty' is a binary variable that takes on the value 1 if there are substantial risks involved in implementation. 'Design ambiguity' is a binary variable that takes on the value 1 if there is a risk of redesign late on in the project. 'Implementation ambiguity' is a binary variable that takes on the value 1 if the technical risks of the project cannot be fully understood at implementation. 'Difficulty to manage' is a binary variable that takes the value 1 if the project is seen have elements that require project management skills of above average level. 'Number of agencies involved' is simply a count of the estimated number of agencies involved in the project cycle. 'Aggregate complexity' is a subjective assessment as to the overall complexity of the project by the coding engineers. This variable is an assessment of the interaction of the other variables as well as any unassessed aspects of complexity and provides a coherent picture of the complexity of the projects by a specialist. Figures are rounded to two decimal places.

Table A4: Standard Errors

Dependent Variable: Project Completion Rate
OLS Estimates

	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Project Type Fixed Effects
CS-Autonomy	0.11	0.18	0.17	0.18
<i>Robust standard errors</i>	(0.01)	(0.01)	(0.01)	(0.01)
<i>Errors clustered by project type within organisation level</i>	(0.05)	(0.03)	(0.03)	(0.03)
<i>Errors clustered by organisation</i>	(0.06)	(0.03)	(0.03)	(0.03)
<i>P-value of clustered coefficients</i>	[0.07]	[0.00]	[0.00]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.08]	[0.02]	[0.02]	[0.00]
CS-Performance	-0.06	-0.11	-0.11	-0.14
<i>Robust standard errors</i>	(0.01)	(0.01)	(0.01)	(0.01)
<i>Errors clustered by project type within organisation level</i>	(0.03)	(0.02)	(0.02)	(0.02)
<i>Errors clustered by organisation</i>	(0.03)	(0.03)	(0.03)	(0.02)
<i>P-value of clustered coefficients</i>	[0.08]	[0.00]	[0.00]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.20]	[0.00]	[0.00]	[0.00]
CS-Other	0.10	0.05	0.05	0.08
<i>Robust standard errors</i>	(0.01)	(0.02)	(0.02)	(0.02)
<i>Errors clustered by project type within organisation level</i>	(0.04)	(0.03)	(0.03)	(0.02)
<i>Errors clustered by organisation</i>	(0.03)	(0.04)	(0.03)	(0.03)
<i>P-value of clustered coefficients</i>	[0.00]	[0.20]	[0.17]	[0.00]
<i>Wild cluster bootstrap p-value of clustered coefficients</i>	[0.01]	[0.28]	[0.26]	[0.01]
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes
Fixed Effects	None	None	None	Project Type
Observations	4721	4721	4721	4721

Notes: Standard errors are in round parentheses, and are robust, clustered by project type within organization, and by organization respectively under the coefficients corresponding to a management index. Standard p-values and wild cluster bootstrap p-values are in square parentheses below these. All columns report OLS estimates. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Table A5: Robustness Checks

Dependent Variable: Project Completion Rate

Standard Errors: Clustered by Project Type Within Organization

OLS Estimates

	(1) Largest Org. by Total Exp.	(2) Org. With Most Projects	(3) Ten Orgs. with Smallest Total Exp.	(4) Ten Orgs. with Smallest No. of Projects	(5) Orgs. Below 5% or Above 95% of CS-Autonomy Scale	(6) Orgs. Below 5% or Above 95% of CS- Performance Scale	(7) Construction Projects	(8) Non- Construction Projects	(9) Centralized	(10) Decentralized	(11) State- level Controls	(12) Northern Projects	(13) Southern Projects	(14) Weighted Topics in CS Indices	(15) Fractional Regression
CS-Autonomy	0.17*** (0.02)	0.17*** (0.03)	0.19*** (0.03)	0.19*** (0.03)	0.23*** (0.04)	0.20*** (0.03)	0.23*** (0.05)	0.16*** (0.05)	0.17*** (0.03)	0.14*** (0.03)	0.17*** (0.03)	0.19*** (0.06)	0.22*** (0.05)	0.23*** (0.03)	1.02*** (0.17)
CS-Performance	-0.15*** (0.02)	-0.13*** (0.03)	-0.15*** (0.02)	-0.14*** (0.02)	-0.24*** (0.04)	-0.18*** (0.03)	-0.21*** (0.05)	-0.06* (0.03)	-0.24*** (0.04)	-0.01 (0.03)	-0.14*** (0.02)	-0.12** (0.06)	-0.30*** (0.10)	-0.14*** (0.02)	-0.96*** (0.16)
CS-Other	0.09*** (0.02)	0.05 (0.03)	0.09*** (0.03)	0.08*** (0.03)	0.09*** (0.03)	0.06** (0.03)	0.11** (0.05)	0.06* (0.03)	0.18*** (0.05)	-0.03 (0.04)	0.08*** (0.03)	-0.03 (0.08)	0.10* (0.05)	0.08*** (0.02)	0.49*** (0.15)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations	4201 (197)	3924 (192)	4601 (176)	4711 (191)	3810 (145)	4209 (181)	3822 (82)	899 (119)	2434 (53)	2287 (148)	4269 (63)	2049 (91)	1895 (104)	4721 (201)	4721 (201)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns bar 15 report OLS estimates. Column 15 reports estimates from a fractional regression model. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Column 1 excludes those projects implemented by the largest organization in terms of total expenditures. Column 2 excludes projects implemented by the largest organization in terms of number of projects. Columns 3 and 4 remove the 10 smallest organizations by expenditures and number of projects respectively. Columns 5 and 6 exclude organizations at the top and bottom of the CS-autonomy and CS-performance management scales respectively. Column 7 includes only construction projects (borehole, building, electrification, dam, road and canal) and Column 8 includes only non-construction projects. Column 9 restricts our specification to those projects implemented by centralized ministries. Column 10 restricts our specification to those projects implemented by decentralized agencies. In Column 11, "State-level Controls" comprise 'poverty controls', the proportion of households in a state who have difficulty meeting their food needs and the proportion of households that self-classify as poor; 'educational controls', literacy rates for adults and youth, and primary and secondary net enrollment and completion rates; and 'infrastructure controls', indicators of access to secure tenure, safe water, safe sanitation, improved waste disposal, medical services, vaccinations, electricity, computers, mobile phones and credit facilities, as well as the unemployment rate for over 15s. Column 12 restricts our specification to those projects for which we have location data and that are implemented in Northern Nigeria, where we exclude the Saturday dummy. Column 13 restricts our specification to those projects for which we have location data and that are implemented in Southern Nigeria. In Column 14 we construct CS-Autonomy and CS-Performance measures by weighting each topic (rather than each variable) equally. Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. At the foot of the table we report the p-value on the null that the coefficients on CS-Autonomy and CS-Performance are of equal and opposite magnitude. Figures are rounded to two decimal places.

Table A6: Management Practices and the Assignment of Projects to Organizations

Dependent Variable: Binary Variable Indicating Organization Implementing Project

Standard Errors: Clustered by Project Type Within Organization

Conditional Logit Model

	(1) Unconstrained Pairs	(2) Feasible Pairs by Sector	(3) Feasible Pairs by Complexity	(4) Organization Controls	(5) Project Interactions
CS-Autonomy	0.35 (0.22)	0.53* (0.27)	0.37 (0.24)	0.35 (0.29)	0.40 (0.31)
CS-Performance	-0.17 (0.26)	-0.33 (0.33)	-0.26 (0.36)	-0.26 (0.45)	-0.34 (0.45)
CS-Other	-0.36 (0.30)	-0.02 (0.23)	0.37 (0.31)	0.57 (0.45)	0.63 (0.48)
Senior Bureaucrat's Span of Control				-0.22 (0.35)	-0.34 (0.40)
Tenure of Senior Bureaucrats				0.03 (0.17)	0.05 (0.18)
Tenure of Low-tier Bureaucrats				-0.03 (0.09)	-0.04 (0.09)
Proportion of Senior Bureaucrats That Report Being Intrinsically Motivated				-4.82 (4.17)	-4.6 (4.37)
Proportion of Low-tier Bureaucrats That Report Being Intrinsically Motivated				-0.35 (3.49)	0.06 (3.22)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices On				-0.01 (0.04)	0.00 (0.04)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices On				0.02 (0.03)	0.02 (0.04)
Organization Controls (capital, general, noise)	No	No	No	Yes	Yes
Interactions of Project and Organizational Characteristics	No	No	No	No	Yes
Project-Organization Paired Observations (clusters)	297423 (63)	44429 (59)	33480 (59)	33370 (58)	33370 (58)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All Columns report conditional logit estimates. The data is set up as follows. For each project, we associate a binary variable with 63 values corresponding to the 63 organizations in the core analysis of the paper. This variable takes the value one if the project is implemented at that organization, and zero otherwise. Thus, for each of our 4721 projects, we have 63 'project-organization' observations. These 297,423 observations are what makes up the 'unrestricted pairs' specification in Column 1. The 'feasible pairs' specification in Column 2 restricts the set of organizations associated with a project to only those in the same sector. Those 847 projects implemented at the only organization in the sector drop out in this specification, leaving us with 44,429 project-organization observations. In Columns 4 and 5 as we do not have data for one organization on the proportion of senior bureaucrats that report observing corrupt practices, this organization drops out, leaving 33,370 project-organization pairs. In Column 5 we restrict the feasible pairs further by assuming projects can only potentially be assigned to organizations in the same sector that are observed being tasked to implement at least one project of similar or greater complexity. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. We follow the grading system of the Federal Government by defining senior bureaucrats as those on grade level 12 and above. The proportion of staff intrinsically motivated refers to the fraction of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?' in the Civil Servants Survey. The percentage of staff who observed corruption refers to the average proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit' in the Civil Servants Survey. Figures are rounded to two decimal places.

Table A7: Management Practices and Public Sector Service Delivery at the Organization Level

**Robust Standard Errors
OLS Estimates**

	(1) Number of Projects Assigned to Organization	(2) Number of Unique Project Types Assigned to Organization	(3) Project Complexity	(4) Log Organizational Budget
CS-Autonomy	22.17 (19.57)	0.21 (0.27)	1.56 (1.89)	0.03 (0.05)
CS-Performance	10.07 (24.87)	-0.01 (0.40)	-0.47 (1.53)	0.05 (0.07)
CS-Other	-19.92 (28.30)	-0.01 (0.37)	-2.10 (1.66)	0.03 (0.05)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes
Observations	63	63	63	63

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Robust standard errors are in parentheses. All columns report OLS estimates. The dependent variable in Column 1 is a count measure of the number of projects assigned to an organization. In Column 2 it is a count variable of the number of unique project types assigned to the organization, where the projects are assigned a primary classification of the following type: a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. The dependent variable in Column 3 is the average complexity of projects assigned to the organization. The dependent variable in Column 4 is the log of the average total organizational budget, averaged over 2006 to 2010. In Columns 1 to 3, capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. In Column 4, we drop total organizational budget as a control as the log of organizational budget is the dependent variable. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Table A8: Management Practices and the Provision of Boreholes

Dependent Variable: Project Completion Rate for Borehole Projects

Standard Errors: Clustered by Organization

OLS Estimates

	(1) Unconditional	(2) Organization Controls	(3) Project Controls	(4) Interaction
CS-Autonomy	0.24*** (0.08)	0.19*** (0.00)	0.22*** (0.04)	0.50*** (0.03)
CS-Performance	0.02 (0.07)	-0.12*** (0.00)	-0.19*** (0.03)	-0.52*** (0.05)
CS-Other	-0.09 (0.11)	-0.05*** (0.00)	-0.02 (0.02)	0.37*** (0.04)
CS-Autonomy x CS-Performance				0.27*** (0.02)
Proportion Never Started		0.44		
Proportion Fully Completed		0.37		
Organization Controls (capital, general, noise)	No	Yes	Yes	Yes
Project Controls	No	No	Yes	Yes
Observations (clusters)	1348 (18)	1348 (18)	1348 (18)	1348 (18)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in all columns is the proportion of the project completed (that is a continuous measure between zero and one). Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Note that given the smaller number of organizations, we have to redefine a number of the organization-level controls: we aggregate the day of the week dummies into a 'start of the week' dummy that takes the value 1 if the organization was surveyed on a Monday or Tuesday; we aggregate the interviewer dummies into two groups; and, we exclude the session rating since the vast majority of ratings were positive. Total and capital budget figures are an average of organization budget figures for the years 2006-10. Figures are rounded to two decimal places.

Table A9: Decomposing the Impacts of Management Practices

Dependent Variable: Proportion Project Completed

Standard Errors: Clustered by Project Type Within Organization

OLS Estimates

	(1) Roles	(2) Flexibility	(3) Performance incentives	(4) Monitoring	(5) Culture	(6) Targeting	(7) Facilities	(8) Skills	(9) Staffing	(10) All	(11) Management
CS-Roles	0.27*** (0.06)									0.33*** (0.04)	
CS-Flexibility		0.18*** (0.05)								0.11** (0.04)	
CS-Performance Incentives			-0.08* (0.04)							-0.07 (0.06)	
CS-Monitoring				-0.21*** (0.05)						-0.28*** (0.06)	
CS-Culture					0.02 (0.04)					0.01 (0.03)	
CS-Targeting						0.03 (0.04)				0.07 (0.05)	
CS-Facilities							0.13*** (0.04)			0.06 (0.04)	
CS-Skills								0.08 (0.07)		0.14** (0.06)	
CS-Staffing									-0.06 (0.07)	0.08 (0.06)	
CS-Management											0.03 (0.03)
H0: CS-Autonomy Components Equal [p-value]										[0.00]	
H0: CS-Performance Components Equal [p-value]										[0.06]	
Organization Controls (ca	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)	4721 (201)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in all columns is the proportion of the project completed (that is a continuous measure between zero and one). All of the index component variables in the table are z-scores which are centered at 0. The variable 'facilities' measures the quality of infrastructure at an organization and the equipment available to staff. The variable 'skills' measures the skills and training opportunities embodied in the staff body. The variable 'staffing' measures the effective utilization of that body of staff. The variable 'targeting' examines the extent of use of targets. The variable 'flexibility' measures the extent to which the organization is able to respond to best practice and project peculiarities. The variable 'roles' measures the extent to which staff can play a role in defining the direction of the organization. The variable 'culture' measures whether the organization inculcates a productive work culture. Together these components make up our autonomy variable. The variable 'monitoring' focuses on the tracking of performance of individuals and projects. The variable 'performance' examines the use of incentives both to reward success and punish failure. Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. At the foot of the table we report the p-value on the null that the coefficients in Column 10 on the variables that make up the CS-Autonomy measure (those associated with roles and flexibility) are of equal magnitude. We also report the p-value on the null that the coefficients in Column 10 on the variables that make up the CS-Performance measure (those associated with performance incentives and monitoring) are of equal magnitude. Figures are rounded to two decimal places.

Table A10: Bureaucrat Characteristics and Management Practices
Means, standard deviations and regression coefficients

	Joint Regression Coefficients		
	(1) Mean (s.d.)	(2) Coefficient on CS- Autonomy	(3) Coefficient on CS- Performance
Proportion of Bureaucrats Who Knew Direct Boss Before Starting Posting	0.00 (0.01)	-	-
Proportion of Bureaucrats Who Knew Managers Before Starting Posting	0.00 (0.01)	-	-
Average Number of Close Colleagues Known Before Starting Posting	4.40 (3.18)	-0.06 (0.42)	-0.04 (0.42)
Proportion of Bureaucrats Being the First Family Member to Join Service	0.48 (0.1)	0.02 (0.01)	-0.01 (0.01)
Tenure of Senior Bureaucrats	15 (5)	0.42 (0.65)	-0.49 (0.65)
Tenure of Low-tier Bureaucrats	10 (4)	0.00 (0.59)	-0.48 (0.59)
Proportion of Senior Bureaucrats Intrinsically Motivated	0.31 (0.12)	0.00 (0.02)	-0.02 (0.02)
Proportion of Low-tier Bureaucrats Intrinsically Motivated	0.39 (0.13)	0.01 (0.02)	-0.02 (0.02)
Proportion of Projects that Senior Bureaucrats that Report Observing Corrupt Practices	0.35 (0.10)	-0.02 (0.01)	0.01 (0.01)
Proportion of Projects that Low-tier Bureaucrats that Report Observing Corrupt Practices	0.41 (0.11)	-0.02 (0.01)	-0.01 (0.01)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Columns 2 to 3 report OLS estimates. In Column 1, standard deviations are in parentheses. In all other columns, standard errors are in parentheses. Proportion of bureaucrats who knew their direct boss before starting their posting is an organization-level average of those bureaucrats who answered positively to a question outlining possible connections to the officials boss before they came to work at the organization. Proportion of bureaucrats who knew their managers before starting their posting is an organization-level average of those bureaucrats who answered positively to a question outlining possible connections to the officials' managers before they came to work at the organization. Average number of close colleagues known before starting their posting is an organization-level average of the number of colleagues an official stated that they had connections with before they came to work at the organization. Proportion of bureaucrats being the first family member to join service is an organization-level average of those bureaucrats who answered 'Yes' to the question 'Are you the first member of your family to enter the Federal service'. Tenure of bureaucrats refers to the number of years they have served in the organization for. The proportion of staff intrinsically motivated refers to the fraction of employees at an organization that answered 'The chance to serve Nigeria' to the question 'What most influenced you to take up a career in the service?'. The percentage of staff who observed corruption refers to the average proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit'. These variables are all elicited from the Civil Servants Survey we conducted. When we control for the proportion of projects that senior bureaucrats that report observing corrupt practices on, we lose one organization (that implemented a single project) in which no senior bureaucrat answered the question. Figures are rounded to two decimal places.

Table A11: Endogenous Management Practices

Dependent Variable: Project Completion Rate

Standard Errors: Clustered by Project Type Within Organization

Interactions in Deviation from Mean

OLS Estimates

	(1) Capital to Total Budget Ratio	(2) Capital to Total Budget Ratio
CS-Autonomy	0.17*** (0.04)	0.17*** (0.04)
CS-Performance	-0.17*** (0.04)	-0.17*** (0.04)
CS-Other	0.07*** (0.02)	0.08*** (0.03)
CS-Autonomy x Capital to Total Budget Ratio	0.07 (0.10)	0.07 (0.10)
CS-Performance x Capital to Total Budget Ratio	0.10 (0.12)	0.13 (0.12)
CS-Other x Capital to Total Budget Ratio		-0.07 (0.11)
Log Total Budget	-0.05 (0.14)	-0.05 (0.14)
Capital to Total Budget Ratio	0.70 (0.54)	0.72 (0.55)
Organization Controls (capital, general, noise)	Yes	Yes
Project Controls	Yes	Yes
Fixed Effects	Project Type	Project Type
Observations	4721 (201)	4721 (201)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable is the proportion of the project completed (that is a continuous measure between zero and one). Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. Project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. Capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. General controls comprise organization-level controls for the share of the workforce with degrees, the share of the workforce with postgraduate qualifications, and the span of control at the organization. Noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. Total and capital budget figures are an average of organization budget figures for the years 2006-10. The capital to total budget Ratio is a variable that divides an organization's capital budget by its total budget. Figures are rounded to two decimal places.

Figure A1: Area of Covariances in Which Coefficients are Underestimated in Absolute Terms

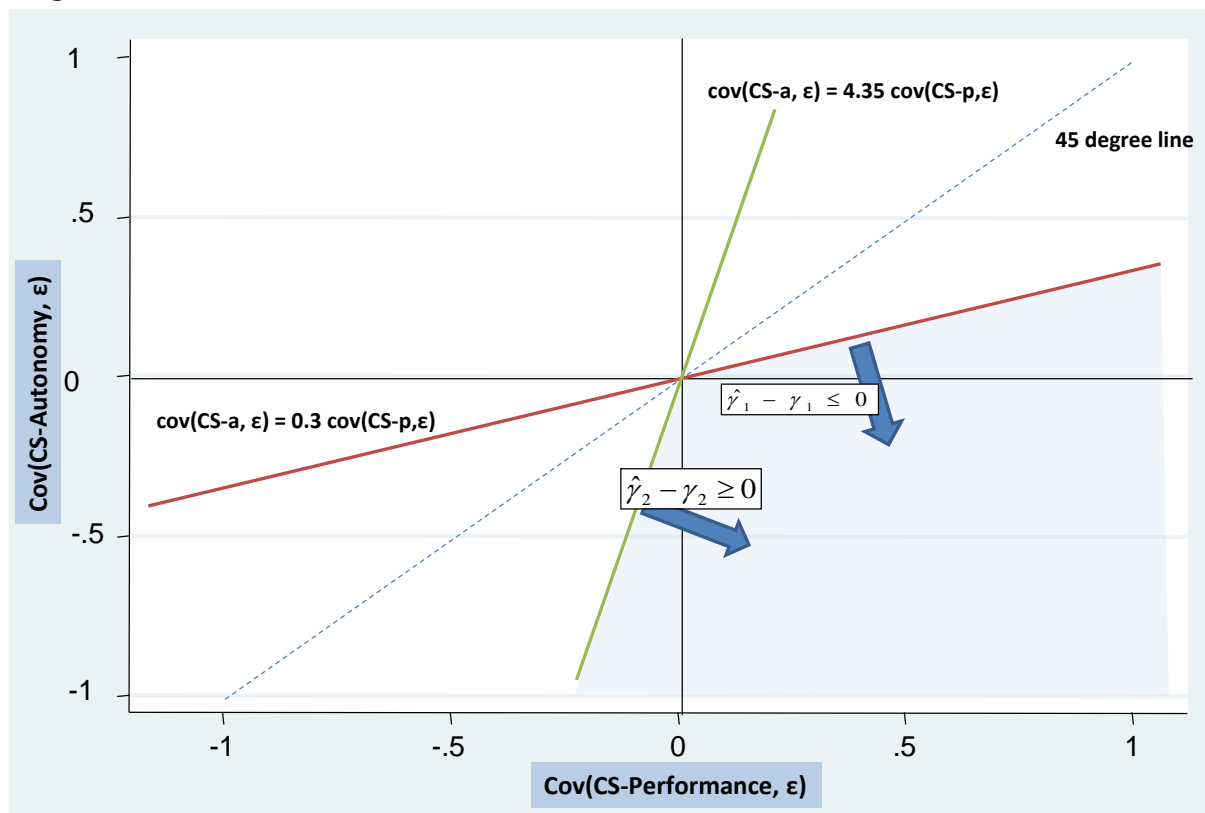
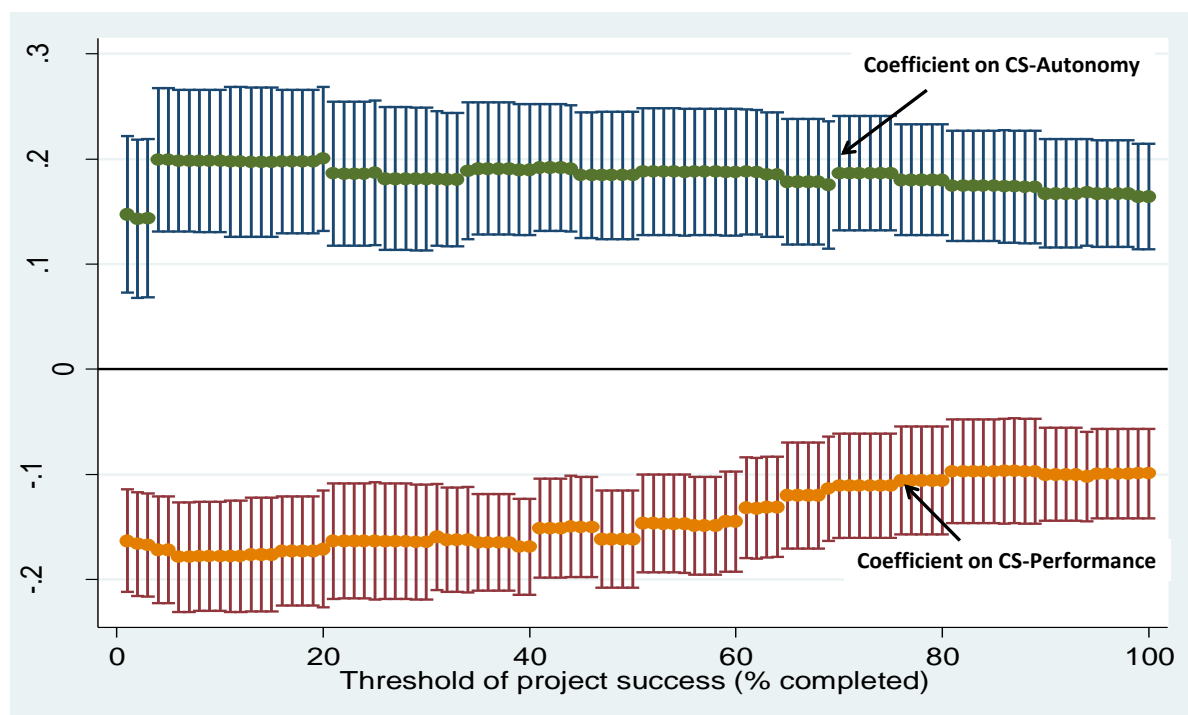


Figure A2: Impact of Management Practices For Different Thresholds of Project Success



Notes: We define a threshold completion rate of $p\%$ and then consider all potential thresholds from 1% to 100% in increments of 1%. We then use this to define a dummy variable for our main empirical specification, where the outcome is a dummy variable equal to one if the project completion rate is above the threshold $p\%$, and zero otherwise. For any given threshold p the coefficients of interest on CS-Autonomy and CS-Performance are shown above and their associated 95% confidence interval.